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**The Mediating Role of Task Orientation in the Relation Between
Parenting Practices and Children's Cognitive Performance**

**Joanne Rinholm
University of Ottawa**

**A dissertation submitted to the Faculty of Graduate Studies and
Research in partial fulfilment of the requirements for the degree
of Doctor of Philosophy.**

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Abstract

The present study was designed to clarify the relations between parenting practices and cognitive performance in school-aged children. Particular attention was directed toward the identification of gender differences in the pattern of relations among variables and toward investigating a model of how parenting practices may influence children's cognitive performance. The model postulated that parenting practices affect children's task orientation (i.e., mastery behaviors and impulse control), which in turn affects their cognitive performance. Using path analysis, the model was assessed in a sample of 63 female and 62 male Grade 6 children. The measure of cognitive performance was academic grades, and the possible confounding influence of cognitive ability upon academic grades was controlled. As expected, maternal encouragement of independence predicted both boys' and girls' academic performance, with mastery behaviors mediating the relation in the female sample. Paternal nurturance also predicted girls' academic performance, with impulse control mediating this association. The remaining findings of the study provided support for individual components of the model. With respect to the relations between parenting practices and task orientation, maternal nurturance predicted both higher mastery behaviors and impulse control in the female sample. For girls, paternal restrictive control predicted lower impulse control, whereas maternal restrictive control predicted higher impulse control. For boys, both maternal and paternal nurturance predicted higher impulse control. In both the male and female

samples, the expected associations between academic performance and both mastery behaviors and impulse control were obtained. The implications of the results and suggestions for future research were discussed.

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I would like to convey a special thanks to my husband, Rick. His understanding, support, assistance, and love made this, and every other challenge in my life, easier, more enjoyable, and more meaningful. Thank you also to my mother for encouraging my education, to my grandmother for appreciating small signs of progress, and to other family and friends for their many contributions over the past few years.

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The Mediating Role of Task Orientation in the Relation Between Parenting Practices and Children's Cognitive Performance

Introduction

In our society, considerable value is placed upon cognitive performance. An individual's ability to excel at cognitive tasks is associated with self-esteem, prestige, occupational attainment, and social mobility (Sattler, 1982). In addition, cognitive capabilities benefit society as a whole, as they represent one means through which individuals can make significant contributions to the community. In recent years, the importance of cognitive performance has grown, as occupational opportunities have decreased and educational requirements for employment have increased (Statistics Canada, 1991). Given the growing importance of cognitive performance for both the individual and society, identification of factors that may enhance cognitive performance has become both a valuable and timely endeavor.

Variables that enhance cognitive performance include both genetic and environmental factors (Loehlin, Willerman, & Horn, 1988). Because genetic factors cannot be altered, modification of environmental factors is the only method by which cognitive performance can be improved. From the research conducted to date, it appears that modification of one environmental factor, parenting practices, may be a viable means of facilitating children's cognitive development. This assumption is based on the finding that parenting practices are associated with

children's proficiency on a wide variety of measures of intellectual and academic performance. Three parenting practices that have repeatedly been shown to positively correlate with children's cognitive performance are parental encouragement of independence, low restrictive control, and nurturance. The potential influence of these three parenting practices upon children's cognitive performance is the focus of the present investigation. As will be discussed below, particular attention is directed toward clarifying the mechanisms through which these parenting practices may influence children's cognitive performance.

In spite of the evidence that parental encouragement of independence, low restrictive control, and nurturance are associated with children's cognitive performance, age and gender differences in these relations remain unclear. With respect to age, more is known about the relations between parenting practices and cognitive performance in preschool children than in school-age children. It cannot be assumed that the contribution of parenting practices to children's cognitive performance is stable across both the preschool and school years, as genetic contributions to intellectual performance increase with age (Loehlin et al., 1988), and age variations in the relations between some parenting practices and children's cognitive performance have been documented (e.g., Hess & McDevitt, 1984). Consequently, confirmation that parenting practices are important to cognitive performance during the school years is required. In

the present study, the relations between parenting practices and cognitive performance are investigated in a sample of Grade 6 children. The results provide important information about the associations among variables at this age level and have implications for the timing of possible intervention efforts.

A second issue related to age differences in the associations among parenting practices and children's cognitive performance is the differential influences of early and concurrent parenting practices upon children's cognitive performance. From the empirical literature, it appears that both early parent-child interactions and contemporary parenting practices influence children's cognitive development (e.g., Hess & McDevitt, 1984). To date, however, the majority of the research has addressed the associations between early parenting practices and children's later cognitive performance. Consequently, the relations among contemporary measures of parenting practices and Grade 6 children's cognitive performance are the focus of the present study. Previous research on both longitudinal and concurrent associations among variables is reviewed, however, to provide an appropriate context for considering the results obtained.

In addition to age differences, gender differences in the associations among parenting practices and cognitive performance warrant careful examination. The importance of clarifying gender differences in these relations is twofold. First, differential socialization experiences of boys and girls may be responsible

for gender differences in cognitive performance; these differences may, in turn, contribute to gender disparities in both educational and career choices (Eccles, Adler, & Meece, 1984). As was discussed previously, educational and occupational choices can have significant implications for both the individual and society. At present, girls tend to perform better than boys on verbal tasks and boys tend to perform better than girls on quantitative tasks (e.g., Eccles et al., 1984). These gender differences appear to be decreasing (Feingold, 1988), however, perhaps because parents are changing the ways in which they interact with their sons and daughters (Hoffman, 1977). Although it is recognized that biological factors may partly account for gender differences in cognitive performance, the convergence of boys' and girls' cognitive abilities over time is more compatible with the influence of socialization experiences. Attention to the possible role of gender in the relation between parenting practices and cognitive performance may provide information on the source of boys' and girls' cognitive skills, which clearly could have far-reaching implications for the desirability of various socialization practices.

The second reason for investigating gender differences in the relation between parenting practices and cognitive performance is that the same parenting practices may have different effects upon boys and girls. Preliminary evidence suggests that this is indeed the case (e.g., Hess & McDevitt, 1984; Solomon, Houlihan, Busse, & Parelius, 1971). In the

majority of investigations, however, gender differences have not been considered. Consequently, conclusions remain tentative, particularly with respect to gender differences at specific age levels. The importance of clarifying gender differences in the effects of parenting practices lies in our ability to identify which parenting practices are most effective in enhancing the cognitive potential of boys and girls.

In addition to determining the associations among parenting practices and cognitive performance in Grade 6 boys and girls, a model of how parenting practices might influence children's cognitive growth is investigated. Although it is widely speculated that the associations among parenting practices and cognitive performance indicate that parenting practices play a causal role in children's cognitive development, there has been little attention directed toward investigating the mechanisms that may underlie these associations. Identification of underlying processes would not only be of theoretical interest, it also would have practical implications for how childrearing experiences could be compensated for or built upon. For example, if we can identify the personal attributes that are affected by parenting practices and in turn affect cognitive performance, we will know which personal attributes to target for intervention purposes. In addition, we will have a stronger rationale for suggesting the modification of current parenting practices.

One set of attributes that may mediate the effects of parental encouragement of independence, low restrictive control,

and nurturance upon children's cognitive performance is children's task orientation. Task orientation refers to a variety of task-related behaviors, including task approach, persistence, and on-task behaviors. As outlined in Figure 1, the hypothesis of the present study is that parenting practices influence children's task orientation, which in turn influences their cognitive performance. Consistent with this hypothesis, researchers have found that both parenting practices and children's cognitive performance are associated with children's task orientation (e.g., Anastasi, 1984; Matas, Arend, & Sroufe, 1978). The mediating role of task orientation in the association between parenting practices and cognitive performance, however, has received little empirical study. Consequently, the premise that task orientation is an important link in the association between parenting practices and children's cognitive performance remains tentative.

The thesis that task orientation mediates the relation between parenting practices and children's cognitive performance is consistent with Bowlby's (1969, 1977) theory of parent-child attachment. Bowlby stated that caregivers who encourage active exploration of the environment, while also providing a secure base for children, facilitate the development of a sense of competence and security. The basis for this proposition is that exploration provides children with the opportunity to develop skills and to learn that they are capable of doing things for themselves. The provision of a secure base enhances the degree

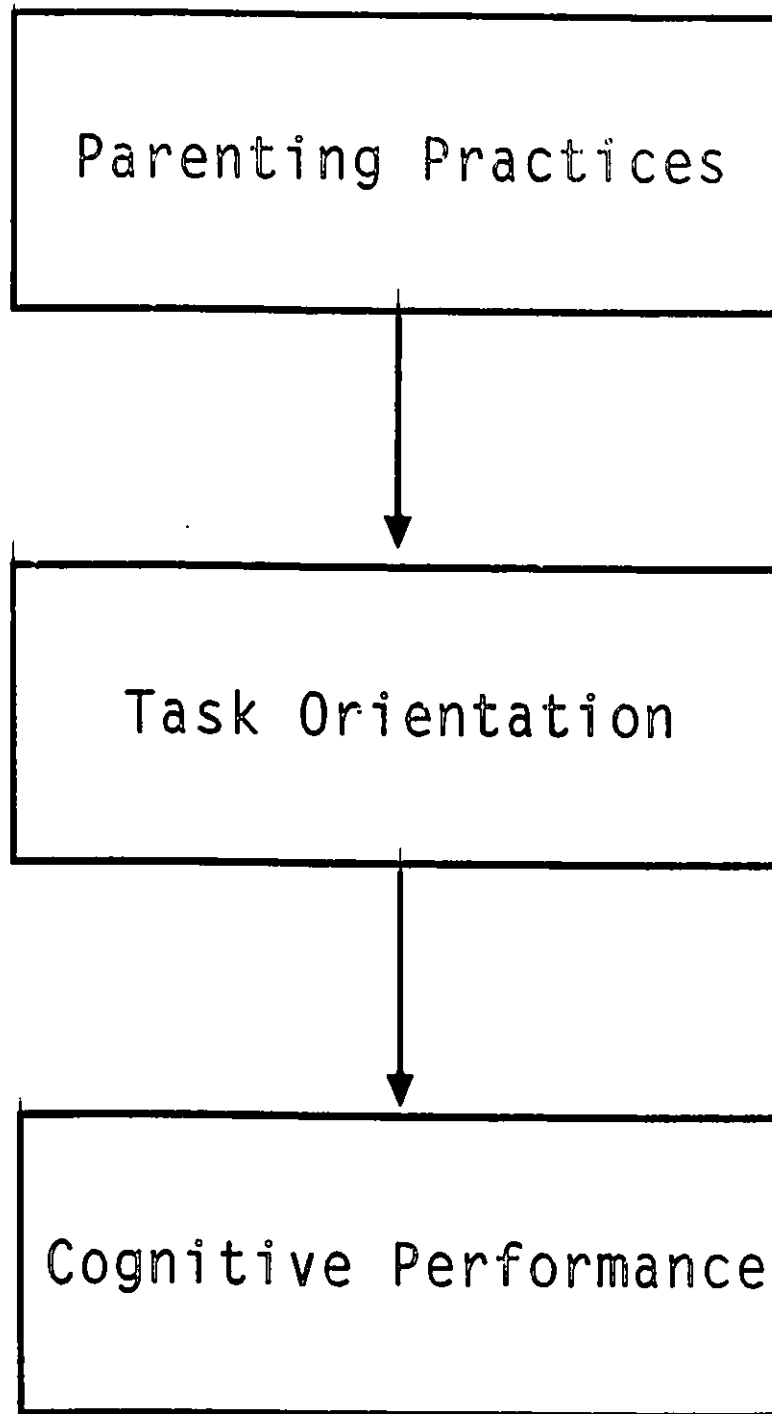


Figure 1. Model of the relations among parenting practices, task orientation, and cognitive performance.

of comfort children experience when interacting with their environment. From Bowlby's theory, it follows that parental encouragement of independence and provision of support would promote a positive task orientation in children (i.e., task approach, persistence, and on-task behaviors), which in turn would enhance success on a wide variety of tasks (see also Bretherton, 1985). Parental restrictive control, on the other hand, would impede a positive task orientation and cognitive performance. Given the value of identifying the mechanisms that underlie the association between parenting practices and children's cognitive performance, clarification of the mediating role of task orientation in these associations is a primary objective of the present study.

Throughout the discussion that follows, only research conducted in Western societies will be discussed and subsequent conclusions will only be generalized to this population. The rationale for this decision is that the relations among parenting practices, task orientation, and cognitive performance are culture bound. Not only do parenting practices vary across cultures (Lieberman, Wicks-Nelson, & Kail, 1986), but the influence of specific parenting practices seems to depend upon the nature of the social structures and roles within a society. As discussed by Maccoby and Martin (1983), socialization practices reflect cultural values and are designed to prepare children for the roles available in their society. In cultures where roles are clearly defined and obedience and conformity are valued,

parental encouragement of independence tends to be lower and restrictive control tends to be higher (Maccoby & Martin, 1983). Within these cultures, demands for achievement are presumed to result in a positive association between parental control and cognitive performance, as individuals are motivated to strive to fulfill the external demands placed upon them (Maccoby & Martin, 1983). When independence and self-determination are valued more than conformity and obedience, however, achievement and performance tend to be self-motivated rather than other-motivated. This is the case in Western societies, and the result is that only those parenting practices that promote self-motivation (e.g., encouragement of independence and low restrictive control) tend to be positively associated with children's cognitive performance. Because the same overt behavior (e.g., cognitive performance) may result from different parenting practices in different cultures, research on the relations among parenting practices, task orientation, and cognitive performance will only be examined if it was conducted within the context of a Western society.

To summarize, there are two primary objectives of the present study. The first is to clarify the relations between parenting practices and cognitive performance in boys and girls, during the middle childhood years. The second is to investigate the possible mediating role of task orientation in these relations. The thesis is organized as follows. First, a review of the literature on the associations among parenting practices,

task orientation, and cognitive performance is provided. Second, the method and results of the current investigation are presented. And third, possible explanations for the results obtained, as well as their implications for both future research and current socialization practices, are discussed. Possible limitations of the investigation are also identified, to assist in the evaluation of the conclusions drawn.

Review of the Literature

The following literature review is a critical examination of research pertaining to the model presented in Figure 1. For ease of presentation, the studies addressing each of the associations in the model are discussed separately, with attention given to both age and gender differences. The individual relations are addressed in the following order: parenting practices and cognitive performance, parenting practices and task orientation, and task orientation and cognitive performance. Research relevant to the mediating role of task orientation is then examined. At the end of each section, an integrative summary will be provided to assist in the formulation of conclusions. A comprehensive summary will also be provided at the end of the literature review.

Parenting Practices and Cognitive Performance

An association between parenting practices and children's cognitive performance has been identified by numerous researchers. In particular, two parenting practices--low parental control and high parental nurturance--have been found to correlate with children's cognitive performance. This finding is consistent with the fact that measures of parental behavior tend to yield these two principal factors (e.g., Becker, 1964; Parker, Tupling, & Brown, 1979; Raskin, Boothe, Reatig, Schulterbrandt, & Odle, 1971; Roe & Siegelman, 1963; Schaefer, 1959). From the existing research, it appears that parental nurturance is a relatively homogeneous construct, comprised of responsiveness,

affectionateness, friendliness, involvement, and closeness. Parental control, on the other hand, appears to be comprised of two primary elements: encouragement of independence and degree of restrictive control. Because some researchers have emphasized one or the other component of parental control, these two components will be discussed separately.

The first component of parental control, encouragement of independence, refers to pressure put upon children to complete tasks independently. Encouragement of independence involves actively promoting autonomous behavior, rather than merely providing the opportunity for autonomous behavior to occur. Restrictive control, on the other hand, refers to the extent to which parents prohibit children's behavior, particularly through the use of power-assertive discipline. Power-assertive discipline includes the use of yelling, threats, forceful commands, and physical punishment (Maccoby & Martin, 1983). Power-assertive discipline differs from love-oriented discipline, which includes the use of praise, reasoning, expression of disappointment, and isolation (Maccoby & Martin, 1983). Attention to the style of discipline, in addition to the amount of discipline, has grown out of the recognition that all parents need to exert some control over their children's behavior, but that different methods of control are possible.

In the following three sections, research on the associations between children's cognitive performance and parental control and nurturance will be reviewed. The two

aspects of parental control, encouragement of independence and degree of restrictive control, will be discussed in separate sections to provide greater clarity. Because numerous studies have been conducted on the associations between children's cognitive performance and both parental nurturance and control, Table 1 was constructed to summarize the results. In constructing Table 1, effort was made to include all empirical studies conducted with children of preschool age or older (i.e., 3 to 18 years of age), published in or after 1965. Studies were located by conducting a computer search of the PsychLit data base. In addition, relevant research investigations cited in these articles were obtained and included in the table. Research conducted with specialized populations, such as learning disabled children, were omitted because of possible population specific findings.

When Table 1 is examined, it is apparent that the results obtained were not consistent across studies. From an inspection of the characteristics of the investigations, it appears that inconsistent results may be a function of three factors: differences in the measures used, the age of the subjects, and the gender composition of the samples. To clarify the role of these factors in the results obtained, the research will be discussed with respect to each factor. For ease of presentation, investigations conducted with preschool and school-age children will be reviewed in separate sections. Within each age group, results obtained for girls, boys, and combined samples of girls

Table 1
Summary of Research on the Relations Between Parenting Practices and Children's Cognitive

Performance

STUDY	SAMPLE CHARACTERISTICS		MEASURES OF COGNITIVE PERFORMANCE	MEASURES OF PARENTING PRACTICES	RESULTING RELATIONS		
	N/F	AGE			COMBINED	MALES	FEMALES
<u>PRESCHOOL AGE SAMPLES</u>							
Barnard, Bee, & Hammond (1984)	179, gender ratio unknown.	4 yrs.	1) Stanford-Binet.	Measured at 4, 8, 12, & 24 mos. (NONE): Maternal involvement & encouragement of developmental advances. Maternal avoidance of restriction & punishment. Maternal responsiveness.	1) 4, 8, 12, 24 mos. 1) 4, 8, 12, 24 mos. 1) 4, 8, 12, 24 mos.	1) 12, 24 mos. 1) 4, 8, 12, 24 mos. 1) 12, 24 mos.	
Beckwith (1984)	126/0	5 yrs.	1) Stanford-Binet.	Measured at 1, 3, 8, & 24 mos.: Maternal responsiveness.		1) 24 mos.	

* Negative relation; * Some inconsistencies across multiple raters.
Note. Numbers under "Resulting Relations" refer to measure of cognitive performance and reflect significant relations between parenting practices and cognitive performance. All relations are positive unless otherwise noted.

(table continues)

Predicting Cognitive Performance 15

STUDY	SAMPLE CHARACTERISTICS			MEASURES OF COGNITIVE PERFORMANCE	MEASURES OF PARENTING PRACTICES	RESULTING RELATIONS		
	N/F	AGE				COMBINED	MALES	FEMALES
Bradley & Caldwell (1976)	21/28	4.5 yrs.	1) Stanford-Binet.	Measured at 6 & 24 mos. (NONE):				
					Maternal involvement & encouragement of developmental advances.	1) 6, 24 mos.		
					Maternal avoidance of restriction & punishment.	1) 24 mos.		
					Maternal responsiveness.	1) 24 mos.		
Elardo, Bradley, & Caldwell (1975)	44/33	3 yrs.	1) Stanford-Binet.	Measured at 6, 12, & 24 mos. (NONE):				
					Maternal involvement & encouragement of developmental advances.	1) 6, 12, 24 mos.		
					Maternal avoidance of restriction & punishment.	1) 6, 12, 24 mos.		
					Maternal responsiveness.	1) 6, 12, 24 mos.		

* Negative relation; * Some inconsistencies across multiple raters.

Note. Numbers under "Resulting Relations" refer to measure of cognitive performance and reflect significant relations between parenting practices and cognitive performance. All relations are positive unless otherwise noted.

(table continues)

Predicting Cognitive Performance 16

SAMPLE CHARACTERISTICS			MEASURES OF COGNITIVE PERFORMANCE		MEASURES OF PARENTING PRACTICES		RESULTING RELATIONS		
STUDY	N/F	AGE	PERFORMANCE		PRACTICES		COMBINED	MALES	FEMALES
Elardo, Bradley, & Caldwell (1977)	38/36	3 yrs.	1) Illinois Test of Psycholinguistic Abilities.		Measured at 6 & 24 mos. (MME):				
					Maternal involvement & encouragement of developmental advances.		1) 6, 24 mos.	1) 24 mos.	1) 6, 24 mos.
					Maternal avoidance of restriction & punishment.		1) 24 mos.	ns.	1) 24 mos.
Epstein & Radin (1975)	99/81, lower, middle, & middle SES.	4 yrs.	1) Stanford-Binet. 2) Piagetian tasks.		Maternal responsiveness.		1) 6, 24 mos.	1) 24 mos.	1) 24 mos.
					Paternal restrictiveness.			2) lower SES.	ns.
					Paternal control.			1) middle SES.	ns.
					Paternal nurturance.			1) total & middle SES, 2) lower-middle & middle SES.	ns.
Estrada, Arsenio, Hess, & Holloway (1987)	24/23	3-4, 5-6 yrs.	1) PPVT & Palmer's Concept Familiarity Index, 3-4 yrs. 2) School readiness (letter, number, concept knowledge), 5-6 yrs.		Measured at 4 yrs.: Affective quality of maternal behaviors: warmth, responsiveness, flexibility, acceptance, positive affect, & low punitiveness.				
							1, 2		

* Negative relation; * Some inconsistencies across multiple raters.
 Note. Numbers under "Resulting Relations" refer to measure of cognitive performance and reflect significant relations between parenting practices and cognitive performance. All relations are positive unless otherwise noted.

(table continues)

Predicting Cognitive Performance 17

SAMPLE CHARACTERISTICS			MEASURES OF COGNITIVE PERFORMANCE	MEASURES OF PARENTING PRACTICES	RESULTING RELATIONS		
STUDY	N/F	AGE			COMBINED	MALES	FEMALES
Gottfried & Gottfried (1984)	68/62 at onset (15 mos.).	3 yrs.	1) McCarthy Scales, 36 mos.: a) Verbal. b) Perceptual. c) Quantitative. d) General cognitive (a+b+c). e) Memory. f) Motor. 2) McCarthy Scales, 42 mos. (a - f). 3) Tests of Early Language Development, 39 mos.	Measured at 15 mos. (NONE): Maternal involvement & encouragement of developmental advances. Maternal avoidance of restriction & punishment. Maternal responsiveness.	1a, 1b, 1c, 1d, 1e, 2a, 2d, 2e ns. 1a, 1d, 1e, 2e		
				Measured at 3 yrs., 3 mos.: Physical punishment. Maternal pride, affection, & warmth.	ns. 1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 2d, 2e, 2f, 3		

* Negative relation; * Some inconsistencies across multiple raters.
Note. Numbers under "Resulting Relations" refer to measure of cognitive performance and reflect significant relations between parenting practices and cognitive performance. All relations are positive unless otherwise noted.
 (table continues)

Predicting Cognitive Performance 18

STUDY	SAMPLE CHARACTERISTICS		MEASURES OF COGNITIVE PERFORMANCE	MEASURES OF PARENTING PRACTICES	RESULTING RELATIONS		
	N/F	AGE			COMBINED	MALES	FEMALES
Hess & McDewitt (1964)	34/33	3-4, 5-6 yrs.	1) Peabody Picture Vocabulary Test & Palmers Concept Familiarity Index, 3-4 yrs. 2) School readiness (letter, number, & concept knowledge), 5-6 yrs.	Measured at 4 yrs.:			
				Maternal discipline strategies:			
				Appeals to personal authority.		ns.	1 ^a , 2 ^a
				Appeals to possible consequences.		ns.	ns.
				Maternal teaching behaviors:			
				Encouragement of verbal participation.		ns.	1, 2
				Direct commands.		ns.	1 ^a , 2 ^a

^a Negative relation; ^{*} Some inconsistencies across multiple raters.

Note. Numbers under "Resulting Relations" refer to measure of cognitive performance and reflect significant relations between parenting practices and cognitive performance. All relations are positive unless otherwise noted.

(table continues)

Predicting Cognitive Performance 19

STUDY	SAMPLE CHARACTERISTICS		MEASURES OF COGNITIVE PERFORMANCE		MEASURES OF PARENTING PRACTICES		RESULTING RELATIONS		
	N/F	AGE	PERFORMANCE		PRACTICES		COMBINED	MALES	FEMALES
Hess, Shipman, Brophy, & Bear (1968), (study 1)	80/82	4 yrs.	1) Stanford-Binet.		Maternal commands.		1", 2", 3"		
			2) Block Sorting Task.		Maternal appeals to authority or norms.				
			3) Sigel Sorting Task.		Maternal use of rationales.				
					Maternal appeals to consideration of the feelings of both the child & others.				
Hess, Shipman, Brophy, & Bear (1968) (study 2)	80/82	4 yrs.	1) Performance on block sorting task taught by mother.		Coercive control (criticism, directiveness).		1"		
			2) Stanford-Binet.		Affectionateness.				

* Negative relation; * Some inconsistencies across multiple raters.
Note. Numbers under "Resulting Relations" refer to measure of cognitive performance and reflect significant relations between parenting practices and cognitive performance. All relations are positive unless otherwise noted.
 (table continues)

Predicting Cognitive Performance 20

SAMPLE CHARACTERISTICS			MEASURES OF COGNITIVE PERFORMANCE	MEASURES OF PARENTING PRACTICES	RESULTING RELATIONS		
STUDY	N/F	AGE			COMBINED	MALES	FEMALES
Hess, Holloway, Dickson, & Price (1984)	24/23	5-6 yrs.	1) School readiness (letter, number, & concept knowledge), 5-6 yrs.	Measured at 4 yrs.: Maternal Discipline Strategies: Appeals to personal authority. Appeals to rules. Maternal Teaching Behaviors: Encouragement of verbal participation. Direct commands. Criticism of errors. Responsiveness. Affective quality: warmth, responsiveness, flexibility, acceptance, positive affect, & low punitiveness.	 1* 1 1 1* 1* ns.		

* Negative relation; * Some inconsistencies across multiple raters.

Note. Numbers under "Resulting Relations" refer to measure of cognitive performance and reflect significant relations between parenting practices and cognitive performance. All relations are positive unless otherwise noted.

(table continues)

Predicting Cognitive Performance 21

STUDY	SAMPLE CHARACTERISTICS		MEASURES OF COGNITIVE PERFORMANCE	MEASURES OF PARENTING PRACTICES	RESULTING RELATIONS		
	N/F	AGE			COMBINED	MALES	FEMALES
Ho (1987)	235: 3 yrs.	3, 4 yrs.	1) Composite score on a cognitive test battery at 3 yrs.	Measured at 12 mos.: Maternal responsiveness.	1, 2		
	219: 4 yrs., gender ratio unknown.		2) Composite score on a cognitive test battery at 4 yrs.	Maternal involvement.	1, 2		
Wonzik (1987)	58/55, in original sample.	3, 3.5, 4, 5 yrs.	1) California Preschool Mental Scale, 3 - 5 yrs.	Measured at 21 mos.: Closeness of mother-child relationship.		4, 5 yrs.	ns.
				Closeness of father-child relationship.		4 yrs.	ns.
				Maternal friendliness.		ns.	4 yrs.
				Paternal friendliness.		ns.	ns.
				Maternal expression of affection.		3.5 ^a , 4 ^a yrs.	ns.
Jordan, Radin, & Epstein (1975)				Paternal expression of affection.		ns.	ns.
	99/81, lower & middle SES.	4 yrs.	1) Stanford-Binet. 2) Piagetian tasks.	Paternal nurturance.		1), 2) total & middle SES.	ns.

^a Negative relation; ^{*} Some inconsistencies across multiple raters.

Note. Numbers under "Resulting Relations" refer to measure of cognitive performance and reflect significant relations between parenting practices and cognitive performance. All relations are positive unless otherwise noted.

(table continues)

Predicting Cognitive Performance 22

SAMPLE CHARACTERISTICS				MEASURES OF COGNITIVE PERFORMANCE		MEASURES OF PARENTING PRACTICES		RESULTING RELATIONS		
STUDY	N/F	AGE						COMBINED	MALES	FEMALES
Moore (1968)	32/29	3 yrs.	1) Stanford-Binet, 3 yrs. 2) Vocabulary test, 3 yrs. 3) Comprehension test, 3 yrs.	Measured at 2.5 yrs: Emotional atmosphere of the home (various measures).					1'	1'
Radin (1972)	42/0, 21 lower SES & 21 middle SES.	4 yrs.	1) Stanford-Binet.	Paternal restrictiveness.					1) total sample ^a .	
			2) Peabody Picture Vocabulary Test.	Paternal nurturance.					1), 2) total & middle SES.	
Radin (1973)	30/0, lower & middle SES.	5 yrs.	1) Stanford-Binet.	Measured at 4 yrs.:-					2) total sample ^a .	
			2) Peabody Picture Vocabulary Test.	Paternal restrictiveness.					1), 2) middle SES & total sample.	
				Paternal nurturance.						
Yarrow, Klein, Lomono, & Morgan (1975)	20, gender ratio unknown.	3.5 yrs.	1) Stanford-Binet.	Measured at 6 mos.:-						
				Maternal responsiveness to infant distress.					ns.	
				Maternal expression of affection.					ns.	

^a Negative relation; Some inconsistencies across multiple raters.
Note. Numbers under "Resulting Relations" refer to measure of cognitive performance and reflect significant relations between parenting practices and cognitive performance. All relations are positive unless otherwise noted.

(table continues)

Predicting Cognitive Performance 23

SAMPLE CHARACTERISTICS			MEASURES OF COGNITIVE		MEASURES OF PARENTING		RESULTING RELATIONS		
STUDY	M/F	AGE	PERFORMANCE		PRACTICES		COMBINED	MALES	FEMALES
SCHOOL AGE SAMPLES									
Bradley & Caldwell (1964)	22/15	7 yrs.	Science Research Associates Achievement Test Battery: 1) Reading. 2) Language Arts. 3) Mathematics.		Measured at 12 mos. (HOME): Maternal involvement & encouragement of developmental advances. ns. Maternal avoidance of restriction & punishment. ns. Maternal responsiveness. ns.				
Bradley, Caldwell, & Rock (1968)	24/18	Grades 4 & 5.	Science Research Associates Achievement Test Battery: 1) Reading. 2) Language Arts. 3) Mathematics. 4) Composite.		Parental encouragement of maturity. Parental responsiveness. 2 Emotional climate. 3 Active involvement of parents. 2, 3, 4				

* Negative relation; * Some inconsistencies across multiple raters.
Note. Numbers under "Resulting Relations" refer to measure of cognitive performance and reflect significant relations between parenting practices and cognitive performance. All relations are positive unless otherwise noted.

(table continues)

Predicting Cognitive Performance 24

SAMPLE CHARACTERISTICS			MEASURES OF COGNITIVE PERFORMANCE		MEASURES OF PARENTING PRACTICES		RESULTING RELATIONS		
STUDY	N/F	AGE	PERFORMANCE		PRACTICES		COMBINED	MALES	FEMALES
Coates & Lewis (1984)	20/20	6 yrs.	1) Piagetian conservation test.		Measured at 3 mos.:				
			2) WISC-R Vocabulary Subscale.		Maternal behaviors:				
			3) WISC-R Block Design Subscale.		Distal responsivity to distress (smiling, vocalizing, looking).		2, 3, 4 ^a , 5 ^a		
			4) Arithmetic achievement tests (various tests).		Proximal responsivity to distress (kissing, touching, holding).		2 ^a , 3 ^a , 4 ^a , 5		
			5) Reading achievement tests (various tests).		Distress responsivity.		4		
Dornbusch, Rutter, Leiderman, Roberts, & Fraleigh (1987)	4047/3789	14-18 yrs.			Vocal responsivity.		1, 2, 3, 4 ^a , 5 ^a		
			1) School grades.		Tactile responsivity.		2 ^a , 3 ^a , 4 ^a		
					Distal responsivity.		2, 3, 4 ^a , 5 ^a		
					Parental restrictive control.			1) 14-18 yrs. ^a	1) 14-18 yrs. ^a

^a Negative relation; * Some inconsistencies across multiple raters.
Note. Numbers under "Resulting Relations" refer to measure of cognitive performance and reflect significant relations between parenting practices and cognitive performance. All relations are positive unless otherwise noted.
 (table continues)

Predicting Cognitive Performance 25

STUDY	SAMPLE CHARACTERISTICS		MEASURES OF COGNITIVE PERFORMANCE	MEASURES OF PARENTING PRACTICES	RESULTING RELATIONS		
	M/F	AGE			COMBINED	MALES	FEMALES
Estrada, Arsenio, Hess, & Holloway, (1987)	24/23	6, 12 yrs.	1) WISC-R, 6 yrs. 2) Iowa Test of Basic Skills (vocabulary & mathematics ability), 12 yrs.	Measured at 4 yrs.: Affective quality of maternal behaviors: warmth, responsiveness, flexibility, acceptance, positive affect, & low punitiveness.		1, 2	

* Negative relation; * Some inconsistencies across multiple raters.
 Note. Numbers under "Resulting Relations" refer to measure of cognitive performance and reflect significant relations between parenting practices and cognitive performance. All relations are positive unless otherwise noted.
 (table continues)

Predicting Cognitive Performance 26

STUDY	SAMPLE CHARACTERISTICS		MEASURES OF COGNITIVE PERFORMANCE	MEASURES OF PARENTING PRACTICES	RESULTING RELATIONS		
	N/F	AGE			COMBINED	MALES	FEMALES
Hess, Hollaway, Dickson, & Price (1984)	24/23	12 yrs.	1) Iowa Test of Basic Skills (vocabulary & mathematics ability), 12 yrs.	Measured at 4 yrs.: Maternal Discipline Strategies: Appeals to personal authority. Appeals to rules. Maternal Teaching Behaviors: Encouragement of verbal participation. Direct commands. Criticism of errors. Responsiveness. Affective quality: warmth, responsiveness, flexibility, acceptance, positive affect, & low punitiveness.	 1' ns 1 1' 1' ns.		
						1	

* Negative relation; * Some inconsistencies across multiple raters.
Note. Numbers under "Resulting Relations" refer to measure of cognitive performance and reflect significant relations between parenting practices and cognitive performance. All relations are positive unless otherwise noted.

(table continues)

Predicting Cognitive Performance 27

STUDY	SAMPLE CHARACTERISTICS		MEASURES OF COGNITIVE PERFORMANCE	MEASURES OF PARENTING PRACTICES	RESULTING RELATIONS		
	M/F	AGE			COMBINED	MALES	FEMALES
Hess & McDewitt (1984)	24/23	12 yrs.	1) Iowa Test of Basic Skills (vocabulary & mathematics ability).	Measured at 4 yrs.: Maternal discipline strategies: Appeals to personal authority. Appeals to possible consequences. Maternal teaching behaviors: Encouragement of verbal participation. Direct commands.		ns. ns.	1 ^a ns.
						ns.	1
						ns.	ns.

^a Negative relation; ^b Some inconsistencies across multiple raters.
Note. Numbers under "Resulting Relations" refer to measure of cognitive performance and reflect significant relations between parenting practices and cognitive performance. All relations are positive unless otherwise noted.

(table continues)

Predicting Cognitive Performance 28

STUDY	SAMPLE CHARACTERISTICS		MEASURES OF COGNITIVE		MEASURES OF PARENTING		RESULTING RELATIONS		
	N/F	AGE	PERFORMANCE		PRACTICES		COMBINED	MALES	FEMALES
Honzik (1967)	58/55, in original sample.	6, 7, 8, 9, 10, 12-13, 14-15, 18 yrs.	1) Stanford-Binet, 6-15 yrs. 2) Wechsler-Bellevue, 18 yrs.	Measured at 21 mos.: Closeness of mother-child relationship. Closeness of father-child relationship. Maternal friendliness. Paternal friendliness. Maternal expression of affection. Paternal expression of affection. Parental encouragement of independence.				1), 2) 6-18 yrs. ns.	ns. 1) 8, 9 yrs.
Marjoribanks (1972)	185/0	11 yrs.	Primary Mental Ability Tests: 1) Verbal. 2) Number. 3) Spatial. 4) Reasoning. 5) Total Scale.					1, 2, 4, 5	ns.

* Negative relation; * Some inconsistencies across multiple raters.
Note. Numbers under "Resulting Relations" refer to measure of cognitive performance and reflect significant relations between parenting practices and cognitive performance. All relations are positive unless otherwise noted.

(table continues)

Predicting Cognitive Performance 29

STUDY	SAMPLE CHARACTERISTICS		MEASURES OF COGNITIVE PERFORMANCE	MEASURES OF PARENTING PRACTICES	RESULTING RELATIONS		
	M/F	AGE			COMBINED	MALES	FEMALES
Moore (1968)	32/29	7, 8 yrs.	1) Stanford-Binet, 8 yrs.	Measured at 2.5 yrs:			
			2) Vocabulary test, 8 yrs.	Emotional atmosphere of the home (various measures).		1, 2, 3, 4	1, 2, 3, 4
			3) Comprehension test, 8 yrs.				
			4) Reading test, 7 yrs.				
Solomon, Houtman, & Perrelevis (1971)	38/34, lower SES.	Grade 5	1) Average school grade.	Maternal encouragement of independent achievement.	ns.	ns.	ns.
				Paternal encouragement of independent achievement.	ns.	ns.	1) curvilinear
				Maternal warmth.	ns.	ns.	1
				Paternal hostility.	ns.	ns.	ns.
Steinberg, Elmen, & Mounts (1989)	60/60	11-16 yrs.	1) English and mathematics grades.	Parental lax control.	ns.		
				Parental restrictive control.	1 ^a		
				Parental acceptance.	1		

^a Negative relation; Some inconsistencies across multiple raters.
 Note. Numbers under "Resulting Relations" refer to measure of cognitive performance and reflect significant relations between parenting practices and cognitive performance. All relations are positive unless otherwise noted.

and boys will be differentiated, as will results obtained in relation to mothers and fathers. Clarification of the measures used to assess parenting practices will be provided at the beginning of each section, as well as throughout the discussion of the research findings.

Throughout the examination of the research, the term cognitive performance will be used to refer to both performance on cognitive ability tests and to school achievement. Because scores on ability tests were used in the majority of investigations (see Table 1), the measure of cognitive performance used in a study will only be noted when it was a measure of school achievement. Differences in the results obtained for different types of cognitive measures will be summarized in a separate section. All studies in Table 1 were correlational in nature and thus are comparable in terms of research design.

As will become apparent in the following review, the association between parenting practices and children's cognitive performance has been assessed both concurrently and longitudinally. One advantage of longitudinal investigations is that they provide more convincing support for the direction of causation among variables (Christensen, 1982). A second advantage of longitudinal investigations is that they provide information about the influence of earlier socialization experiences upon children's later functioning. However, because we cannot assume that the effects of parenting practices remain

stable over the course of a child's life, earlier measures of parenting practices may tell us little about the influence of recent parenting behaviors upon children's development. Consequently, investigations of the association between concurrent measures of parenting practices and children's cognitive performance are invaluable. As will be shown, the direction of associations among parenting practices and children's cognitive performance tends to be consistent across longitudinal and concurrent investigations, although some differences in the significance of these relations are evident. The high correspondence between longitudinal and concurrent investigations supports the view that concurrent associations reflect the influence of parenting practices upon children's cognitive development. The reverse pattern of causation, however, cannot be ruled out.

Parental Encouragement of Independence and Children's Cognitive Performance

In the research on the association between parental encouragement of independence and children's cognitive performance, numerous operational definitions of encouragement of independence have been utilized. With preschool children, encouragement of independence has been defined in terms of encouraging children to try new activities and to do things for themselves. With school-age children, encouragement of independence has been defined in terms of encouraging maturity, independent exploration of the environment, and independent

completion of tasks. Although each measure assesses somewhat different parenting behaviors, all provide information on the extent to which parents actively promote their children's age-appropriate autonomy.

Preschool children. In preschool children, only maternal, and not paternal, encouragement of independence has been investigated in association with children's cognitive performance. As can be seen from Table 1, the most commonly used measure of encouragement of independence in this age group was an interview and observational measure, which assessed encouragement of independence within a context of maternal interest and interaction (HOME Inventory, see Bradley & Caldwell, 1984). The specific maternal behaviors assessed by this measure are attention to and interaction with the child, encouragement of developmental advances, and provision of toys that challenge children to develop new skills. The HOME Inventory measures relatively stable parenting behaviors, as a moderate level of stability over a two-year period has been documented ($r = .58$; Gottfried & Gottfried, 1984).

Of the five studies in which the HOME Inventory was used, significant correlations with children's cognitive performance were found in male (Barnard, Bee, & Hammond, 1984; Elardo, Bradley, & Caldwell, 1975, 1977), female (Barnard et al., 1984; Elardo et al., 1975, 1977), and combined gender (Barnard et al., 1984; Bradley & Caldwell, 1976; Elardo et al., 1975, 1977; Gottfried & Gottfried, 1984) samples. In the majority of these

studies, maternal encouragement of independence was assessed at multiple points in time (i.e., 4, 6, 8, 12, and 24 months) and was used to predict children's cognitive performance at three and four years of age. In some investigations, the association was only significant for some of the times at which maternal encouragement of independence was assessed. Because a consistent pattern did not emerge across studies, however, variations across time appear to be sample-specific.

In contrast with the above longitudinal studies, Hess and McDevitt (1984) assessed the concurrent association between maternal encouragement of independence and preschool children's cognitive performance. They found that maternal encouragement of verbal participation in a teaching situation was associated with cognitive performance for girls, but not for boys. When boys and girls were combined into a single sample, the association also was not statistically significant (Hess, Holloway, Dickson, & Price, 1984). Because these results are inconsistent with the findings obtained for boys when the HOME Inventory was used, it may be that only global, and not specific, aspects of encouragement of independence are associated with boys' cognitive performance. Encouragement of verbal participation in a teaching situation may not be associated with boys' cognitive performance, because boys may not require maternal encouragement to interact in these activities. An alternative explanation for the difference between Hess and McDevitt's results and those obtained with the HOME Inventory is that maternal encouragement of

independence was assessed at different age levels. Perhaps only early maternal encouragement of independence (i.e., before four years of age) promotes boys' cognitive development. This possibility will be examined further in the section on school-age children.

To summarize, it appears that mothers who actively encourage their children to develop new skills and to participate in new activities tend to have sons and daughters who perform better on cognitive tasks than do mothers who are less encouraging of their children's independence. Mothers who encourage verbal participation, however, appear to enhance the cognitive performance of their daughters, but not their sons. The latter conclusion is very tentative, however, as it is only based on one investigation. Conclusions about the effects of paternal encouragement of independence upon preschool children's cognitive performance cannot be drawn because of an absence of research in this area.

School-age children. In comparison with the research conducted with preschool children, investigations into the association between parental encouragement of independence and cognitive performance in school-age children have been broader in scope. First, the association between encouragement of independence and cognitive performance has been assessed both concurrently and longitudinally at a number of different age levels. Second, both maternal and paternal encouragement of independence have been assessed. And third, a wider range of

measures has been used to operationally define parental encouragement of independence.

In the longitudinal investigations, maternal encouragement of developmental advances during infancy and toddlerhood (HOME Inventory) was not associated with cognitive performance in a combined sample of 7-year-old boys and girls (Bradley & Caldwell, 1984). As with the concurrent preschool investigations, maternal encouragement of verbal participation (measured at 4 years of age) was associated with girls', but not boys', cognitive performance at 12 years of age (Hess & McDevitt, 1984). Although the relation between maternal encouragement of verbal participation and children's cognitive performance was significant when a combined sample of boys and girls was used (Hess et al., 1984), this finding may simply reflect the association between the maternal variable and girls' cognitive performance (the correlation was in the same direction for boys and girls, but it was only significant for girls). The findings from these longitudinal investigations appear to indicate that maternal encouragement of developmental advances during infancy and toddlerhood has little impact upon children's future cognitive performance. Maternal encouragement of verbal participation, however, may have long-lasting effects upon girls' cognitive performance. The latter conclusion, however, is based on one study only. The longitudinal association between paternal encouragement of independence and children's cognitive performance during the school years has not been investigated.

In contrast with the longitudinal research, the concurrent associations of both maternal and paternal encouragement of independence with school-age children's cognitive performance have been investigated. In two of the three studies in which paternal encouragement of independence was measured, however, it was measured in conjunction with maternal encouragement of independence. Consequently, the differential influences of maternal and paternal encouragement of independence could not be determined.

From the research in which combined measures of paternal and maternal encouragement of independence were used, it was found that parental encouragement of maturity (the operational definition of this construct was not provided) was not associated with cognitive performance in a combined sample of Grade 4 and 5 boys and girls (Bradley, Caldwell, & Rock, 1988). Encouragement of independence (encouragement to explore the environment and emphasis on early independence), however, was associated with cognitive performance in a sample of 11-year-old boys (Marjoribanks, 1972). The discrepancy between the results obtained in the above studies may have been due to differences in the measures of parental encouragement of independence that were used (i.e., encouragement of maturity versus encouragement of independent behaviors).

To date, separate measures of maternal and paternal encouragement of independence have been used in only one concurrent investigation (Solomon et al., 1971). In this study,

maternal encouragement of independent achievement was not associated with either boys' or girls' academic achievement. In contrast, a moderate level of paternal encouragement of independent achievement was associated with girls' academic achievement (i.e., the association was curvilinear) and was unrelated to boys' academic achievement. The apparent impact of fathers upon daughters' academic achievement may indicate that moderate encouragement from fathers to excel academically counteracts the traditional gender-role stereotype that achievement belongs to the masculine domain. The apparent absence of an effect by mothers upon children's cognitive performance warrants confirmation through additional research. As well, use of broader measures of encouragement of independence (i.e., beyond the achievement domain) would enhance our understanding of the association between encouragement of independence and children's cognitive performance.

To summarize, the association between encouragement of independence and school-age children's cognitive performance has been documented by some researchers, but not others. Differences among the measures of encouragement of independence, as well as discrepancies in whether boys and girls and mothers and fathers were combined into single categories, make it difficult to draw definitive conclusions. The possible consequence of combining categories is that if a significant relation existed for a subset of the sample (i.e., boys versus girls, mothers versus fathers), it could be masked by a nonsignificant relation for the remaining

portion of the sample. In order to clarify the association between parental encouragement of independence and school-age children's cognitive performance, additional research is required in which both male and female children and parents are considered separately.

Encouragement of Independence and Cognitive Performance: Summary

In summary, it appears that there is more consistent support for a relation between maternal encouragement of independence and cognitive performance in preschool children than in school-age children. Specifically, early maternal encouragement of independence appears to have a positive influence upon both boys' and girls' cognitive development during the preschool years. In contrast, during the school-age years, the effects of maternal encouragement of independence may be less substantial for girls, and perhaps absent for boys. This conclusion is highly speculative, however, owing to a lack of research with school-age children. With respect to paternal encouragement of independence, no investigations have been conducted with preschool children and only one investigation has been conducted with school-age children. From this investigation, it appears that paternal encouragement of independence may positively influence the cognitive development of girls, but not boys. To confirm (or modify) these tentative conclusions, additional research on the association between parental encouragement of independence and children's cognitive performance is necessary.

Parental Restrictive Control and Children's Cognitive Performance

Various measures of parental restrictive control have been assessed in conjunction with children's cognitive performance. For both preschool and school-age children, restrictive control has been defined in terms of restricting children's behavior, using punishment and criticism, giving commands, and appealing to rules and authority. As discussed above, these behaviors reflect the use of power-assertive discipline to control children's actions.

Preschool children. As can be seen from Table 1, both maternal and paternal restrictive control have been assessed in relation to preschool children's cognitive performance. With respect to maternal restrictive control, negative correlations with girls' cognitive performance have been found in three studies, both concurrently (Hess & McDevitt, 1984) and longitudinally (Barnard et al., 1984; Elardo et al., 1977). For preschool boys, a negative correlation between maternal restrictive control and children's cognitive performance was documented in one study (Barnard et al., 1984), whereas nonsignificant results were obtained in two investigations (Elardo et al., 1977; Hess & McDevitt, 1984). The one significant finding appears to have resulted from a larger sample size (85 versus 38 and 34 subjects), as two of the three investigations were identical with respect to design and measures of restrictive control (i.e., Barnard et al., 1984; Elardo et al., 1977). Consequently, it seems that the association between

maternal restrictive control and children's cognitive performance is weaker for boys as compared to girls, thereby requiring a larger sample size for detection.

The finding that maternal restrictive control is a better predictor of girls', as compared to boys', cognitive performance may be a function of one of two factors. First, because a closer relationship may exist between mothers and daughters as compared to mothers and sons (Huston, 1983), daughters may be negatively influenced by maternal restrictive control more than sons. Second, girls may have a greater desire to please than boys, which may make them more sensitive to the effects of maternal restrictive control (Hess & McDevitt, 1984). Although the source of the gender difference is unclear, it does appear that maternal restrictive control has a stronger effect upon the cognitive development of girls than boys.

The differential relation between restrictive control and cognitive performance for boys and girls may explain why inconsistent results were obtained when combined gender samples were used. Significant negative correlations between maternal restrictive control and children's cognitive performance have been reported in a number of investigations (Barnard et al., 1984; Elardo et al., 1975, 1977; Hess, Shipman, Brophy, & Bear, 1968), but nonsignificant results have also been obtained (Gottfried & Gottfried, 1984; Hess et al., 1984). As was previously mentioned, if the relation between two variables differs for boys and girls, the association for one gender may

mask the association for the other gender. Consequently, separate analyses for boys and girls are needed to identify possible gender variability in the associations among parenting practices and children's cognitive performance.

With regard to paternal restrictive control, significant negative concurrent correlations have been found with boys' cognitive performance (Epstein & Radin, 1975; Radin, 1972, 1973), but not with girls' cognitive performance (Epstein & Radin, 1975). Although the statistical significance of findings for boys varied partly as a function of socioeconomic status, these variations were not consistent across studies. Moreover, in two of the three studies, statistically significant findings were obtained only when participants from all socioeconomic categories were considered collectively. Consequently, no definitive conclusions can be drawn about the influence of socioeconomic status upon the negative association between paternal restrictive control and boys' cognitive performance. Differential findings for boys and girls may reflect the closer relationship that fathers may have with their sons as compared to their daughters (Huston, 1983).

In summary, it appears that the negative association between maternal restrictive control and children's cognitive performance is stronger for preschool girls than boys. Conversely, the negative association between paternal restrictive control and children's cognitive performance appears to be stronger for preschool boys than girls. The latter conclusion is more

speculative, however, as only one study has been conducted on the relation between paternal restrictive control and preschool girls' cognitive performance. From the above findings though, it appears that parental restrictive control has a stronger influence upon children who are of the same gender as the parent, at least during the preschool stage of development.

School-age children. When the research on school-age children is considered, it is apparent that little attention has been directed toward investigating the association between parental restrictive control and children's cognitive performance. In fact, no studies could be located in which the association between paternal restrictive control and school-age children's cognitive performance was investigated. However, paternal restrictive control was assessed in combination with maternal restrictive control in two investigations. In the first investigation, a combined sample of 11- to 16-year-old boys and girls was used. In this investigation, parental restrictive control was negatively associated with children's school grades (Steinberg, Elmen, & Mounts, 1989). In the second investigation, parental restrictive control was negatively correlated with school grades in a sample of 14- to 18-year-old adolescents (Dornbusch, Ritter, Leiderman, Roberts, & Fraleigh, 1987). The correlation was significant at each age level and for both genders. It is unknown, however, if these associations would have been found for both parents, if mothers and fathers had been considered separately.

Of the three studies in which the relation between maternal restrictive control and school-age children's cognitive performance was addressed, two were conducted with combined samples of boys and girls (Bradley & Caldwell, 1984; Hess et al., 1984) and one was conducted with separate samples of boys and girls (Hess & McDevitt, 1984). In all of the studies, maternal restrictive control was assessed when children were 4 years of age or younger and was used to predict children's cognitive performance at 7 or 12 years of age.

Of the two studies conducted with combined gender samples, a significant negative correlation between maternal restrictive control and children's cognitive performance was obtained in one of the studies (Hess et al., 1984), but not in the other (Bradley & Caldwell, 1984). This difference may be due to the fact that only power-assertive discipline was assessed in the former study, whereas a composite measure of all methods of control was used in the latter study. In the latter study, the potential benefits of some forms of control (e.g., love-oriented discipline) may have counteracted the negative effects of other forms of discipline (e.g., power-assertive discipline), thereby resulting in nonsignificant findings. In addition, Bradley and Caldwell assessed maternal control when children were infants, whereas Hess et al. assessed maternal control when children were 4 years old. Perhaps very early measures of maternal control are less predictive of school-age children's cognitive performance than are later measures of maternal restrictive control.

The only researchers to conduct separate analyses on the association between maternal restrictive control and school-age boys' and girls' cognitive performance were Hess and McDevitt (1984). These researchers found that maternal appeals to personal authority when disciplining children at 4 years of age were negatively associated with girls', but not boys', cognitive performance at 12 years of age. Maternal commands in a teaching situation and maternal appeals to possible consequences of children's behavior (which may represent love-oriented discipline), were not associated with girls' or boys' performance. A possible conclusion from these results is that only specific aspects of maternal control (e.g., appeals to personal authority) are negatively associated with girls' cognitive development, whereas no aspect of maternal control is associated with boys' cognitive development. This conclusion is highly speculative, however, as no study could be located in which the relations between concurrent measures of maternal control and school-age children's cognitive performance were assessed. It is unlikely that degree and method of maternal control are stable across a child's development, and thus it is difficult to extrapolate the possible influence of recent exposure to maternal restrictive control upon school-age children. As with preschool children, the apparently stronger influence of maternal restrictive control upon girls' cognitive performance may result from the closer relationship that girls tend to have with their mothers (Huston, 1983) or from their

stronger desire to please (Hess & McDevitt, 1984), as compared with boys. These interpretations are tentative, however, as gender differences in the relation between maternal restrictive control and children's cognitive performance were only investigated in one study.

Restrictive Control and Cognitive Performance: Summary

To summarize, researchers have found that maternal restrictive control is negatively associated with girls' cognitive performance during both the preschool and school years. This relation has not been found consistently for boys at either age level, possibly because the relation is not as strong for boys as for girls. In contrast, paternal restrictive control appears to be negatively associated with boys', but not girls', preschool cognitive performance (one study only). No research is available on the association between paternal restrictive control and school-age children's cognitive performance. As a result, additional research is needed before drawing definitive conclusions about the association between parental restrictive control and children's cognitive performance, particularly during the school-age years.

Parental Nurturance and Children's Cognitive Performance

In comparison with parental encouragement of independence and restrictive control, the relation of parental nurturance with children's cognitive performance has been investigated more extensively, particularly with regard to fathers. In these investigations, parental nurturance has been defined in terms of

responsivity, affection, warmth, friendliness, closeness, and acceptance. In some investigations, global measures of nurturance were used, whereas individual components of nurturance were assessed in other investigations.

Preschool children. In preschool children, numerous researchers have found that maternal nurturance is positively correlated with cognitive performance. Longitudinally, this association has been found for boys (Barnard et al., 1984; Elardo et al., 1977), girls (Barnard et al., 1984; Elardo et al., 1977), and combined samples of boys and girls (Barnard et al., 1984; Bradley & Caldwell, 1976; Elardo et al., 1977; Gottfried & Gottfried, 1984; Ho, 1987). In one investigation, the closeness of the mother-child relationship was positively associated with boys' cognitive performance, maternal friendliness was unrelated to boys' cognitive performance, and maternal expression of affection within the family was negatively associated with boys' cognitive performance (Honzik, 1967). For girls, maternal friendliness was the only maternal variable associated (positively) with cognitive performance. The inconsistent findings obtained across the three measures of maternal nurturance may indicate that only certain aspects of maternal nurturance are associated with children's cognitive performance. Variations in results across multiple time assessments of nurturance (i.e., at 4, 6, 8, 12, and 24 months) indicated that later measures of maternal nurturance tended to be more predictive of children's cognitive performance than did earlier

measures of maternal nurturance (e.g., Bradley & Caldwell, 1976; Elardo et al., 1977; Gottfried & Gottfried, 1984).

As with the longitudinal investigations, significant correlations between concurrent measures of maternal nurturance and children's cognitive performance have been obtained for boys (Moore, 1968; Radin, 1972), girls (Moore, 1968; Radin, 1972), and combined samples of boys and girls (Beckwith, 1984; Estrada, Arsenio, Hess, & Holloway, 1987; Hess et al., 1968). Although nonsignificant results were obtained in one study conducted with a combined sample (Yarrow, Klein, Lomonaco, & Morgan, 1975), this may have been due to insufficient power to detect a significant association between variables, resulting from a small sample size ($N = 20$).

As with maternal nurturance, significant associations between paternal nurturance and preschool boys' cognitive performance have been found, both concurrently (Epstein & Radin, 1975; Jordan, Radin, & Epstein, 1975; Radin, 1972, 1973) and longitudinally (Honzik, 1967). Variations did occur, however, across multiple dimensions of paternal nurturance. Specifically, Honzik (1967) found that the closeness of the father-child relationship was associated with boys' cognitive performance at four years of age, but paternal friendliness toward the child and expression of affection within the family were not associated with boys' cognitive performance at any age (four assessments were conducted during the preschool years). Thus, although most researchers have found that paternal nurturance is associated

with preschool boys' cognitive performance, it appears that there may be differences in the extent to which specific dimensions of paternal nurturance influence boys' cognitive development.

Although there is evidence that paternal nurturance is associated with boys' cognitive performance, some variations in this relation have been found as a function of socioeconomic status (SES). Epstein and Radin (1975) found that paternal nurturance was associated with boys' cognitive performance in middle and lower-middle SES samples, but not in a lower SES sample. Jordan et al. (1975) and Radin (1972, 1973) found significant correlations in a middle SES sample, but not in a lower SES sample. These researchers interpreted their findings as suggesting that boys' identification with their fathers might result in boys' excelling in different areas, depending upon their socioeconomic status. Thus, middle and lower-middle SES boys may be encouraged to excel cognitively, whereas lower SES boys may be encouraged to excel physically. This explanation is based on apparent socioeconomic differences in gender role definitions (Jordan et al., 1975). It should be noted that the direction of the association was the same in all socioeconomic groups and that the number of subjects in the different groups tended to be relatively small. Consequently, significant associations may have been found for lower SES boys if a larger sample had been used. However, it appears that the magnitude of the correlation between paternal nurturance and boys' cognitive performance is higher for middle SES than lower SES boys.

In contrast with the research on the relation between paternal nurturance and cognitive development in preschool boys, relatively little attention has been directed toward this relation in preschool girls. In fact, this association has only been addressed in three studies. Using a longitudinal design, Honzik (1967) found that three aspects of paternal nurturance (closeness of father-child relations, friendliness, and expression of affection in the family), measured when girls' were 21 months of age, were unrelated to girls' performance on cognitive tests throughout the preschool years. In concurrent investigations, Epstein and Radin (1975) and Jordan et al. (1975) found that paternal nurturance was not associated with preschool girls' performance on a measure of cognitive ability. Thus, from the research to date, there is no evidence of an association between paternal nurturance and preschool girls' cognitive performance.

A final investigation into the association between parental nurturance and preschool children's cognitive performance employed a combined measure of maternal and paternal nurturance. In this investigation, the overall emotional atmosphere of the home was significantly correlated with both boys' and girls' cognitive performance (Moore, 1968). Because maternal and paternal nurturance were assessed in combination, however, the extent to which the correlations with cognitive performance were specific to either mothers or fathers could not be determined.

From the above research, it appears that paternal nurturance

has a stronger influence upon boys' cognitive development than upon girls' cognitive development during the preschool years. This finding may be a function of gender differences in the identification process (Jordan et al., 1975). Specifically, girls are presumed to identify with their mothers, and thus may be influenced more by maternal than paternal nurturance. Conversely, boys are expected to identify with their fathers, and thus may be most influenced by paternal nurturance. The identification process involves efforts to be like the parent and may include internalization of parental values and imitation of parental behavior, including task-related behaviors (Radin, 1972). The outcome of identification is thought to be an increased salience of the behavior of the same-gender parent, as compared to the cross-gender parent. Although gender differences in identification provide an explanation for the results obtained for paternal nurturance, it should be noted that maternal nurturance appears to be correlated with both boys' and girls' cognitive performance (e.g., Estrada et al., 1987). Consequently, identification may moderate the association between paternal nurturance and cognitive performance, whereas the tendency for mothers to be the primary caregiver for both boys and girls (Rice, 1981) may account for the apparent importance of maternal nurturance for both boys' and girls' cognitive development.

School-age children. In comparison with preschool children, considerably less research has been conducted on the association

between parental nurturance and cognitive performance in school-age children. With regard to maternal nurturance, Honzik (1967) assessed three aspects of nurturance when children were 21 months of age. She found significant associations between the closeness of mother-child relations and boys' cognitive performance between the ages of 6 and 18 years (cognitive performance was measured at 8 points in time). Maternal affection (measured in relation to all family members), on the other hand, was unrelated to boys' cognitive performance at any age. Maternal friendliness was only associated with boys' performance at nine years of age. For girls, the only significant correlation found by Honzik was between maternal friendliness and girls' cognitive performance at eight years of age. Consequently, there is more convincing evidence of an association between early maternal nurturance and later cognitive performance for boys as compared to girls.

In contrast with the longitudinal results for maternal nurturance, the concurrent association between maternal warmth and children's school grades during the fifth grade was statistically significant for girls, but not for boys (Solomon et al., 1971). In conjunction with the longitudinal results, this finding may indicate that early maternal nurturance influences boys' cognitive performance during the school years, whereas provision of maternal nurturance during the school years has a stronger effect upon girls' cognitive development. Replication of these results is clearly needed, however, before conclusions can be drawn.

In the remaining studies conducted on the relation between maternal nurturance and children's cognitive performance, combined samples of boys and girls were used. Two of these studies provided support for the conclusion that maternal nurturance is positively associated with children's cognitive performance (Estrada et al., 1987; Hess et al., 1984). In a third investigation, both positive and negative correlations between measures of maternal responsivity (obtained at three months of age) and measures of children's cognitive performance (measured at six years of age) were obtained (Coates & Lewis, 1984). As observed by the researchers, it is difficult to explain why the various aspects of maternal responsivity were differentially correlated with the measures of cognitive ability. One possibility, however, is that various forms of responsivity (e.g., proximal versus distal responsivity) are experienced as being more or less nurturing by children, which may result in different levels of security and different task-related behaviors.

With respect to paternal nurturance, only one study could be located in which associations with school-age children's cognitive performance were investigated. In this study, aspects of paternal nurturance were assessed when children were 21 months of age and cognitive performance was assessed repeatedly when children were between the ages of 6 and 18 years (Honzik, 1967). It was found that closeness of father-child relations was associated with girls' intellectual performance at 8 and 9 years

of age and friendliness was associated with girls' performance at 8, 9, and 10 years of age. None of the measures of paternal nurturance (closeness, friendliness, or expression of affection) were associated with boys' intellectual performance at any age during the school years (Honzik, 1967). To date, the association between concurrent measures of paternal nurturance and school-age children's cognitive performance has not been investigated. Consequently, there is insufficient data from which to draw even tentative conclusions about the impact of paternal nurturance upon school-age children's cognitive development.

Three studies have been conducted in which combined measures of maternal and paternal nurturance were used. Moore (1968) reported that the emotional atmosphere of the home at three years of age was associated with boys' and girls' cognitive performance at both seven and eight years of age. Bradley et al. (1988) reported that concurrent measures of the emotional climate of the home, parental responsiveness, and parental involvement were associated with Grade 4 and 5 children's cognitive performance. Steinberg et al. (1989) found that parental nurturance was significantly correlated with 11- to 16-year-old children's school grades. Because maternal and paternal nurturance were assessed in combination, however, it is unknown if these results are related to the gender of the parent.

To summarize, the research findings for school-age children suggest that early maternal nurturance is associated with boys' cognitive performance, whereas later maternal nurturance is

associated with girls' cognitive performance. This conclusion is very tentative, however, as each relation has only been investigated in one study. Early paternal nurturance appears to enhance girls', but not boys', cognitive performance during the school years, although only one study could be located in which this relation was addressed. No investigations appear to have been conducted on the concurrent association between paternal nurturance and school-age children's cognitive performance.

Parental Nurturance and Cognitive Performance: Summary

When the investigations on the association between parental nurturance and children's cognitive performance are considered collectively, it appears that early maternal nurturance affects boys during both the preschool and school years and early paternal nurturance affects girls during both the preschool and school years. Concurrent maternal nurturance appears to be important for girls at both age levels, whereas concurrent paternal nurturance appears to be important for boys during the preschool years. No research on the concurrent association between paternal nurturance and children's cognitive performance during the school years is currently available.

Parenting Practices and Children's Cognitive Performance:

Conclusions

Although it is evident that parental encouragement of independence, low restrictive control, and nurturance are positively correlated with children's cognitive performance, variations in the relations appear to exist across both gender

and age. To clarify the degree of empirical support for the various relations, Table 2 was constructed. Upon examination of Table 2, it is evident that many of the associations have received little attention in the empirical literature. Consequently, it is cautioned that some of the interpretations that follow are very tentative and require confirmation through future research.

From the research that has been conducted, there is consistent support for positive associations between preschool girls' cognitive performance and maternal encouragement of independence, low restrictive control, and nurturance. There is some evidence that girls' cognitive performance during the school years is associated with the above three maternal variables, but less research has been conducted with this age group and significant findings have not always been obtained. With regard to the paternal variables, no support for associations between preschool girls' cognitive performance and paternal restrictive control and nurturance has been found, although very little research has been conducted on these relations. For school-age girls, cognitive performance appears to be associated with both paternal encouragement of independence and nurturance.

When the results obtained for boys are considered, it appears that preschool boys' cognitive performance is positively associated with maternal encouragement of independence and nurturance. There does not appear to be a robust association between preschool boys' cognitive performance and maternal

Table 2
Proportion of Studies in Which Significant Associations Between Parenting Practices and Children's Cognitive Performance Were Found

	Sample characteristics													
	Combined				Males				Females					
	Preschool		School-age		Preschool		School-age		Preschool		School-age		Preschool	
	L	C	L	C	L	C	L	C	L	C	L	C	L	C
<u>Maternal Variables</u>														
Encouragement of independence	5/5	0/1	1/2	--	3/3	0/1	0/1	0/1	3/3	1/1	1/1	0/1		
Restrictive control	3/4	1/2	1/2	--	1/2	0/1	0/1	--	2/2	1/1	1/1 ^b	--		
Nurturance	5/5	3/4	3/3	--	3/3	2/2	1/1 ^b	0/1	3/3	2/2	1/1 ^b	1/1		
<u>Paternal variables</u>														
Encouragement of independence	--	--	--	--	--	--	--	0/1	--	--	--	1/1 ^a		
Restrictive control	--	--	--	--	--	3/3	--	--	--	0/1	--	--		
Nurturance	--	--	--	--	1/1 ^b	4/4	0/1	--	0/1	0/2	1/1 ^b	--		

Note. L = Longitudinal design; C = Concurrent design.
^a Curvilinear relation; ^b Inconsistent results across multiple measures.

restrictive control. During the school-age years, the only maternal variable that has a documented association with boys' cognitive performance is nurturance. This association was obtained in only one of two studies, however, and thus remains equivocal. With respect to fathers, preschool boys' cognitive performance appears to be positively associated with both low restrictive control and nurturance, whereas paternal encouragement of independence has not been investigated. The associations between school-age boys' cognitive performance and both paternal encouragement of independence and nurturance have each been investigated in one study only; in both cases the associations were not statistically significant. To date, paternal restrictive control has not been investigated in relation to school-age boys' cognitive performance.

Although it is clear that additional research is needed to determine the relations among dimensions of parenting and both boys' and girls' cognitive performance, even the existing research has given rise to discrepant interpretations. This is particularly true for parental nurturance. In the majority of the studies reviewed above, it was concluded that parental nurturance was positively associated with children's cognitive development. In Huston's (1983) review of the literature, however, she stated that a moderate level of parental nurturance appears to facilitate agentic behavior (e.g., cognitive performance), whereas a high level of parental nurturance appears

to promote communal behavior. The assumed curvilinear relation between parental nurturance and agentic behavior corresponds with the view that agentic behavior requires sufficient affection and support to provide confidence and security, but not so much that children fail to move away from parents (Stein & Bayley, 1973).

Because linear relations have been the focus of most investigations, it is difficult to determine if a curvilinear association exists between parenting variables and children's cognitive performance. Both Huston (1983) and Stein and Bailey (1973) inferred a curvilinear relation from the fact that agentic behavior appeared least likely to occur when children were exposed to a high level of babying, protectiveness, and other forms of holding children close to parents. In the present discussion, however, nurturance is interpreted as the provision of support and affection; it does not include sheltering children from new experiences and potential challenges. Similarly, punishment was considered to be an aspect of nurturance by Stein and Bailey, whereas it is considered to be a restrictive behavior in the present review. These differences in definition may explain why evidence of a curvilinear association between parental nurturance and children's cognitive performance was not identified in any of the studies reviewed above.

Stein and Bailey's (1973) assertion that children need to move away from their parents to develop agentic behavior is congruent with the model being investigated in the present study.

In contrast with Stein and Bailey, however, it is proposed that encouragement of independence is more effective than moderate (as compared to high) nurturance for promoting children's independence. This position is not entirely inconsistent with Stein and Bailey's view, as they themselves stated that achievement motivation should be fostered by supportive encouragement of independence and suppressed by parental rejection (p. 357). Consequently, there appears to be some agreement that both encouragement of independence and nurturance promote achievement behaviors in children. The amount of parental nurturance that best fosters achievement behaviors, however, is unclear. If there is a tendency for highly nurturant parents to be overprotective of their children, then Stein and Bailey may be correct in concluding that moderate nurturance best facilitates agentic behavior. To determine if moderate nurturance is most conducive to children's cognitive development, curvilinear associations will need to be investigated in future research.

A final point to consider when determining the association between parenting practices and children's cognitive performance is gender differences in the amount of encouragement of independence, restrictive control, and nurturance provided by parents. From the literature, it appears that parents tend to provide boys with more encouragement of independence and punishment, but less supervision, whereas girls tend to receive

more nurturance (Block, 1983). Moreover, gender-differentiated treatment appears to be more marked from fathers than from mothers (Block, 1983).

Although gender differences in socialization experiences should not be overlooked, it is important to recognize that higher frequencies of a given parenting behavior do not necessarily mean stronger effects. Instead, it appears that the effects of parenting practices are moderated by gender differences in social role expectations and in the closeness of the parent-child relationship. With respect to social role expectations, Oldershaw (1991) proposed that, regardless of the frequency, parenting behaviors have a stronger influence upon children's behavior when generalized social expectations for a given behavior are not well defined. In contrast, when there are clear social expectations for children to engage in a given behavior, parental influence is weaker. The basis for this hypothesis is that if children learn about the appropriateness of a certain behavior from numerous sources, then parental instruction is less salient to them. However, if parents are the predominant source of information about the appropriateness of a behavior, then parental messages are more influential.

Oldershaw's (1991) hypothesis appears to be more applicable to parental encouragement of independence than restrictive control and nurturance, as parental encouragement of independence is more closely associated with the promotion of a particular

class of behaviors (i.e., independence). Because generalized social expectations for independent behaviors are weaker for girls than for boys (Block, 1983), encouragement of independence from parents is expected to influence girls to a greater degree than boys. This is consistent with the research that has been conducted with school-age children, which is when children are exposed to a larger number of social influences. In contrast, because parental nurturance and restrictive control do not involve attempts to foster a particular class of behaviors (i.e., they can be expressed in response to a wide variety of behaviors), their influence upon children is not expected to be moderated by social role expectations to the same extent as parental encouragement of independence. Instead, gender differences in the closeness of the parent-child relationship (Huston, 1983) are expected to moderate the influence of parental nurturance and restrictive control. Further support for this hypothesis will be discussed in a following section on the association between parenting practices and children's task orientation.

Differing Measures of Cognitive Performance

In the above review, results obtained with divergent measures of cognitive performance were not differentiated because of the complexity of the findings and the lack of research conducted with each measure. Although there is insufficient data to conclude that different relations exist among parenting

practices and divergent measures of cognitive performance, there is some suggestion that this may, in fact, be the case. The cognitive measures used in the above investigations can be grouped into three categories: measures of crystallized ability (i.e., acquired skills), fluid ability (i.e., problem solving with unfamiliar stimuli), and combined crystallized-fluid ability. In this section, a brief summary of differences in the patterns of associations among parenting practices and the three categories of cognitive measures is provided.

With respect to parental encouragement of independence, it appears that maternal encouragement of independence is associated with all three categories of cognitive skills (Elardo et al., 1975; Gottfried & Gottfried, 1984). The association of both maternal and paternal encouragement of independence with crystallized ability appears to be stronger for girls than for boys (Hess & McDevitt, 1984; Solomon et al., 1971). For maternal restrictive control, associations with both boys' and girls' crystallized and combined crystallized-fluid abilities have been found (Barnard et al., 1984; Elardo et al., 1977). The association between maternal restrictive control and crystallized abilities appears to be stronger for girls than boys (Hess & McDevitt, 1984). In contrast, paternal restrictive control does not appear to be associated with girls' cognitive skills (Epstein & Radin, 1975), whereas some support for associations with boys' cognitive skills in all categories have been obtained (Epstein &

Radin, 1975; Radin, 1972, 1973).

When parental nurturance is considered, it appears that maternal nurturance is associated with all three categories of cognitive skills for both boys and girls (Barnard et al., 1984; Estrada et al., 1987). In school-age children, the association between maternal nurturance and crystallized abilities appears to be stronger for girls (Solomon et al., 1971), whereas the association between maternal nurturance and combined crystallized-fluid abilities appears to be stronger for boys (Honzik, 1967). For paternal nurturance, associations with all three categories of cognitive skills have been found for preschool boys, but not girls (Epstein & Radin, 1975; Radin, 1972). In contrast, an association between paternal nurturance and a measure of combined crystallized-fluid abilities was found for school-age girls, but not boys (Honzik, 1967).

Because few studies have been conducted with measures from each of the three categories of cognitive skills (i.e., crystallized, fluid, and combined crystallized-fluid abilities), the above findings do not provide convincing evidence that parenting practices are differentially related to divergent abilities. Theoretically, however, parenting practices would be expected to have a stronger influence on crystallized than fluid abilities, as crystallized abilities represent acquired skills, whereas fluid abilities are thought to be more biologically determined (Cattell, 1963). This may partly explain why measures

of fluid ability were rarely used in the above investigations. A second explanation for the lack of attention to fluid abilities, however, is that crystallized abilities are more practically significant, as they are a central component of scholastic achievement (Cattell, 1963). Scholastic achievement is highly valued in our society and thus may be of more practical interest than the ability to solve problems with unfamiliar stimuli (i.e., fluid abilities). Consequently, attention to crystallized abilities appears to be well-justified, at least from a practical point of view.

Parenting Practices and Children's Task Orientation

As discussed in the first section of this manuscript, the association between parenting practices and children's cognitive performance is hypothesized to be mediated by children's task orientation. The basis for this hypothesis is that parental encouragement of independence, nurturance, and low restrictive control are expected to promote children's task approach and persistence by enhancing their sense of competence and security (e.g., Bretherton, 1985; Sroufe, 1979). In addition, a sense of competence and security (as well as experience in interacting with the environment) is expected to facilitate the development of the ability to regulate actions without assistance from others (e.g., Bretherton, 1985). It is anticipated that the above behaviors, referred to as mastery motivation, persistence, and impulse control, enhance children's cognitive performance. In

this section, the research addressing the associations between parenting practices and the three aspects of task orientation will be reviewed. As will be seen, both global and specific measures of task orientation have been employed in research investigations. Before examining the research, however, it is important to clarify the meaning of mastery motivation, persistence, and impulse control.

Defining Mastery Motivation, Persistence, and Impulse Control

The variables of mastery motivation, persistence, and impulse control represent the most commonly identified features of the construct of task orientation. Of the three variables, mastery motivation and persistence are most closely related, with impulse control referring to a relatively different set of behaviors and attributes. In this section, both conceptual and operational definitions of the three defining characteristics of task orientation will be presented.

Because of the relation between mastery motivation and persistence, it is helpful to discuss these two variables together. Mastery motivation refers to a desire to master skills and to derive satisfaction from being effective (Harter, 1981; White, 1959). Persistence refers to continued effort to complete activities, even in the face of obstacles. Mastery motivation and persistence are conceptually related, as persistence is considered to be a behavioral manifestation of mastery motivation. In fact, many writers consider persistence to be the

central defining feature of mastery motivation (e.g., Feather, 1962; Jennings, Harmon, Morgan, Gaiter, & Yarrow, 1979; Yarrow, McQuiston, Macturk, McCarthy, Klein, & Vietze, 1983). The rationale for this is that continued effort on tasks is interpreted as indicating a desire to master skills, as well as derivation of satisfaction from successful completion of tasks.

Although many writers consider persistence to be a behavioral manifestation of mastery motivation, it is important to appreciate that not all research has been conducted with this association in mind. Instead, some researchers have investigated the correlates of persistence without making reference to its conceptual association with mastery motivation. In these investigations, the most frequently used measure of persistence is the amount of time an individual spends working on a challenging task. Another measure of persistence that has been used in research investigations is low frequency of requests for assistance with tasks.

In addition to operationally defining mastery motivation in terms of persistence (i.e., time spent on tasks and completion of tasks without assistance), mastery motivation has been defined in terms of exploration, environmental manipulation, spontaneous play, stimulus seeking, and sensation seeking (Anastasi, 1984). All of these behaviors are assumed to reflect gratification associated with attempts to master the environment. In the review that follows, research conducted with measures of

persistence will be differentiated from research conducted with other indicators of mastery motivation. However, because all of these behaviors are considered to reflect efforts to master tasks, they will collectively be referred to as "mastery behaviors".

The third feature of task orientation, impulse control, refers to self-regulation of behavior. Impulse control has been defined in terms of spontaneous inhibition of a forbidden behavior, ability to restrain from touching a desirable object, ability to inhibit motor impulses, accurate performance on the Matching Familiar Figures Test (Kagan, 1966), and absence of overreactivity to frustration. Impulse control differs from mastery behaviors, as impulse control is not skill- or goal-oriented. However, the ability to self-regulate may contribute to mastery behaviors, as it may facilitate attention-focusing and on-task behavior. As will be seen in the following sections, impulse control has been measured both separately and in conjunction with mastery behaviors.

Associations Among Parenting Practices and Global Measures of Task Orientation

Two investigations of the associations among parenting practices and global measures of task orientation have been conducted. In the first study, Baumrind (1973) found that concurrent measures of both maternal and paternal control (defined as the use of firm discipline, but not intrusive or

restrictive parental behavior) and encouragement of independence characterized the family relations of 3- and 4-year-old children who were high on task approach, vitality, self-reliance, and self-control. This set of attributes closely corresponds to the attributes of mastery motivation, persistence, and impulse control. The family relations of children who were low on these attributes were characterized by the use of coercive control (i.e., withdrawal of love and ridicule), low encouragement of independence, and overindulgence.

Although it may seem contradictory that both parental encouragement of independence and control were positively associated with children's task orientation, Baumrind (1973) emphasized that control only referred to firm discipline (i.e., consistent enforcement of well-established rules) and not to restriction of children's behavior. Thus, she argued that firm discipline appears to have a positive influence upon children's task orientation, whereas restrictiveness does not, possibly because restrictiveness interferes with children's sense of self-determination. The distinction made by Baumrind is similar to Maccoby and Martin's (1983) distinction between love-oriented and power-oriented discipline (see earlier discussion).

A second investigation into the association between parenting practices and a global measure of children's task orientation was conducted by Baruch and Barnett (1981). Girls' task orientation was defined in terms of persistence, mastery

motivation, independence, and distractibility. The maternal behaviors assessed in this study included maturity demands, pressure for self-reliance, reactions to dependent behavior, firm enforcement, reasoning, control, and responsiveness. When the concurrent associations between the maternal variables and 4- and 5-year-old girls' task orientation were examined, only two significant correlations were found. Specifically, mothers who did not respond to their daughters' requests for help on an easy puzzle task tended to have daughters who were highly task-oriented. This maternal behavior can be considered to reflect encouragement of independence, as it involves promoting the independent completion of a task that is within a child's range of ability. The other maternal variable positively associated with girls' task orientation was maternal control (the operational definition of this term was not provided).

Because multiple measures of maternal encouragement of independence, restrictive control, and nurturance were obtained in Baruch and Barnett's (1981) investigation, it is surprising that only two of the measures were associated with girls' task orientation. If the dimensions of task orientation (i.e., mastery behaviors and impulse control) had been assessed separately, it is possible that more of the parenting measures would have been associated with one of the two dimensions of task orientation. This proposal is based on the possibility that some parenting practices are differentially related to the components

of task orientation.

From the research addressing the association between parenting practices and global measures of task orientation, two tentative conclusions can be drawn. First, encouragement of independence appears to facilitate a positive task orientation. Second, parental control (but not parental restrictiveness) appears to promote a positive task orientation. Although no evidence was found for an association between parental nurturance and global measures of children's task orientation, little research has been conducted in this area. Associations between parental nurturance and the individual components of children's task orientation (i.e., mastery behaviors and impulse control), however, have been documented, as will be discussed below.

Associations Among Parenting Practices and Children's Mastery Behaviors

In comparison with the research on the associations among parenting practices and children's cognitive performance, less attention has been directed toward the associations among parenting practices and children's mastery behaviors. However, the relations of parental encouragement of independence, restrictive control, and nurturance with children's mastery behaviors have each received some attention in the literature. The purpose of this section is to summarize this research and to identify tentative conclusions about the associations among parenting practices and boys' and girls' mastery behaviors.

Parental encouragement of independence and children's mastery behaviors. The associations between maternal and paternal encouragement of independence and children's mastery behaviors have been investigated for both girls and boys. To date, however, all of the research has been conducted with preschool children. For girls, it appears that maternal and paternal encouragement of independence are not associated with persistence (Baumrind & Black, 1967), and only very specific aspects of maternal and paternal encouragement of independence are associated with other mastery behaviors (i.e., confidence, initiation of activities, and degree of comfort in new situations). Specifically, it appears that parental structuring of tasks during a teaching situation is negatively associated with girls' mastery behaviors, with the association being more robust for mothers than for fathers (Harrington, Block, & Block, 1978).

For preschool boys, the evidence for an association between parental encouragement of independence and mastery behaviors is stronger than for preschool girls. With respect to paternal encouragement of independence, various measures of the extent to which fathers encouraged boys' independence in a teaching situation were associated with boys' mastery behaviors, although some correlations were not significant (Harrington et al., 1978). In addition, a measure of the extent to which both parents respected children's decisions was positively associated

with measures of both persistence and other mastery behaviors for boys (Baumrind & Black, 1967). With respect to maternal encouragement of independence, associations with both boys' persistence and other mastery behaviors were found in one study (Baumrind & Black, 1967). In another study, however, only one measure of maternal encouragement of independence (in a teaching situation only) was associated with boys' mastery behaviors (Harrington et al., 1978).

From the above results, it appears that paternal and maternal encouragement of independence are associated with both boys' and girls' mastery behaviors, with the evidence being more convincing for boys than for girls. In both genders, however, these associations have not been obtained consistently, perhaps because of variations in the measures used. Because both of the above studies were conducted with preschool children, it is impossible to determine if parental encouragement of independence is associated with school-age children's mastery behaviors. As a result, the need for research with school-age samples is apparent.

Parental restrictive control and children's mastery behaviors. Both maternal and paternal restrictive control have been investigated in association with girls' and boys' mastery behaviors. All of the investigations, however, have been conducted with preschool children. For girls, parental (mothers and fathers were considered together) use of coercive power was

negatively associated with girls' persistence (Baumrind & Black, 1967). When other measures of mastery behavior were used (i.e., confidence, initiation of activities, and degree of comfort in new situations), nonsignificant associations with measures of paternal (Baumrind & Black, 1967; Epstein & Radin, 1975; Harrington et al., 1978) and maternal (Baumrind & Black, 1967; Harrington et al., 1978) restrictive control were obtained.

Consistent with the results obtained for girls, both significant and nonsignificant correlations between parental restrictive control and boys' mastery behaviors have been found. In one investigation, parental (mothers and fathers were considered together) use of coercive power was not associated with boys' persistence (Baumrind & Black, 1967). When other measures of mastery behaviors were used, both significant (Harrington et al., 1978) and nonsignificant correlations were obtained (Baumrind & Black, 1967; Epstein & Radin, 1975). With respect to maternal restrictive control, a significant negative correlation with boys' mastery behaviors was obtained in one investigation (Harrington et al., 1978) and a nonsignificant correlation was obtained in another investigation (Baumrind & Black, 1967).

From the above results, it is apparent that the association between parental restrictive control and mastery behaviors has not been consistently documented for either boys or girls. Inconsistent results across studies may have emerged from

differences in the measures of restrictive control and mastery behaviors used. Because all of the above research was conducted with preschool children, research with school-age children is clearly needed.

Parental nurturance and children's mastery behaviors. In comparison with parental encouragement of independence and restrictive control, more research has been conducted on the association between parental nurturance and children's mastery behaviors. Moreover, with respect to maternal nurturance, this research has been conducted over a wider range of ages. Results obtained with combined samples of boys and girls will be discussed first, followed by the results obtained when boys and girls were considered separately.

In combined samples of boys and girls, maternal, but not paternal, nurturance has been investigated in association with children's mastery behaviors. Associations between maternal nurturance and measures of persistence have been found for children at the ages of 6 months (Yarrow et al., 1975), 2 years (Matas et al., 1978), and 4, 6, and 12 years (Estrada et al., 1987). When other measures of mastery behaviors were used, significant associations also were obtained at the ages of 6 months (Yarrow et al., 1975), 2 years (Matas et al., 1978), and 4 to 6 years (Arend, Gove, & Sroufe, 1979). A nonsignificant association between maternal nurturance at 6 months of age and children's mastery behaviors at 19 months of age has been

reported (Yarrow et al., 1975), but may have been due to a relatively small sample size at the 19-month age level ($N = 19$). Overall, the research with combined samples of boys and girls provides convincing evidence of an association between maternal nurturance and children's mastery behaviors. Only one of these investigations, however, was conducted with children who were over the age of six years.

Less convincing evidence for an association between maternal nurturance and children's mastery behaviors has been obtained when boys and girls were considered separately. This may be because a larger sample is needed to consistently identify the relation. Nonsignificant associations between maternal nurturance and both boys' and girls' mastery behaviors were reported in an investigation conducted with 3- and 4-year-old children (Baumrind & Black, 1967). In an investigation in which multiple single-item measures of maternal nurturance were used, only one of the measures was associated with 3-year-old boys' or girls' mastery behaviors (Harrington et al., 1978). For girls, maternal warmth and supportiveness in a teaching situation was negatively correlated with mastery behaviors (Harrington et al., 1978). For boys, maternal joking and playing was positively associated with mastery behaviors. The negative correlation obtained for girls may indicate that when mothers are overly supportive in teaching situations, girls do not feel challenged to master the environment. Maternal nurturance in other

situations, however, does not appear to influence girls' mastery behaviors. For boys, the one significant association may indicate that only some aspects of maternal nurturance promote mastery behaviors. The validity of this conclusion is questionable, however, as only single-item measures of nurturance were used. Multiple-item measures of nurturance may be helpful in clarifying the association between the global construct of maternal nurturance and children's mastery behaviors.

In contrast with maternal nurturance, there is preliminary evidence of a gender difference in the association between paternal nurturance and children's mastery behaviors. For 4-year-old girls, paternal nurturance was associated with one of two measures of mastery behaviors (Epstein & Radin, 1975). In another study, multiple measures of paternal nurturance were unrelated to 3-year-old girls' mastery behaviors (Harrington et al., 1978). For boys, measures of paternal nurturance were associated with measures of mastery behaviors in two studies (Epstein & Radin, 1975; Harrington et al., 1978). The potentially stronger association between paternal nurturance and boys' mastery behaviors, as compared with girls' mastery behaviors, may indicate that fathers have a stronger influence on their sons, perhaps because boys tend to share a closer relationship with their fathers than do girls (Huston, 1983).

In summary, some support for an association between maternal nurturance and girls' and boys' mastery behaviors has been found,

particularly when combined gender samples were used. Although there is some evidence that paternal nurturance is associated with girls' mastery behaviors, it appears that the association between paternal nurturance and boys' mastery behaviors is stronger. To date, only one investigation appears to have been conducted with children over the age of six years. Consequently, additional research is clearly needed to determine the nature of the relation between parental nurturance and children's mastery behaviors during the school years.

Parenting Practices and Children's Mastery Behaviors: Summary.

From the above research, it appears that both maternal and paternal encouragement of independence are associated with boys' and girls' mastery behaviors, with the association being somewhat stronger for boys than girls. The apparent gender difference is inconsistent with Oldershaw's (1991) suggestion that encouragement of independence would have a weaker impact upon boys than girls, because of stronger social expectations for boys' independence. It is possible, however, that parental encouragement of independence has a stronger influence upon girls than boys during the school years, as this is when children are exposed to a wider range of socialization agents (e.g., teachers, classmates, members and instructors of extracurricular activities). This possibility can only be addressed through further research.

With regard to maternal and paternal restrictive control,

negative associations with both boys' and girls' mastery behaviors have been obtained, although not consistently. It may be that restrictive control does not have as significant of an impact upon children's mastery behaviors as do other parenting practices. Associations between parental restrictive control and children's mastery behaviors have not been investigated in school-age samples.

From the research on parental nurturance, strong support for an association between maternal nurturance and children's mastery behaviors was obtained when combined samples of boys and girls were used. Somewhat less support was obtained when boys and girls were considered separately, which suggests that a relatively large sample is needed to identify the relation. With regard to paternal nurturance, evidence of an association with both boys' and girls' mastery behaviors was obtained, although the relation appears to be somewhat stronger for boys than girls. This gender difference may be due to the closer relationship that fathers tend to have with their sons as compared to their daughters (Huston, 1983). As with other parenting factors, the research on the association between parental nurturance and children's mastery behaviors has been conducted with preschool children. Consequently, it is not known if the same pattern of relations would be obtained in samples of older boys and girls.

Associations Among Parenting Practices and Children's Impulse Control

As with mastery behaviors, the parental correlates of impulse control have been investigated. Parental encouragement of independence, restrictive control, and nurturance have each been assessed in conjunction with children's impulse control. This research will be reviewed below.

Parental encouragement of independence and children's impulse control. Two investigations have been conducted on the association between parental encouragement of independence and children's impulse control. In one investigation, a combined sample of 9- to 12-month-old boys and girls was used (Stayton, Hogan, & Ainsworth, 1971). In this study, it was found that maternal provision of opportunities to explore the environment was positively associated with children's impulse control. In the second study, maternal encouragement of independence was positively associated with 2-year-old boys' impulse control (Lytton, 1977). In fact, maternal encouragement of independence was the strongest predictor of boys' impulse control, when multiple measures of parenting practices (e.g., parental control and nurturance, but not paternal encouragement of independence) were entered into a regression equation. Consequently, maternal encouragement of independence may play a critical role in the development of impulse control, at least for infants and toddlers.

Although consistent evidence of a positive association between maternal encouragement of independence and children's impulse control was obtained in the above investigations, the relation has not been investigated separately for girls or for children older than two years of age. Moreover, the association between paternal encouragement of independence and children's impulse control has not been determined. Thus, although there is preliminary evidence that encouragement of independence may facilitate the development of impulse control, further confirmation of this relation is required.

Parental restrictive control and children's impulse control.

In comparison with encouragement of independence, more attention has been directed toward the association between parental restrictive control and children's impulse control. Most of this research has been conducted with preschool children and only mothers were considered in the majority of the investigations. Research conducted with combined samples of boys and girls will be discussed first, followed by research conducted with separate samples of boys and girls.

From the research in which boys and girls were considered together, it appears that age differences may exist in the association between maternal restrictive control and children's impulse control. For 9- to 12-month-old children, maternal intrusiveness (i.e., mother imposes her will on the child regardless of the child's mood, wishes, or current activity) was

negatively correlated with children's impulse control (Stayton et al., 1971). Frequency of maternal commands and physical interventions were unrelated to children's impulse control at this age level (Stayton et al., 1971). For 6- to 12-year-old children, however, maternal commands during a goal-oriented activity were associated with low impulse control (Copeland, 1985). Together, these results may indicate that maternal commands only interfere with the development of impulse control in older children, perhaps because responsibility for one's own actions increases with age. In younger children, maternal commands may be necessary for the regulation of children's behavior. Maternal intrusiveness, however, is unlikely to facilitate the development of impulse control at any age. This is because maternal intrusiveness is expected to negatively influence opportunities to interact with the environment (Bretherton, 1985), as well as children's sense of self-determination (Maccoby & Martin, 1983). Experience interacting with the environment and self-determination are considered to be critical in the development of self-regulatory skills (Bretherton, 1985; Maccoby & Martin, 1983).

In the remaining investigations conducted on the association between parental restrictive control and children's impulse control, boys and girls were considered separately. In the one investigation conducted with girls, early maternal control (both restrictive and nonpunitive control, measured at 6, 13 and 24

months of age) was unrelated to impulse control at 6 years of age (Olson, Bates, & Bayles, 1990). For boys, maternal restrictive control at 13 months was negatively associated with impulse control at 6 years of age, whereas maternal restrictive control at 6 months was not related to impulse control (Olson et al., 1990). Maternal use of nonpunitive control at 24 months was positively associated with boys' impulse control. Together, these results appear to indicate that the form of control used by mothers has a stronger influence on the development of impulse control in boys than girls. It is possible that boys' impulse control is more strongly affected by methods of parental control because parents tend to engage in more control efforts with boys than girls (Block, 1983).

In an investigation conducted with 2-year-old boys, the associations between children's impulse control and both maternal and paternal restrictive control were assessed (Lytton, 1977). Although multiple measures of parental control were obtained, the zero-order correlations between these measures and boys' impulse control were not reported. Instead, all of the parenting measures were entered into a stepwise multiple regression. The results of the analysis were that two of the measures of parental control significantly predicted impulse control, when they were entered into the regression equation, following the entry of another parenting variable (encouragement of independence). The two aspects of parental control that significantly predicted

boys' impulse control were maternal use of material rewards (negative association) and paternal use of mild forms of control, such as suggestions (positive association). The other measures of parental control (maternal withdrawal of love, suggestions, praise, criticism, and maternal and paternal use of physical punishment) did not attain statistical significance in the regression equation. These results do not indicate that the other measures of parental control were not associated with boys' impulse control. Instead, these measures simply were not significant predictors when they were considered in combination with other parenting measures.

The apparent benefit of mild forms of paternal control in Lytton's (1977) investigation is consistent with Olson et al.'s (1990) finding that nonpunitive control enhances boys' impulse control. As was discussed above, use of less directive control techniques may aid in the development of a sense of self-determination. In contrast, use of material rewards may operate similarly to restrictive control by impeding children's sense of self-determination (Maccoby & Martin, 1983).

To summarize, three tentative conclusions can be drawn about the relation between parental control and children's impulse control. First, maternal restrictive control appears to have a stronger negative influence upon the development of impulse control in boys than girls (based on one study only). Second, maternal restrictive control may have a stronger negative

influence upon older children than younger children. And third, unlike restrictive control, mild forms of control may enhance children's impulse control. Conclusions about the influence of parental restrictive control on school-age children's impulse control, particularly when boys and girls are considered separately, must await further research.

Parental nurturance and children's impulse control. From the research conducted on the association between parental nurturance and children's impulse control, inconsistent results have been obtained when combined samples of boys and girls were used. When maternal nurturance was inferred from the quality of mother-child attachment at 12 months of age, associations with children's impulse control at both 21 months (Londerville & Main, 1981) and 4 to 6 years of age (Arend et al., 1979) were not significant. In contrast, measures of maternal responsiveness and acceptance were positively associated with impulse control in a sample of 9- to 12-month-old children (Stayton et al., 1971). Although inconsistent results may have been obtained because of differences in the measures of maternal nurturance used, findings obtained with separate samples of boys and girls (discussed below) indicate that some of the above results may have been sample specific.

Only one study has been conducted on the association between maternal nurturance and girls' impulse control; two studies have addressed this relation in boys. For girls, quality of

attachment at 6 and 13 months was not associated with impulse control at 6 years of age (Olson et al., 1990). For boys, quality of attachment at 13 months, but not at 6 months, was positively associated with boys' impulse control (Olson et al., 1990). When both maternal and paternal nurturance were entered into a stepwise regression analysis with other parenting practices (e.g., encouragement of independence and restrictive control), they did not significantly predict 2-year-old boys' impulse control (Lytton, 1977). However, because zero-order correlations between parental nurturance and boys' impulse control were not reported, conclusions about the independent associations between these variables could not be determined.

From the above results, it appears that maternal nurturance may promote boys', but not girls', impulse control. This conclusion, however, is very tentative, as it is based on only one study. Moreover, all of the research reviewed above was conducted with children who were either six years of age or younger. Consequently, it is not known if similar results would be obtained with older children. If maternal nurturance influences boys', but not girls' impulse control, it may be because maternal nurturance moderates the effects of the more frequent control efforts to which boys are exposed (Block, 1983). This hypothesis is consistent with Maccoby and Martin's (1983) proposal that nurturance enhances children's willingness to behave in accordance with parental standards.

Parenting Practices and Children's Impulse Control: Summary

To summarize, the majority of the research on the association between parenting practices and children's impulse control has been conducted with preschool children. From this research, it appears that maternal encouragement of independence has a positive influence upon the development of impulse control, whereas paternal encouragement of independence has not been assessed in relation to children's impulse control. With respect to parental restrictive control, negative associations with impulse control have been obtained. This association has been documented most frequently with boys and may be stronger for school-age children than for preschool children. Finally, with regard to maternal nurturance, positive associations have been reported with children's impulse control, particularly for boys. No information on the association between paternal nurturance and children's impulse control appears to be available. Additional research, particularly with school-age children, is needed before conclusions can be drawn about the associations among parenting practices and children's impulse control.

Task Orientation and Cognitive Performance

The final relation in the proposed model (see Figure 1) is between children's task orientation and cognitive performance. Both aspects of task orientation (mastery behaviors and impulse control) are expected to enhance cognitive performance. Mastery behaviors should promote cognitive performance by increasing the

level of involvement in tasks, heightening attention toward the goals of tasks, and leading to increased efforts to learn and complete tasks (Lange, MacKinnon, & Nida, 1989). In addition, mastery behaviors are expected to enhance cognitive performance by promoting acquisition of information about the environment, which would prove useful in completing a wide range of tasks.

As with mastery behaviors, impulse control is hypothesized to enhance cognitive performance. Impulse control can be expected to result in careful work habits, which would facilitate both learning and more accurate task performance. In addition, both impulse control and mastery behaviors are expected to be positively associated with academic performance because both are considered to be desirable attributes within the school setting (Mevarech, 1985). In this section, the research addressing the relations of mastery behaviors and impulse control with cognitive performance will be examined. Although it will become apparent that most of the research has been conducted with preschool children, the associations of both mastery behaviors and impulse control with cognitive performance have been investigated in school-age samples. In the following three sections, the associations between cognitive performance and both combined and separate measures of mastery behaviors and impulse control will be addressed.

Global Task Orientation and Cognitive Performance

The association between cognitive performance and a combined

measure of mastery behaviors and impulse control has been investigated in one study. Using a sample of male and female children in Grades 2 and 4, Mevarech (1985) found that children's task orientation (i.e., adaptability, threshold, persistence, and distractibility) was correlated with scores on two cognitive measures: a standardized arithmetic achievement test and teachers' ratings of arithmetic achievement. Correlations were significant for both the Grade 2 and Grade 4 children, although possible gender differences were not addressed. As noted by Mevarech, the use of a composite measure of task orientation made it impossible to determine which specific components of task orientation were associated with cognitive performance. From this investigation, however, it is evident that at least one aspect of task orientation (i.e., mastery behaviors or impulse control) is associated with school-age children's cognitive performance.

Mastery Behaviors and Cognitive Performance

An association between mastery behaviors and cognitive performance has been documented for children between the ages of 6 months and 16 years. The majority of the investigations, however, have been conducted with preschool children. With combined samples of boys and girls, concurrent associations between measures of persistence and cognitive performance were obtained when children were 12 months (Redding, Morgan, & Harmon, 1988), 2 years (Sigman, Cohen, Beckwith, & Topinka, 1987), 4

years (Palisin, 1986), and 6 years (Martin & Holbrook, 1985) of age. In two investigations, nonsignificant concurrent correlations between persistence and cognitive performance were obtained when children were 2 (Redding et al., 1988), and 3 years (Jennings, Yarrow, & Martin, 1984; Redding et al., 1988) of age.

When other measures of mastery behaviors were used, all concurrent associations with cognitive performance were statistically significant. This association was investigated when children were 6 months (Yarrow, McQuiston, et al., 1983), 3 to 5 years (Lange, MacKinnon, & Nida, 1989), and 4 years (Palisin, 1986) of age. Although significant findings were not always obtained when multiple measures of mastery behaviors and cognitive performance were used, the majority of the associations between measures of mastery behaviors and cognitive performance were statistically significant. Nonsignificant findings may have resulted from differences in the measures used and may indicate that global measures are most useful in determining the association between mastery behaviors and cognitive performance.

Consistent with the concurrent findings for combined samples of boys and girls, longitudinal results indicate that there is a significant association between children's mastery behaviors and cognitive performance. In three investigations, measures of persistence predicted later cognitive performance in children aged 2, 5, and 7 to 8 years (Messer, Rachford, McCarthy, & Yarrow, 1987; Palisin, 1986; Sigman et al., 1987). When other

measures of mastery behaviors were used, mastery behaviors predicted later cognitive performance in six studies conducted with children ranging in age from 16 months to 8 years (Colombo, Mitchell, Dodd, Coldren, & Horowitz, 1988; Messer et al., 1987; Palisin, 1986; Yarrow et al., 1975; Yarrow et al., 1983; White, 1978). In one of the investigations, mastery behaviors at 6 months of age were not associated with cognitive performance at 19 months of age, but were associated with cognitive performance at 3 years of age (Yarrow et al., 1975). Given that few nonsignificant findings have been obtained, there is convincing evidence for an association between mastery behaviors and children's cognitive performance, at least during the preschool and early school years. Nonsignificant results may have been either sample specific or may have resulted from differences in the measures used.

From the investigations in which boys and girls were considered separately, stronger support for an association between mastery behaviors and cognitive performance was found for boys than girls. In one study, two measures of mastery behaviors were associated with 4-year-old boys' performance on two out of three measures of cognitive performance (Epstein & Radin, 1975). For girls, one of the measures of mastery behaviors was associated with one of the measures of cognitive performance and the other measure of mastery behaviors was associated with two of the measures of cognitive performance. In a second

investigation, conducted with 3-year-old children, mastery behaviors were associated with one index of cognitive performance for girls and with three indices of cognitive performance for boys (Jennings, Yarrow, & Martin, 1984). In one additional investigation, mastery behaviors were associated with cognitive performance for boys, but not for girls, aged 7 years of age (Harrington et al., 1978). In a study by Sigman et al. (1987), a combined gender sample was used because similar patterns of correlations were obtained for boys and girls. As reported above, the results obtained in this investigation consisted of significant associations between mastery behaviors at 2 years of age and cognitive performance at 2, 3, and 5 years of age. Consequently, it appears that mastery behaviors are associated with cognitive performance for children of both genders during the preschool school years, although the association may be stronger for boys than for girls.

In addition to investigating the zero-order correlation between mastery behaviors and children's cognitive performance, researchers have considered this relation in conjunction with other variables. In one investigation, it was determined that mastery behaviors predicted cognitive performance in 5-year-old children, even after controlling for the effects of an earlier measure of cognitive performance (Sigman et al., 1987). In another investigation, mastery behaviors predicted school achievement in Grade 1, after the effects of IQ were controlled

(Martin & Holbrook, 1985). Both of these investigations provide support for the view that mastery behaviors enhance cognitive performance, quite independent of ability. As a result, cognitive performance appears to be a function of both ability and task orientation (Sigman et al., 1987).

An additional investigation into the comparative importance of mastery behaviors and ability for children's cognitive performance was conducted by Yarrow et al. (1983). These researchers found that mastery behaviors at 6 months of age were a stronger predictor of cognitive performance at 12 months of age than was cognitive performance at 6 months of age. This finding is congruent with the view that children's cognitive development is substantially enhanced by mastery behaviors.

Together, the above studies provide convincing support for the view that mastery behaviors positively influence children's cognitive performance. Moreover, this relation appears to exist independently of the contribution made by cognitive ability to cognitive performance. The majority of the research on the relation between mastery behaviors and cognitive performance has been conducted with preschool children. Consequently, it is not clear if this relation also exists in school-age samples.

Impulse Control and Cognitive Performance

The association between children's impulse control and cognitive performance has been documented across a wide range of age levels. When combined samples of boys and girls were used,

associations between impulse control and cognitive performance were obtained with children aged 9 to 12 months (Stayton et al., 1971), 18 to 30 months (Lee, Vaughn, & Kopp, 1983), 3 to 5 years (Lange et al., 1989), 5 years (Massari, Haywieser, & Meyer, 1969), 5 to 6 years (Loo & Wenar, 1971), and 7 years (Halverson & Waldrop, 1976; Weithorn, Kagen, & Marcus, 1984). As well, impulse control was associated with cognitive performance for children in both Grades 5 and 9 (Nuessle, 1972). The association between impulse control and cognitive performance was not statistically significant in two investigations, which were conducted with 1- and 2-year-old children (Londerville & Main, 1981; Lytton, 1977). These nonsignificant findings may have been either sample specific or may have resulted from differences in the measures used. Although significant correlations were not always obtained between all measures of impulse control and all measures of cognitive performance, the majority of the associations between measures of impulse control and cognitive performance were statistically significant.

Possible gender differences in the association between impulse control and cognitive performance were investigated in two studies. Using a measure of impulse control obtained when children were in Grade 4, Barrett (1977) found that impulse control significantly predicted both boys' and girls' cognitive performance during Grades 4, 5, and 6 (Barrett, 1977). Kagan, Pearson, and Welch (1966) also found that impulse control was

associated with both boys' and girls' cognitive performance in a sample of Grade 1 children. From these investigations, it appears that the findings obtained with combined gender samples are equally applicable to both boys and girls.

As with mastery behaviors, the association of impulse control with cognitive performance has been investigated in conjunction with measures of cognitive ability. In an investigation by Lee et al. (1983), it was found that impulse control in 18- to 30-month-old children was associated with poor memory performance, even when age and cognitive ability were controlled. This finding is consistent with the view that impulse control significantly contributes to cognitive performance, above and beyond the contribution of cognitive ability.

From the above research, it appears that impulse control is positively associated with children's cognitive performance across a wide range of ages. This association appears to apply to both boys and girls. Impulse control appears to make a contribution to children's cognitive performance independently of cognitive ability, and thus seems to play a critical role in enhancing children's cognitive performance.

Task Orientation and Cognitive Performance: Summary

In summary, there is convincing evidence that both mastery behaviors and impulse control are associated with children's cognitive performance. Although these associations appear to

exist for both boys and girls, there is some evidence that the association between mastery behaviors and cognitive performance is stronger for boys than girls. The reason for this possible gender difference is unclear and warrants confirmation. As with the other components of the model being investigated, the majority of the research on the association between task orientation and children's cognitive performance was conducted with preschool children. Associations of both mastery behaviors and impulse control with cognitive performance, however, have been reported in school-age samples.

Investigating the Mediating Role of Task Orientation

From the above review, it is evident that each relation in the proposed model (see Figure 1) has been investigated. In addition, the mediating role of task orientation has been considered in two studies (Epstein & Radin, 1975; Steinberg et al., 1989). In both of these studies, measures of mastery behaviors, but not impulse control, were used to define task orientation. The results of both investigations are consistent with the view that mastery behaviors mediate the associations among parenting practices and children's cognitive performance. As will be seen, however, more comprehensive investigation of the model is needed.

In a study by Steinberg et al. (1989), 11- to 16-year-old boys and girls completed questionnaires on parental behaviors and psychosocial maturity. The measure of psychosocial maturity was

comprised of three scales: work orientation (aspirations for competent work performance and capacity to experience pleasure from work), self-reliance (absence of excessive dependence on others, a sense of control over one's life, and initiative), and identity (self-esteem, concern with life goals, internalization of values, and clarity of self-concept). Both work orientation and self-reliance appear to be strongly associated with the concept of mastery behaviors. Subjects' English and mathematics grades for each term of the following year were obtained and were averaged to yield an approximate measure of grade-point average (GPA).

Steinberg et al. (1989) first investigated the associations among the parenting measures and children's GPA. Controlling for family composition, socio-economic status, age, gender, achievement test scores, and GPA in the previous year, it was found that both parental (mothers and fathers were considered together) lax control and restrictive control significantly predicted a lower GPA. The portion of variance in GPA accounted for by parental acceptance approached significance ($p < .10$).

When the mediating role of psychosocial maturity in the above relations was considered, it was found that psychosocial maturity significantly mediated the negative associations of parental lax control and restrictive control with children's GPA. The mediating role of psychosocial maturity in the positive association between parental acceptance and GPA approached

significance.

Because psychosocial maturity was a composite index of three measures, Steinberg et al. (1989) also examined the mediating role of each of the three measures separately. They found that work orientation significantly mediated the relation between each of the parenting variables and children's GPA. In contrast, self-reliance did not statistically mediate any of the relations between the parenting measures and GPA. Self-reliance, however, may have indirectly mediated these associations through the influence of work orientation upon self-reliance (i.e., self-reliance was correlated with work orientation and GPA). Identity also appeared to indirectly mediate the association between parental restrictive control and GPA, as it mediated the association between parental restrictive control and work orientation.

Although Steinberg et al. (1989) provided preliminary support for the view that task orientation mediates the associations between academic performance and parental restrictive control and nurturance, many questions remain unanswered. First, because combined measures of mothers' and fathers' parenting behaviors were used, differences in the adequacy of the model for mothers and fathers could not be determined. Both theory and research indicate that mothers and fathers influence children differently (e.g., Hess & McDevitt, 1983), and thus mothers and fathers need to be considered

separately. Second, controlling for gender and age may have obscured important differences in the pattern of relations that exist for boys and girls, at different age levels. From an informal inspection of the data, Steinberg et al. reported that gender and age differences appeared to exist in the levels of the three parenting variables. Because of sample size constraints, however, analyses were not conducted separately for boys and girls or for different age levels. Given that gender and age differences appear to exist in the pattern of associations among parenting practices, task orientation, and cognitive performance, attention to these differences is required.

A third consideration in interpreting Steinberg et al.'s (1989) findings is the conceptual meaning of psychosocial maturity. As was described above, the psychosocial maturity measure was comprised of three scales: work orientation, self-reliance, and identity. Together, these scales assess mastery behaviors in combination with other attributes. When the individual scales are examined, work orientation appears to predominantly measure mastery behaviors, although aspects of mastery behaviors were assessed by each of the other two scales. The results from a hierarchical factor analysis confirm the apparent overlap among the work orientation, self-reliance, and identity scales (Greenberger, Josselson, Knerr, & Knerr, 1975). Specifically, analyses of the questionnaire from which these scales were derived indicated that each scale was not a separate

factor. Instead, work orientation, self-reliance, identity, and communication skills formed one higher-order factor. Because this higher-order factor is an aggregation of multiple measures, it is difficult to precisely define what it assesses. Moreover, because separate factors were not obtained for each of the individual scales, none of the individual scales appear to be independent measures of a single construct. Consequently, to facilitate the interpretation of findings, it is recommended that homogeneous, well-defined measures of task orientation be used in future research.

A final characteristic of Steinberg et al.'s (1989) investigation that warrants attention is their definition of GPA. To calculate GPA, Steinberg et al. averaged subjects' grades in English and mathematics. These two academic subjects were chosen because they permitted comparability across grades. One of the consequences of this decision, however, is that we do not know if the pattern of results obtained was equally applicable to all academic subjects. Attention to this question would further our understanding of the associations among parenting practices, task orientation, and academic performance.

A second investigation of the role of task orientation in the associations among parenting practices and children's cognitive performance was conducted by Epstein and Radin (1975). Using a sample of 4-year-old children, paternal nurturance, restrictive control, and children's performance on three

cognitive measures (a standardized intellectual test, Piagetian tasks, and verbal explanations of Piagetian tasks) were assessed. In addition, two measures of mastery behaviors were derived from children's behaviors during the standardized intellectual testing. The first measure primarily assessed mastery behaviors that were interpersonal in orientation (e.g., social confidence), although other mastery behaviors (e.g., initiation of activity) were also assessed. The second measure primarily assessed task-oriented mastery behaviors (e.g., persistent, absorbed by task), although other behaviors (e.g., normal activity level) were also assessed.

Epstein and Radin (1975) reported that paternal nurturance was positively associated and restrictive control was negatively associated with boys', but not girls', cognitive performance. Consequently, the mediating role of mastery behaviors in these associations was only investigated for boys. Although there were some differences in the results obtained across measures of cognitive performance and across levels of socioeconomic status, both measures of mastery behaviors significantly mediated the associations of paternal nurturance and restrictive control with boys' cognitive performance.

The results of Epstein and Radin's (1975) investigation are consistent with the view that mastery behaviors mediate the association between parenting practices and children's cognitive performance. However, questions related to this proposal remain

unanswered. First, because only paternal practices were assessed, there is no information on the mediating role of mastery behaviors in the association between maternal behaviors and children's cognitive performance. Second, the finding that neither paternal nurturance nor restrictive control was associated with girls' cognitive performance is inconsistent with the results obtained in some previous investigations (e.g., Dornbusch et al., 1987; Honzik, 1967). Although associations between girls' cognitive performance and paternal nurturance and restrictive control may not exist, additional research is clearly required before drawing this conclusion. In addition, investigations on the mediating role of mastery behaviors need to be conducted at other age levels to determine if developmental differences exist in the applicability of the model.

The remaining issues in Epstein and Radin's (1975) research that require clarification are related to the measurement of variables. The two measures of mastery behaviors used by Epstein and Radin both assessed components of mastery behaviors. If the question of interest is whether or not mastery behaviors mediate the associations between dimensions of parenting and children's cognitive performance, then it seems preferable to employ one comprehensive measure of mastery behaviors. In Epstein and Radin's study, it would have been interesting to determine if a composite measure of both mastery scales was a stronger mediator of the associations investigated. Finally, with respect to

paternal behaviors, there is some question as to whether the measures employed were accurate indicators of typical paternal behavior. All measures were obtained from observation of fathers during an interview conducted in the presence of their children. It seems probable that a father may behave differently when he is in this situation than when he is alone with his child. Moreover, relatively specific indicators of paternal nurturance and control were used. As noted by Hess and McDevitt (1984), global measures of parenting practices are probably more stable than situation-specific measures. Consequently, it would be helpful to determine if similar patterns of results are obtained when more global measures of paternal behaviors are used.

From the studies conducted by Steinberg et al. (1989) and Epstein and Radin (1975), it appears that the model presented in Figure 1 may be a valid representation of the mechanisms underlying the associations among parenting practices and children's cognitive performance. However, because comprehensive measures of mastery behaviors have not been used, the mediating role of mastery behaviors has not been adequately investigated. Moreover, the potential mediating role of impulse control has not been addressed. Because both theory and research are consistent with the view that impulse control partially mediates the effects of parenting practices upon children's cognitive performance, this hypothesis warrants investigation. Furthermore, by overcoming the methodological limitations of the above two

studies, our confidence in the results obtained could be enhanced.

Summary of the Model and Purpose of the Present Investigation

In summary, it is proposed that task orientation mediates the associations among parenting practices and children's cognitive performance. Although age and gender differences have been documented, researchers have demonstrated that parental encouragement of independence, low restrictive control, and nurturance are positively associated with children's mastery behaviors, impulse control, and cognitive performance. Moreover, mastery behaviors and impulse control are associated with children's cognitive performance. Research on the mediating role of mastery behaviors is also consistent with the model. The mediating role of impulse control has not been investigated to date.

In the present study, the mediating role of mastery behaviors and impulse control in the associations among parenting practices and children's cognitive performance will be determined. Because parental encouragement of independence, low restrictive control, and nurturance all appear to be positively associated with children's cognitive performance, the associations of these three parental behaviors with children's task orientation and cognitive performance will be assessed. The effects of cognitive ability will be controlled for when the mediating role of task orientation in the associations among

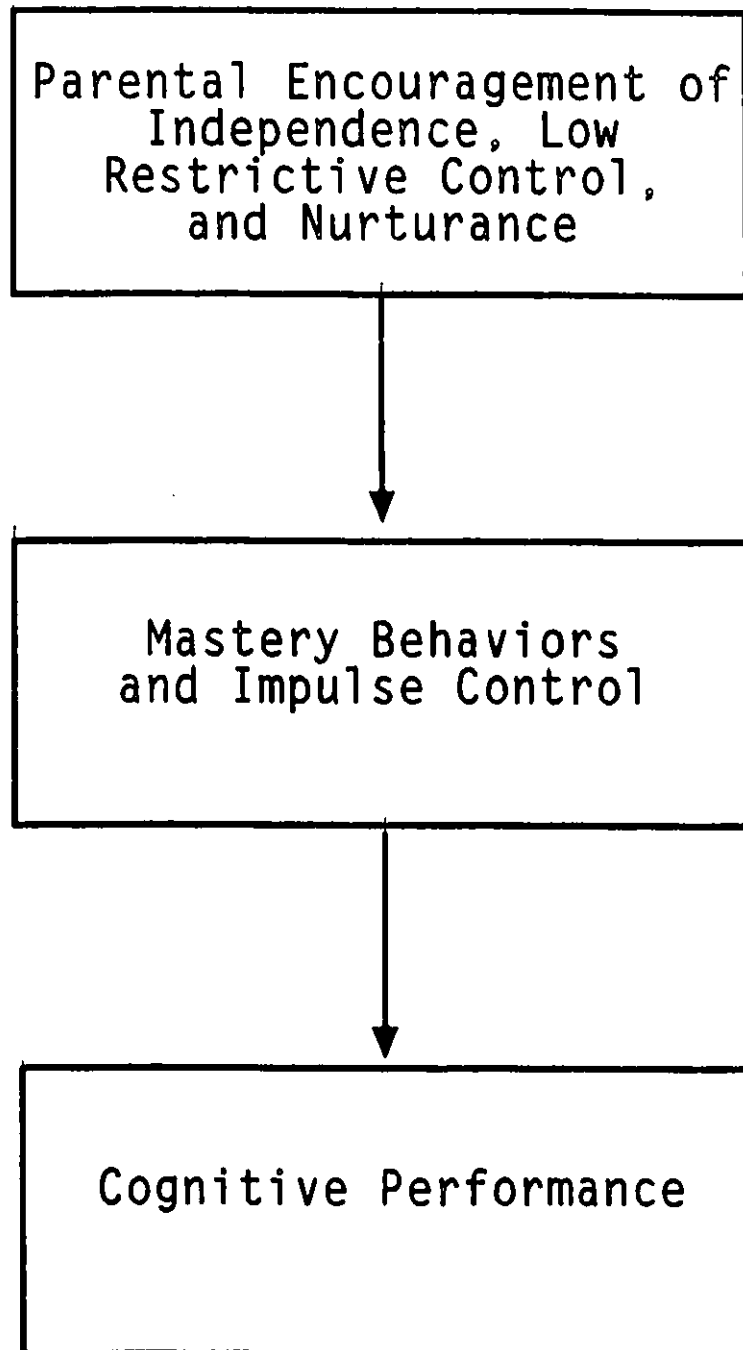


Figure 2. Model of the relations among specific dimensions of parenting practices, task orientation, and cognitive performance.

parenting practices and cognitive performance is assessed. The decision to control for cognitive ability is consistent with the view that cognitive performance is a function of both ability and motivation (e.g., Sigman et al., 1987). Moreover, controlling for cognitive ability recognizes the significant contribution of heredity to children's cognitive performance (e.g., Loehlin et al., 1988). Consistent with the practical significance of academic performance, the measure of cognitive performance to be used in the present investigation is academic achievement. The specific pattern of relations that will be addressed is summarized in Figure 2. Path analysis will be used to determine the support for the proposed pattern of relations.

Constraints of the Model

Variable Specificity

Although the model presented in Figure 2 summarizes a pattern of causal relations, it is not intended to suggest that only the variables in this model influence children's cognitive performance. Instead, it is acknowledged that other factors, such as heredity (e.g., Loehlin et al., 1988) and children's play experiences (e.g., Carpenter, 1983), influence children's task orientation and cognitive performance. Moreover, other parenting factors may influence these variables. For example, parental modelling and reinforcement of a positive task orientation may promote children's cognitive performance (e.g., Mischel, 1970; Stein & Bailey, 1973). The purpose of the present study,

however, is to further our understanding of how parental encouragement of independence, low restrictive control, and nurturance may influence children's cognitive performance, independent of these additional factors.

Although task orientation is presented as the sole mediator of the associations among the measures of parenting practices and children's cognitive performance, it is recognized that other variables also may mediate these associations. These variables include various personality characteristics (e.g., self-esteem, need to achieve), problem solving experience, and social interactions (Estrada et al., 1987, noted that a considerable amount of learning occurs within a social context). Although it is assumed that the model presented in Figure 2 is relevant to both boys and girls, the above review suggests that there may be gender differences in the magnitude of the associations among variables. Consequently, the adequacy of the model for males and females will be evaluated separately.

Fit With Other Parenting Constructs

As discussed by Maccoby and Martin (1983), theorists and researchers have conceptualized and categorized parenting practices in various ways. The methods employed have ranged from identifying and measuring specific parenting behaviors to developing global classifications of parenting styles. At the specific level of analysis, frequencies of certain parental behaviors, such as direct commands in a teaching situation (Hess

& McDevitt, 1984), have been the subject of investigation. At the global level of analysis, parenting styles have been identified, which are based on amalgamations of multiple parenting behaviors. Parenting style classifications incorporate the dimensions of both nurturance and control into typologies of parenting.

An early parenting style classification system is Schaefer's (1959) circumplex model of parenting. This model is based on the orthogonal variables of warmth/hostility and control/autonomy. Baumrind (1973) formulated a somewhat different model of parenting style, based on four parenting variables: control, maturity demands, nurturance, and clarity of parent-child communication (providing explanations for parental control efforts and taking the child's feelings and opinions into consideration). From these variables, Baumrind empirically derived three parenting styles: Authoritative (high on control, maturity demands, nurturance, and clarity of communication), Authoritarian (lower on control, maturity demands, nurturance, and clarity of communication), and Permissive (lowest on control, maturity demands, and clarity of communication, but in between Authoritative and Authoritarian parents on nurturance).

A more recent classification of parenting styles, developed by Maccoby and Martin (1983) to organize their review of the literature on parent-child interactions, has many similarities to Baumrind's (1973) parenting styles. Maccoby and Martin's

classification is based on two dimensions: parental demands and control, and parental acceptance and responsiveness. The classification system yields four patterns of parenting: Authoritarian-Autocratic (demanding and rejecting), Indulgent-Permissive (undemanding and accepting), Authoritative-Reciprocal (demanding and accepting), and Indifferent-Uninvolved (undemanding and rejecting).

As recognized by Maccoby and Martin (1983), it is difficult to assign all conceptualizations and measures of parenting to their four-category classification system. This is particularly true when multiple aspects of control and/or acceptance are being considered. For example, they observe that the use of love-oriented discipline techniques cannot be encompassed within their classification system. With respect to the parenting dimensions addressed in the present study, the distinction between encouragement of independence and restrictive control cannot be differentiated within either Maccoby and Martin's classification system or the other classification systems discussed above. Instead, encouragement of independence and restrictive control are combined under the dimension of parental demands and control. Thus, parents high on encouragement of independence and/or restrictive control would be classified as Authoritarian-Autocratic if they were low on nurturance and as Authoritative-Reciprocal if they were high on nurturance. Alternatively, parents low on encouragement of independence and/or restrictive

control would be classified as Permissive-Indulgent if they were high on nurturance and as Indifferent-Uninvolved if they were low on nurturance. Because it seems plausible that parents can be high on encouragement of independence and low on restrictive control (or vice versa), it is preferable, at least for the purposes of the present study, to consider the two dimensions of control separately. Distinguishing between the two dimensions of control will allow for the identification of possible differences in the salience of encouragement of independence and restrictive control for the development of children's task orientation and academic performance. The possibility that the effects of one parenting practice (e.g., restrictive control) are moderated by the effects of another parenting practice (e.g., nurturance) is plausible, however, and further research on the delineation of global parenting styles is considered an important goal for future research.

Developmental Specificity

From the research conducted to date, it is apparent that we know more about the associations among parenting practices, task orientation, and cognitive performance in preschool children than in school-age children. As a result of this imbalance, school-age children were selected for the present investigation. It was decided to use a sample of Grade 6 children, as issues of achievement and task performance may be more salient to children at this age than at younger ages (Hoffman, 1977). Moreover, in

comparison with adolescents, fewer variables are expected to influence cognitive performance in Grade 6 children. This premise is based on the view that achievement during adolescence is influenced by increased social pressure to conform to a traditional gender role, particularly for girls (Stein & Bailey, 1973). Consequently, determining the role of task orientation in the associations among parenting practices and cognitive performance may be facilitated by using a preadolescent sample.

Hypotheses

The specific hypotheses of the present study are presented below. All hypotheses are derived from the theory that parental encouragement of independence, low restrictive control, and nurturance promote mastery behaviors and impulse control, through the development of a sense of competence and security, which results from interaction with the environment. In turn, the dimensions of task orientation are presumed to influence children's academic performance. Unless otherwise stated, it is expected that maternal variables will be more strongly associated with girls' behaviors and paternal variables will be more strongly associated with boys' behaviors. This expectation is based on the assumption that the typically closer relationships between mothers and daughters and between fathers and sons (Huston, 1983) will increase the influence of the same-gender parent upon the child.

1. Both maternal and paternal encouragement of independence will be positively correlated with boys' and girls' academic achievement. The correlations will be larger in the female sample than in the male sample, as generalized social expectations for independence are weaker for girls than for boys. Consequently, encouragement of independence from parents should have a stronger impact upon girls' academic achievement than upon boys' academic achievement.

2. Both maternal and paternal restrictive control will be negatively correlated with girls' and boys' academic achievement.

3. Maternal and paternal nurturance will be positively correlated with boys' and girls' academic achievement.

4. Maternal and paternal encouragement of independence will be positively correlated with children's mastery behaviors. It is expected that the correlations will be stronger for girls than for boys, as generalized social expectations for independent behaviors appear to be weaker for girls than for boys. Consequently, encouragement of independence from parents is expected to affect girls more than boys.

5. Both maternal and paternal restrictive control will be negatively correlated with boys' and girls' mastery behaviors.

6. Both maternal and paternal nurturance will be positively correlated with boys' and girls' mastery behaviors.

7. Maternal and paternal encouragement of independence will be positively correlated with children's impulse control. It is expected that the correlations will be stronger for girls than for boys, as generalized social expectations for independent behaviors appear to be weaker for girls than for boys. Consequently, encouragement of independence from parents is expected to have a stronger influence on girls than boys.

8. Both maternal and paternal restrictive control will be negatively correlated with children's impulse control.

9. Both maternal and paternal nurturance will be positively correlated with children's impulse control.

10. Mastery behaviors and impulse control will each be positively correlated with children's academic performance.

11. Mastery behaviors and impulse control will statistically mediate the associations among the parenting variables and children's academic performance. This hypothesis is based on the assumption that parenting practices partly influence children's academic performance through their impact on children's task orientation.

For all of the above hypotheses, moderate, rather than strong, associations among variables are expected. This prediction is based on the fact that additional variables undoubtedly affect children's task orientation and academic performance (see discussion under "Variable Specificity").

Method

Subjects

Participants were 63 female and 62 male Grade 6 students recruited from three public schools in Ottawa, Canada. The children were participants in a longitudinal project conducted from 1986 to 1989. The data used in the present study were collected in 1987 (35 girls and 35 boys) and 1989 (28 girls and 27 boys). For the subjects tested in 1989, similar data had previously been collected in 1987, when the subjects were in Grade 4. T-tests were conducted on all measures and no group differences between the data collected in 1987 and 1989 were found. Consequently, the data from the two groups were combined.

Consent Rate

Parental consent forms were distributed to 327 children in the first year of the longitudinal study. The forms were returned by 191 children (58%). From this initial sample, 31 subjects were dropped for one of three reasons: parents did not complete questionnaires, only a few children per classroom agreed to participate (their involvement would have been unnecessarily disruptive to the teacher), and subjects did not meet all of the requirements of the longitudinal study (e.g., videotapes of the children playing could not be obtained). Six additional Grade 6 subjects were dropped because they were missing data that were pertinent to the present investigation. From the 1987 data, therefore, 35 boys and 35 girls were available to participate in the present investigation.

In the second year of data collection, 22 of the 84 children who were in Grade 6 could not be followed up because of relocation. Seven additional children were omitted because they were missing data that were pertinent to the present investigation. The result was that 28 girls and 27 boys in the second year of data collection were available for the present investigation.

Measures

The following measures were used in the present study:

Child Rearing Practices Report (CRPR)

The CRPR (Block, 1965; see Appendix A) is a 91-item measure of socialization practices that assesses child-rearing attitudes, values, behaviors, and goals. The items of the CRPR were derived from empirical observations of mothers interacting with their children, a review of the socialization literature, and discussions with researchers. The CRPR is an ipsative Q-sort procedure, in which the saliency of each item is judged within the context of the other items, in reference to a given child. This is in contrast with most procedures where an item is rated on a normative basis, in reference to other children.

Using the ipsative procedure, CRPR items are arranged into seven categories, ranging from "most descriptive" to "least descriptive". A forced distribution is used for the items, with sorters being instructed to assign 13 items to each category. The primary advantage of a Q-sort procedure over standard questionnaires is that response biases are reduced, as a

prespecified number of items must be assigned to each category. Thus, a rater cannot assign all items to extreme categories or to mid-range categories.

Block (1965) reported that the test-retest stability of the CRPR over an eight month interval was .71 for the overall test, with a range of .38 to .85 for individual items. The sample used for this analysis, however, was college students, not parents. More recently, Roberts, Block, and Block (1984) determined the correlation between CRPR data obtained from 65 mothers and 42 fathers when their children were 3 years of age and again when their children were 12 years of age. Significant correlations were obtained for approximately three-fourths of the CRPR items for mothers (with a range of .25 to .70) and for over half of the items for fathers (with a range of .30 to .74).

Evidence for the validity of the CRPR as a measure of actual parenting behaviors was provided by Block, Jennings, Harvey, and Simpson (see Block, 1965). In their study, 112 mothers were observed interacting with their children in three structured situations. Based on a factor analysis of these observations, eight parenting styles were identified. Four years later, following the development of the CRPR, 76 of the mothers in the original sample were contacted and all agreed to complete the CRPR. Significant correlations between the CRPR and observed parenting styles were found, which indicates that the CRPR is a valid measure of actual parenting behaviors.

Various methods of scoring Q-sort data have been discussed

in the literature. Researchers have used rationally or factor-analytically derived scales, single items, and criterion definitions (i.e., experts sort all CRPR items to provide a global definition of a certain construct and subjects' data are correlated with this criterion definition). In the present study, rationally derived scales were selected to measure dimensions of parenting. This decision was based on the fact that criterion definitions are more appropriate for the measurement of relatively global constructs, as they are based on a composite measure of all items of the CRPR. Use of single items, on the other hand, may result in less stable measures. Consequently, construction of rationally derived scales appeared to be most appropriate for the assessment of specific dimensions of parenting.

To construct the measures of parental encouragement of independence, restrictive control, and nurturance, four steps were followed. First, one professor and three graduate students in psychology read definitions of parental encouragement of independence, restrictive control, and nurturance, that were derived from the literature. Second, the three concepts were discussed to confirm that all four people had a clear understanding of what each concept meant. Third, each person was given a list of the 91 items on the CRPR and was asked to identify independently the items that measured encouragement of independence, restrictive control, and nurturance. Fourth, the items that were identified by at least three of the raters were

used to construct scales to measure each of the dimensions of parenting. The outcome of this procedure was an 11-item encouragement of independence scale, an 11-item restrictive control scale, and a 13-item nurturance scale. The items comprising these scales are presented in Appendix B. Internal consistency analyses were conducted on the scales and any items that detracted from the cohesiveness of the scales were eliminated (see Results section).

California Child Q-Set (CCQ)

The California Child Q-Set (see Appendix C), developed by Block and Block (1980), is an age appropriate modification of the California Q-Set. Like the CRPR, it is an ipsative procedure that involves sorting 100 statements about the psychological characteristics of children into nine categories. The categories range from "most characteristic" to "least characteristic" and the sorters are instructed to assign 11 items to each category except for the middle category, to which 12 items are assigned.

In a study by Gjerde, Block, and Block (1986), moderate interrater agreement for the CCQ was found for a sample of 111 children. The CCQ was completed by teachers when the children were aged 3, 4, and 7 years and by psychologists when the children were aged 7, 11, and 14 years. At least three raters were used at each age level. Gjerde et al. (1986) reported that the average correlations among observers for composite Q-sorts were .65 at ages 3 and 4, .47 at age 7, .70 at age 11, and .72 at age 14.

Evidence for the validity of the CCQ as a measure of actual attributes was provided by Block and Block (1980). In their study, teachers completed the CCQ for 130 children, when the children were three years old and again when the children were four years old. Item clusters presumed to measure ego resiliency (which refers to resourceful adaptation to situations and flexible problem solving) and ego control (which refers to the threshold for response and the regulation of ego impulses) were correlated with children's performance on a wide range of experimental tasks. The experimental tasks included measures of delay of gratification, motor inhibition, exploration, planfulness, tolerance of frustration, and problem solving. The correspondence between CCQ items and performance on the experimental measures provides support for the CCQ as an appropriate source for measures of task orientation.

In the present study, the CCQ was used to construct measures of persistence, mastery motivation, and impulse control. CCQs completed by mothers instead of by fathers were used, as it was assumed that mothers would provide more accurate descriptions of their children's attributes. This assumption was based on the fact that mothers tend to spend more time with their children than do fathers (Huston, 1983). Furthermore, it was felt that if maternal and paternal ratings were combined, the resulting scores might be biased because of discrepancies in mothers' and fathers' perceptions of their children.

Construction of the task orientation scales involved four

steps. First, one professor and three graduate students in psychology read a summary of recent literature on persistence, mastery motivation, and impulse control. Second, the three concepts were discussed to confirm that all four people had a clear understanding of what each concept meant. Third, each person was given a list of the 100 items on the CCQ and was asked to identify independently which items measured persistence, mastery motivation, and impulse control. Finally, those items that were identified by at least three of the raters were used to construct a scale to measure each of the dimensions of task orientation. The outcome was an 8-item persistence scale, a 12-item mastery-motivation scale, and an 11-item impulse-control scale. The items comprising these scales are presented in Appendix D. Internal consistency analyses were conducted on these scales and any items that detracted from the cohesiveness of the scales were eliminated (see Results section).

Academic Performance

Participants' grades were obtained from the school records for each of the three terms in the academic year. The range for grades was .5 to 5, and were assigned by teachers for each of the following core subject areas: French, English, mathematics, science, and social studies. If grades assigned in the third term are moderately correlated with grades assigned in the first and second term, then grades in the third term will be used to assess academic performance. The rationale for this decision is that final grades are presumed to be a global indicator of

children's progress and performance over the course of the academic year. Grades in the first and second term may not provide as accurate of a representation of academic performance, as grades in the first two terms may be affected by inconsistent effort, absences, and a possible tendency for teachers to use marks to motivate children to work harder. Final grades, however, are probably a good indicator of children's overall performance. Consequently, if there is moderate agreement in grades across terms, only grades in the final term will be used.

A second factor that will be considered in the measurement of academic performance is whether a cumulative measure of grades across all subject areas is an accurate representation of grades in each subject area. Correlations among grades in each subject area will be examined for both the male and female sample, and if all the correlations are statistically significant, a cumulative measure of grades across all subject areas will be constructed. This measure will reflect overall grade point average. Regardless of the outcome, analyses will be conducted for both individual subject areas and overall grade point average. The benefits of using both measures is that similarities and differences in predictors can be identified and results can be compared with measures used in previous research.

Canadian Cognitive Abilities Test (CCAT)

The CCAT, developed by Thorndike, Hagen, Lorge, and Wright (1970), is a standardized ability test developed for children aged 3 to 12 years. The test provides a verbal, nonverbal, and

quantitative measure of intellectual functioning. The scores on the three scales are highly intercorrelated for both boys and girls (r 's averaged .57; Behrens & Vernon, 1978).

In the present study, children's verbal and nonverbal scores on the CCAT were available from the school board. The scores were based on an administration of the test while the participants were in the sixth grade. The subtests of the verbal battery are vocabulary, sentence completion, verbal classification, and verbal analogies. On the nonverbal battery, the subscales are figure classification, figure analogies, and figure synthesis. In the present study, a measure of overall cognitive ability was needed to control for the possible confounding influence of ability upon grades. Consequently, a combined measure of verbal and nonverbal ability will be used, providing the combined measure has adequate internal consistency in the present study.

Socioeconomic Status

Using the socioeconomic index constructed by Blishen, Carroll, and Moore (1987), the socioeconomic status of the parents will be determined. The socioeconomic index was derived from 1981 Canadian Census data and provides a rating based on the income and the education associated with particular occupations in Canada. The socioeconomic status of the parents will be summarized to provide information about the demographic characteristics of the sample.

Procedure

Parents were sent the two Q-sort measures (CRPR and CCQ) to complete prior to a home visit. During the home visit, the Q-sort measures were checked to ensure that they had been completed properly. In addition, parents were interviewed regarding demographic information (e.g., socioeconomic status, language, marital status). The grades for the children were obtained directly from school records and their CCAT scores were obtained from the school board.

Statistical Power

Before examining the results of the present investigation, it is important to determine the statistical power of the analyses. If alpha is set at .05 and the effect size is assumed to be .30 (e.g., previous findings suggest that the correlation between parenting practices and children's cognitive performance is of this magnitude), the power of a single statistical test would be .92 for the combined male and female sample. If the magnitude of the effect in the population is assumed to be .40 (e.g., the correlation between task orientation and children's cognitive performance), then the power would exceed .99. In both cases, statistical power would surpass the conventional level of .80 (Cohen & Cohen, 1983).

Although the use of a combined gender sample has the advantage of yielding a high level of power, it does not allow for consideration of gender differences in the pattern of relations among variables. Consequently, it was decided that

more information would be obtained if boys and girls were considered separately. For each gender sample, the power of a statistical test would be approximately .66 and .90, if the magnitude of the effect in the population was .30 and .40, respectively. Although the power is somewhat below convention if an effect size of .30 is assumed, the benefit of using separate samples for males and females was considered to justify this consequence.

As will become apparent, multiple tests of significance were performed in this investigation. Specifically, 60 correlations will be examined in each sample (6 parenting measures with 2 task orientation and 6 cognitive measures; 2 task orientation measures with 6 cognitive measures). If a Bonferroni correction ($.05/60$) is used to set the Type I error rate for all correlations at .05, an alpha level of .001 would be required for each statistical test. Unfortunately, the consequence of using a more stringent alpha level is a higher probability of Type II errors. In fact, the probability of committing a Type II error, even with an alpha of .01, exceeds 50% (e.g., $n = 60$, population $r = .30$, alpha = .01, power = .41; Cohen, 1977).

Because Type I and Type II errors are inversely related, a balance between the two error rates is clearly needed (Cohen & Cohen, 1983). Consequently, an alpha of .05 will be retained when testing a priori hypotheses. This will ensure that there is a reasonable probability of detecting correlations that do, in fact, exist in the population. This decision also is in

accordance with the fact that the correlations obtained will tend to underestimate the actual associations among variables because of the less than perfect reliability of the measuring instruments. As discussed by Pedhazur (1982), correlation coefficients are lower when random errors of measurement are present than when measures are perfectly reliable. This fact does not negate the possibility that some correlations may be significant by chance; this prospect will be addressed in the final interpretation of the results. Moreover, to protect against an inflated Type I error rate in unplanned analyses, a Bonferroni correction will be used for all post-hoc analyses (i.e., when assessing correlations that were not hypothesized).

Results

Data analysis was conducted in five stages. First, the psychometric properties of the measures were determined. Second, demographic variables were analyzed. Third, the fit between the distributions of variables and the assumptions of multivariate analysis were investigated. Fourth, the specific hypotheses of the study were tested, using Pearson correlations and path analysis. And fifth, post-hoc analyses of the association between demographic variables and children's cognitive performance were conducted.

Psychometric Evaluation of Measures

Q-Sort Scales

To evaluate the cohesiveness of the measures of parenting practices (parental encouragement of independence, restrictive control, and nurturance) and children's task orientation (persistence, mastery motivation, and impulse control), internal consistency analyses were conducted on these scales. As outlined in the method section, scale items were examined and those items that detracted from the cohesiveness of the scales were eliminated. On this basis, two items were deleted from the parental restrictive control scale (11 items; items 43 and 89 omitted), one item was deleted from the parental nurturance scale (13 items; item 62 omitted), and no items were deleted from the parental encouragement of independence scale (11 items). With regard to the task orientation scales, one item was deleted from the persistence scale (8 items; item 43 omitted) and two items

were deleted from the mastery motivation scale (12 items; items 52 and 71 omitted). No items were deleted from the impulse control scale (11 items). The items that comprise the parenting and task orientation scales are presented in Appendix B and D.

When examining the psychometric properties of the parenting and task orientation scales, it is important to consider how these scales differ from more standard research measures. The parenting scales were constructed from a pool of 91 Q-sort items and the task orientation scales were constructed from a pool of 100 Q-sort items. As was discussed in the method section, the Q-sort procedure requires sorters to assign a specified number of items to each response category. For example, the parenting practices measure (CRPR) required that 13 items be assigned to each of the 7 possible response categories. This procedure differs from standard rating procedures, where a rater can assign as many items as desired to any response category. The result of restricting the number of items that can be given the same score (i.e., that can be assigned to the same response category) is that a lower ceiling is placed upon the possible magnitude of intercorrelations amongst the items on constructed scales. Consequently, somewhat lower estimates of internal consistency are expected for scales derived from Q-sort data. A second effect of the Q-sort method is that response biases are reduced, as raters are prevented from assigning all items to either extreme categories or to midrange categories. Consequently, the mean, standard deviation, and range of a scale should be more

representative of the actual distribution of the variables being measured. Thus, when studying the psychometric properties of the scales, and in particular the internal consistencies of the scales, it is important to appreciate the influence of the forced-distribution format upon the scale characteristics.

The means, standard deviations, ranges, and coefficient alpha estimates of reliability for the measures of parenting practices and task orientation are presented in Table 3 for the female sample and Table 4 for the male sample. As can be seen, the lowest estimates of internal consistency were for maternal restrictive control (Cronbach's alpha = .51) and encouragement of independence (Cronbach's alpha = .56) in the male sample. The low internal consistencies may indicate that encouragement of independence and restrictive control are not meaningful organizing constructs for maternal behaviors toward Grade 6 boys. Maternal behaviors may be in a transitional phase, owing to boys' increasing independence at this age. This transitional phase may occur for girls at an older age.

Because of the conceptual similarity between persistence and mastery motivation, the correlations between the two dimensions of task orientation were examined. It was found that the measures of persistence and mastery motivation were moderately correlated in both the male ($r(62) = .44, p < .001$) and female ($r(63) = .61, p < .001$) samples. These correlations are probably underestimates of the actual association between persistence and mastery motivation because of the less than

perfect reliability of the measuring instruments. As was discussed previously, correlation coefficients are lower when random errors of measurement are present than when measures are perfectly reliable (Pedhazur, 1982). Consequently, it can be assumed that the association between persistence and mastery motivation is relatively strong in the present samples.

The empirical association between persistence and mastery motivation is consistent with the conceptual similarity of the two constructs. As was discussed in the literature review, persistence is considered to be a defining feature of mastery motivation (e.g., Jennings et al., 1979; Yarrow et al., 1983). In the present study, the persistence and mastery motivation scales were constructed to empirically distinguish between the two variables. However, because of the association between the two scales, it was decided to combine the persistence and mastery motivation scales to yield a global measure of mastery behaviors. The internal consistency of this combined scale exceeded the internal consistency of both the persistence and mastery motivation scales. Because persistence and mastery motivation are conceptually and empirically related constructs and are more reliably measured conjointly, the combined scale was used in subsequent analyses. The psychometric properties of the combined scale, referred to as the mastery behaviors scale, are presented in Table 3 for the female sample and Table 4 for the male sample.

Table 3

Descriptive Information for Measures in the Female Sample

Measure (possible range)	M	SD	Range	Coefficient alpha
Paternal encouragement of independence (11-77)	58.77	8.61	25-71	.74
Paternal nurturance (12-84)	66.44	10.51	23-80	.81
Paternal restrictive control (9-63)	21.79	6.89	15-50	.71
Maternal encouragement of independence (11-77)	59.37	6.73	41-73	.62
Maternal nurturance (12-84)	69.60	8.34	40-81	.79
Maternal restrictive control (9-63)	20.78	5.34	11-40	.63
Persistence (7-63)	46.46	8.16	20-59	.66
Mastery motivation (10-90)	64.54	10.04	29-78	.71
Impulse control (11-99)	67.54	11.87	31-89	.74
Mastery behaviors (17-153)	111.00	16.33	57-135	.80
Cognitive Ability (0-200)	167.99	14.52	130-190	.67
Overall GPA (.5-5)	1.95	.70	.9-3.8	--
French grade (.5-5)	1.98	.79	1-3.6	--
English grade (.5-5)	2.11	.63	1-3.3	--
Mathematics grade (.5-5)	2.17	.88	1-4.5	--
Science grade (.5-5)	1.83	.90	.8-4	--
Social studies grade (.5-5)	2.08	.89	1-4	--

Note. $n = 62$ for paternal measures; $n = 63$ for maternal measures, task orientation measures, overall GPA, French grade, and mathematics grade; $n = 59$ for CCAT; $n = 39$ for English grade and social studies grade; $n = 57$ for science grade. Higher numbers reflect lower grades.

Table 4

Descriptive Information for Measures in the Male Sample

Measure (possible range)	M	SD	Range	Coefficient alpha
Paternal encouragement of independence (11-77)	60.59	7.66	30-74	.71
Paternal nurturance (12-84)	66.20	9.41	32-79	.78
Paternal restrictive control (9-63)	22.66	6.41	13-51	.70
Maternal encouragement of independence (11-77)	61.77	5.54	51-71	.56
Maternal nurturance (12-84)	71.02	6.42	51-82	.65
Maternal restrictive control (9-63)	19.95	4.47	12-39	.51
Persistence (7-63)	45.57	7.57	21-59	.59
Mastery motivation (10-90)	63.55	8.88	38-79	.64
Impulse control (11-99)	66.84	13.07	28-87	.78
Mastery behaviors (17-153)	109.11	13.98	70-135	.73
Cognitive ability (0-200)	168.31	19.90	112-195	.75
Overall GPA (.5-5)	2.30	.73	1.1-3.8	--
French grade (.5-5)	2.27	.75	1-4.1	--
English grade (.5-5)	2.21	.80	1-3.6	--
Mathematics grade (.5-5)	2.24	1.12	1-5	--
Science grade (.5-5)	2.44	.97	1-4.3	--
Social studies grade (.5-5)	2.20	.95	1-4	--

Note. $n = 56$ for paternal measures; $n = 62$ for maternal measures, task orientation measures, overall GPA, French grade, and mathematics grade; $n = 57$ for CCAT; $n = 48$ for English grade; $n = 50$ for science grade; $n = 47$ for social studies grade. Higher numbers reflect lower grades.

Following evaluation of the psychometric properties of the individual Q-sort scales, all Q-sort scales were examined to ensure that conceptually related items were not shared by two or more scales. The purpose of the evaluation was to ensure that the correlations among measures in subsequent analyses would not be inflated by the presence of similar items on measures. Only two scales appeared to share similar items: parental encouragement of independence and mastery behaviors. To correct for the possible effects of item confounding between the two measures, three items were deleted from the mastery behaviors scale. These items are listed in Appendix E.

Following deletion of the three items on the mastery behaviors scale, the correlation between the mastery behaviors scale and the impulse control scale was examined. The positive correlation was weak in the female sample ($r(63) = .31, p < .05$) and nonsignificant in the male sample ($r(62) = .21, p > .05$). In both samples, therefore, impulse control and mastery behaviors appear to be relatively separate components of task orientation.

After examining the psychometric properties of the Q-sort scales, t-tests were conducted to identify gender differences on the measures of parenting practices and children's task orientation. The only statistically significant gender difference was on the maternal encouragement of independence scale, where the mean level of maternal encouragement of independence was higher for boys than for girls ($t(123) = 2.18, p < .05$). When maternal and paternal scores were compared, it

was found that mothers reported being more nurturant than fathers in both the male ($t(55) = 3.92, p < .001$) and female ($t(60) = 2.19, p < .05$) samples. Mothers' and fathers' scores did not differ on either the encouragement of independence or restrictive control measures.

Cognitive Measures

Two issues were addressed with respect to the measurement of academic performance. First, analyses were conducted to determine the appropriateness of using grades assigned in the third term as a measure of overall academic performance. Using data collected during the first year of the study (37 boys and 38 girls), the correlation between grades assigned in the third term and a cumulative measure of grades in the first and second term was calculated. When grades across all subject areas were considered together, the correlations were .90 and .76 for females and males, respectively ($ps < .001$, two-tailed). When individual subject areas were considered (i.e., French, English, mathematics, social studies, and science), correlations between grades in the third term and the cumulative measure of grades in the first and second term ranged from .46 to .93 ($ps < .001$, two-tailed). The high correspondence between grades assigned in the third term and the cumulative measure of grades was consistent with the view that final grades reflect children's learning and academic performance over the course of the school year. Consequently, third-term grades were used in subsequent analyses.

The second issue addressed was the extent to which a

summative measure of grades across all subject areas (subsequently referred to as overall GPA) represented grades in each subject area (i.e., French, English, mathematics, science, and social studies). Correlations among grades in all subject areas were statistically significant, with the correlations ranging from .58 to .88 (mean correlation = 68.80) in the female sample and from .29 to .75 (mean correlation = 56.50) in the male sample (see Table 5). From the magnitude of the correlations, it is evident that there was considerable congruence among grades in individual subject areas. Consequently, overall GPA, in addition to grades in each subject area, was used to measure academic performance.

With respect to the standardized measure of cognitive ability (CCAT), the internal consistency of a combined measure of the verbal and nonverbal scales was determined. In the male sample, the estimate of internal consistency was .75 and in the female sample it was .67. The estimates of internal consistency indicated that there was sufficient cohesiveness to use a combined measure of verbal and nonverbal ability (subsequently referred to as cognitive ability). The psychometric properties of the cognitive ability scale are presented in Tables 3 and 4.

T-tests were conducted to identify gender differences on the measures of cognitive ability and academic performance. Girls and boys did not differ on the standardized measure of cognitive ability (CCAT). For overall GPA, however, girls scored

Table 5

Intercorrelations Among Parenting, Task Orientation, and Cognitive Performance Variables in the Female (Above Diagonal) and the Male (Below Diagonal) Samples

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Paternal encouragement of independence		.23	.24	.25	.11	.20	-.06	.01	.02	-.03	.07	.07	.03	-.06	.13
2. Paternal nurturance	.20		-.49***	.09	.31*	.29*	.21	.47***	.23	.12	.39*	.32*	.22	.18	.06
3. Paternal restrictive control	-.30*	-.38**		-.14	-.04	-.19	.02	-.33*	-.05	.06	-.20	-.08	-.16	-.09	.02
4. Maternal encouragement of independence	.20	-.14	-.01		.18	.16	.32**	.20	.28*	.19	.27	.33**	.23	.24	.12
5. Maternal nurturance	.08	.27*	-.11	.01		.11	.29*	.59***	.19	.18	.26	.15	.18	.17	-.05
6. Maternal restrictive control	-.06	-.09	.11	-.27*	-.07		.19	.25*	.13	.19	.23	.18	.04	.06	.28*
7. Mastery behaviors	.02	-.02	.03	.14	.26	.14		.31*	.34**	.29*	.47**	.43***	.27*	.30	.17
8. Impulse control	.17	.30*	-.12	.11	.27*	-.01	.21		.40**	.32*	.38*	.44***	.37**	.24	.15
9. GPA	.05	-.07	-.07	.18	-.12	.16	.26*	.30*		.89***	.86***	.87***	.88***	.85***	.54***
10. French grade	.04	-.05	-.01	.27*	-.10	.02	.19	.24	.80***		.69***	.69***	.73***	.75***	.48***
11. English grade	-.18	-.17	.03	.07	-.11	.20	.25	.23	.89***	.75***		.70***	.74***	.66***	.60***
12. Mathematics grade	.05	-.07	.00	.18	-.20	-.07	.15	.18	.79***	.64***	.71***		.69***	.58***	.53***
13. Science grade	.11	-.01	-.16	.22	-.04	.02	.23	.10	.67***	.29*	.47**	.42**		.65***	.37**
14. Social studies grade	-.03	-.15	-.01	-.02	-.18	.29	.38**	.32*	.81***	.71***	.74***	.51***	.41*		.64***
15. Cognitive ability	.05	-.11	-.05	.16	-.19	.13	.16	.26	.62***	.52***	.67***	.62***	.40**	.56***	

Note. *p < .05. **p < .01. ***p < .001. (two-tailed significance tests).

significantly higher than boys ($t(120) = 2.55, p < .05$). When individual subjects areas were considered, it was found that girls received higher grades than boys in French ($t(120) = 2.22, p < .05$) and science ($t(103) = 3.27, p < .01$). Gender differences were not apparent for English, mathematics, or social studies.

Demographic Characteristics of Sample

Parental Characteristics

Four parental characteristics--education, socio-economic status (SES), language, and marital status--were examined to determine the populations from which the male and female samples were drawn. It was found that, on average, mothers in both the female and male samples had completed 16 years of education ($SD = 3.01$ and 2.32 ; range = 10 to 22 and 11 to 22 years, respectively). For fathers, the average number of years of education completed was 17 in the female sample and 18 in the male sample ($SD = 3.42$ and 3.42 ; range = 6 to 24 and 11 to 31 years, respectively).

In comparison with the average Canadian SES score ($M = 42.74, SD = 13.28$) reported by Blishen et al. (1987), fathers in both samples were more than one standard deviation above the mean ($M = 63.24$ and $64.92, SD = 10.84$ and 12.81 , for the female and male samples, respectively). For mothers working outside of the home (68 and 73 % of the female and male samples, respectively), the mean SES score was 53.36 ($SD = 15.17$) in the female sample and 55.32 ($SD = 13.36$) in the male sample. Both scores are

within one standard deviation of the national average. Based on the educational and occupational characteristics of the sample, it is apparent that participants were from a middle socioeconomic status background. Analysis of other parenting characteristics revealed that 98% of the parents spoke English at home and 88% were in their first marriage and were living with their spouse.

Academic Programs of Children

Information on the academic programs of the children are presented in Table 6. As can be seen, students were enrolled in Early French Immersion, Late French Immersion, Enriched English, and English programs. For both males and females, participants in the Enriched English program scored higher on the measure of cognitive ability than did participants in the French Immersion programs. Differences, however, were not large and may partly have resulted from the fact that the ability test was an English test.

To determine whether there were differences in the standards used to assign grades across programs, overall GPA was compared across the three primary programs (Early French Immersion, Late French Immersion, and Enriched English). For males, differences among programs were found. For females, however, no differences were found. These results appear to indicate that consistent differences in the grading systems used in the three programs were not present. The differences obtained in the male sample may have been sample-specific and therefore may not have occurred if a larger sample had been used.

Table 6

Cognitive Ability and Overall GPA Across Academic Programs

Program	<u>Cognitive ability</u>			<u>Overall GPA</u>		
	<u>M</u>	<u>SD</u>	<u>Range</u>	<u>M</u>	<u>SD</u>	<u>Range</u>
<u>Females</u>						
Early French Immersion (n = 26)	164.61 ^b	16.04	129.75-185.00	2.41 ^d	.73	1.11-3.73
Late French Immersion (n = 25)	165.23 ^b	12.18	138.50-184.25	1.54 ^d	.46	.92-2.71
Enriched English (n = 13)	181.46 ^a	5.94	171.75-190.25	1.82 ^d	.43	1.17-2.67
<u>Males</u>						
Early French Immersion (n = 29)	161.84 ^b	19.16	112.25-186.50	2.52 ^d	.77	1.20-3.83
Late French Immersion (n = 14)	159.44 ^b	18.77	130.00-188.75	2.45 ^d	.57	1.42-3.17
Enriched English (n = 18)	186.50 ^a	4.09	178.75-194.50	1.81 ^e	.60	1.11-3.47
English (n = 1)	140.25 ^c	-	-	2.58	-	-

Note. Different superscripts denote significant differences between means; analyses were conducted separately for females and males, as well as for cognitive ability and overall GPA.

Evaluation of Assumptions

To determine whether the data met the assumptions of multivariate analysis, plots of residuals against predicted scores were examined. Because these plots were not normally distributed, histograms for each variable were examined. Significant levels of skewness and kurtosis were observed on eight variables ($Z \pm 3.67$, $p = .001$, two-tailed significance; Tabachnick & Fidell, 1989). Consequently, square root transformations were performed on these variables. Following this transformation, significant skewness and kurtosis remained for two variables. Logarithmic transformations of these two variables yielded nonsignificant levels of skewness and kurtosis. The transformed variables, presented in Appendix F, were used in all multivariate analyses.

To identify univariate outliers (cases with extreme values on one variable), histograms for each variable were examined. Multivariate outliers (cases with an unusual combination of two or more scores) were assessed by Mahalanobis' distance (the distance of a case from the mean of all variables) and influential cases were assessed by Cook's distance (change in regression coefficients produced by leaving out a case). No outliers or influential cases were found. Consequently, all subjects were retained for subsequent analyses. Multicollinearity (correlations between variables of .90 and above) was not present.

Testing of Hypotheses

Associations Among Parenting Practices and Children's Cognitive Performance (Hypotheses 1 - 3)

To determine whether parental encouragement of independence, nurturance, and restrictive control were associated with children's cognitive performance, the correlations among these variables were examined. As shown in Table 5, maternal encouragement of independence was positively correlated with both girls' overall GPA and their grades in mathematics. Paternal nurturance was correlated with both girls' English and mathematics grades. For boys, the only significant association between a parenting variable and a measure of cognitive performance was for maternal encouragement of independence with grades in French. When the magnitude of the correlations in the female and male samples were compared using Fisher r -to- z transformations, it was found that the correlation between paternal nurturance and grades in Mathematics was significantly higher in the female sample than in the male sample. The magnitude of the correlations between the other dimensions of parenting and cognitive performance did not statistically differ in the male and female samples.

Although the measure of cognitive ability (CCAT) was included in the present study to control for the influence of ability upon academic performance, it is recognized that performance on ability tests is a function of environmental influences, in addition to genetic influences. Consequently, the

association between the parenting measures and children's performance on the cognitive ability test were examined. The only significant association was a positive correlation between maternal restrictive control and girls' cognitive ability.

Associations Among Parenting Practices and Task Orientation
(Hypotheses 4 - 9)

When the correlations among the measures of parenting practices and task orientation were examined, it was found that paternal nurturance, maternal nurturance, and maternal restrictive control were positively correlated with girls' impulse control. Paternal restrictive control was negatively correlated with girls' impulse control. Maternal encouragement of independence and maternal nurturance were positively correlated with girls' mastery behaviors. For boys, paternal nurturance and maternal nurturance were positively correlated with impulse control. None of the parenting measures were significantly associated with boys' mastery behaviors. When Fisher r -to- z transformations were used to compare the magnitude of the correlations in the male and female samples, the only significant difference found was that maternal nurturance was more strongly correlated with impulse control in the female sample than in the male sample.

Associations Among Task Orientation and Cognitive Performance
(Hypothesis 10)

In both the male and female samples, task orientation was associated with academic performance, but not with cognitive

ability. This is consistent with the view that the measure of cognitive ability is less dependent upon environmental contributions than are academic grades. For girls, both mastery behaviors and impulse control were associated with overall GPA and grades in French, English, mathematics, and science. For boys, both mastery behaviors and impulse control were associated with overall GPA and grades in social studies. When Fisher r -to- z transformations were used to compare the magnitude of the correlations in the male and female samples, no significant gender differences were found for the relations between task orientation and cognitive performance.

The Mediating Role of Task Orientation (Hypothesis 11)

The mediating role of task orientation was investigated for the two parenting variables that were significantly correlated with children's academic performance (i.e., maternal encouragement of independence and paternal nurturance). Separate analyses were conducted for each of the four measures of academic performance that were correlated with the parenting measures (i.e., overall GPA and both English and mathematics grades in the female sample and French grades in the male sample). Path analysis was used to determine whether the effects of the parenting variables upon academic performance were direct or indirect, via task orientation. In all path models, cognitive ability (i.e., CCAT scores) was included to control for the simultaneous influence of ability upon grades. Following the initial analyses, models were trimmed to retain only those paths

that were statistically significant ($p < .05$) or that approached statistical significance ($p < .10$). One path was removed at a time, in recognition of the fact that the removal of one variable from a model can influence the paths for the remaining variables (Pedhazur, 1982). For every significant association between a parenting variable and children's academic performance, the hypothesized model will be presented first, followed by the trimmed model.

It should be noted that the values of some of the zero-order correlations presented below will differ from the values presented in Table 5. The reason for this is that the correlations reported below are for only the portion of the sample that was used in the calculation of a path model. To be used in the computation of a path model, it was necessary for subjects to have data on all of the variables in the model. Thus, some subjects in the total sample were omitted from each analysis. For each model presented below, the number of subjects used is reported.

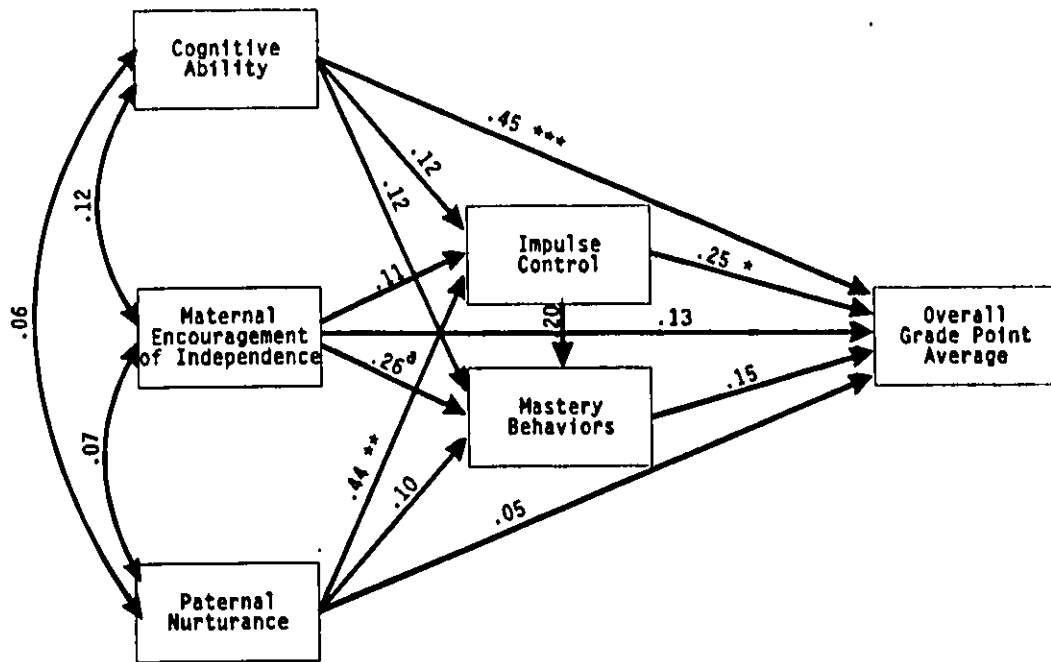
Path models for girls' overall GPA. The hypothesized path model for the relations among maternal encouragement of independence, paternal nurturance, and girls' overall GPA is presented in Figure 3.a. Following deletion of the nonsignificant paths, it was found that impulse control significantly mediated the association between paternal nurturance and overall GPA. Specifically, as shown in Figure 3.b, the paths from paternal nurturance to impulse control (.47)

and from impulse control to overall GPA (.35) were statistically significant. The resulting indirect causal effect of paternal nurturance upon overall GPA, via impulse control was .17 ($.47 \times .35$). This indirect effect represents 74% of the total association between paternal nurturance and overall GPA ($.17/.23$). Thus, 74% of the association between paternal nurturance and overall GPA was explained by the effect of paternal nurturance upon girls' impulse control. The direct path from cognitive ability to overall GPA (.49) also was statistically significant (Figure 3.b).

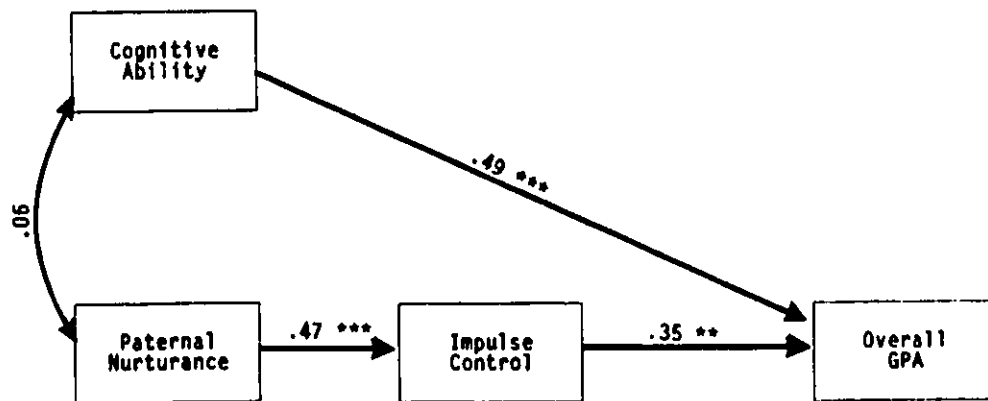
In the trimmed model (Figure 3.b), the multiple R^2 for the regression predicting overall GPA equalled .40, indicating that 40% of the variance in overall GPA was accounted for by the model. The direct and indirect effects of all variables in the path models are summarized in Table 7. Together, the results indicate that cognitive ability, as well as paternal nurturance via impulse control, predict girls' overall GPA.

Path models for girls' mathematics grades. The hypothesized path model for the relations among maternal encouragement of independence, paternal nurturance, and girls' grades in mathematics is presented in Figure 4.a. The trimmed model is presented in Figure 4.b. From the trimmed model, it is evident that mastery behaviors significantly mediated the association between maternal encouragement of independence and girls' grades in mathematics. Specifically, the paths from maternal

encouragement of independence to mastery behaviors (.27) and from mastery behaviors to mathematics grades (.30) were statistically significant. The resulting indirect causal effect was .08 (.27 X .30) and represented 23% of the total association between maternal encouragement of independence and mathematics grades (.08/.35).



a) Hypothesized model



b) Trimmed model

^a $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

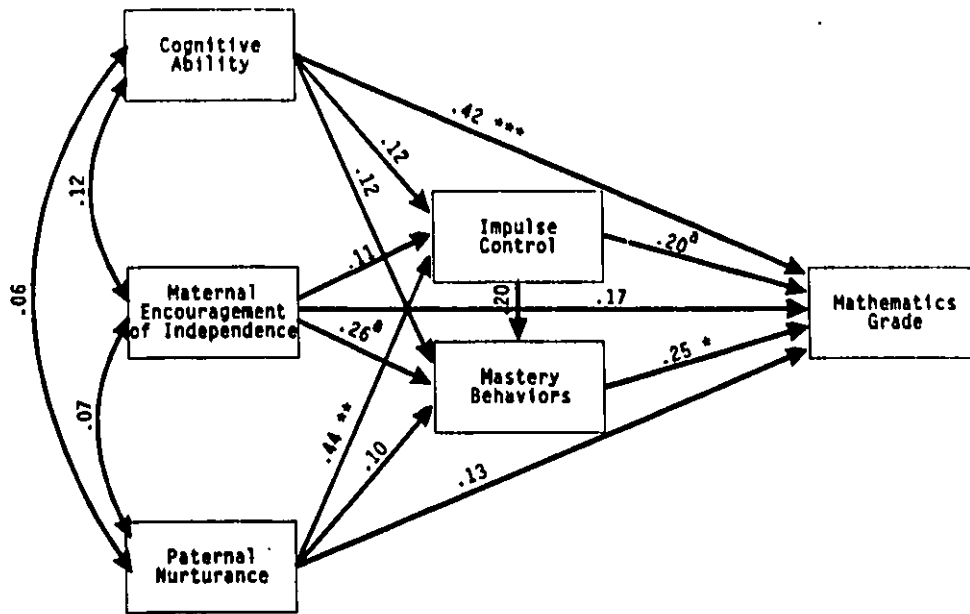
Figure 3. Path models for the relations between parenting practices and girls' overall GPA ($n=57$).

Table 7

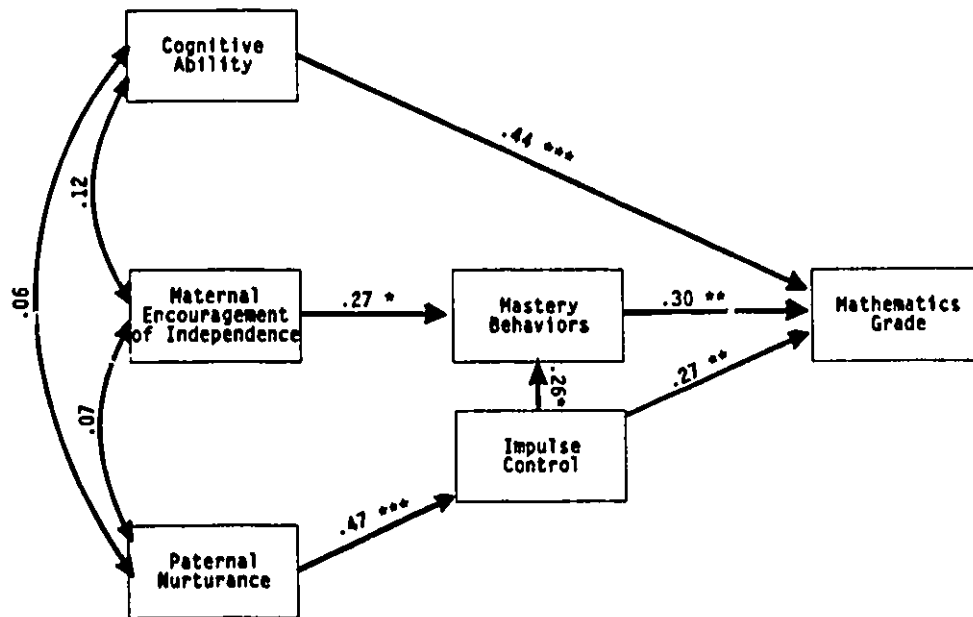
Summary of Direct and Indirect Effects of Parenting Practices and Cognitive Ability Upon Girls' Overall GPA (n = 57)

Variable	Pearson r	Effects		Total	Non- Causal
		Direct	Indirect		
<u>Hypothesized model</u>					
Cognitive ability					
Via impulse control			.03		
Via mastery behaviors			.02		
Via impulse-and-mastery			<u>.00</u>		
	.54***	.45***	.05	.50***	.04
Maternal encouragement of independence					
Via impulse control			.03		
Via mastery behaviors			.04		
Via impulse-and-mastery			<u>.00</u>		
	.28*	.13	.07	.20	.08
Paternal nurturance					
Via impulse control			.09		
Via mastery behaviors			.02		
Via impulse-and-mastery			<u>.01</u>		
	.23	.05	.12	.17	.06
<u>Trimmed model</u>					
Cognitive ability	.54***	.49***		.49***	.05
Paternal nurturance					
Via impulse control			<u>.17</u>		
	.23		.17	.17	.06

*p < .05. **p < .01. ***p < .001. (two-tailed significance).



a) Hypothesized model



b) Trimmed model

^a $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Figure 4. Path models for the relations between parenting practices and girls' mathematics grades ($n=55$).

Table 8

Summary of Direct and Indirect Effects of Parenting Practices and Cognitive Ability Upon Girls' Mathematics Grades (n = 55)

Variable	Pearson r	Effects			Non- Causal
		Direct	Indirect	Total	
<u>Hypothesized model</u>					
Cognitive ability					
Via impulse control			.02		
Via mastery behaviors			.03		
Via impulse-and-mastery			<u>.01</u>		
	.53***	.42***	.06	.48***	.05
Maternal encouragement of independence					
Via impulse control			.02		
Via mastery behaviors			.07		
Via impulse-and-mastery			<u>.01</u>		
	.35**	.17	.10	.27	.08
Paternal nurturance					
Via impulse control			.09		
Via mastery behaviors			.03		
Via impulse-and-mastery			<u>.02</u>		
	.31*	.13	.14	.27	.04
<u>Trimmed model</u>					
Cognitive ability	.53***	.44***		.44***	.09
Maternal encouragement of independence					
Via mastery behaviors			<u>.08</u>		
	.35**		.08	.08	.27
Paternal nurturance					
Via impulse control			.13		
Via impulse-and-mastery			<u>.04</u>		
	.31*		.17	.17	.14

* $p < .05$. ** $p < .01$. *** $p < .001$. (two-tailed significance)

In the trimmed model, impulse control significantly mediated the association between paternal nurturance and girls' grades in mathematics. The paths from paternal nurturance to impulse control (.47) and from impulse control to mathematics grades (.27) were statistically significant. The resulting indirect causal effect was .13 ($.47 \times .27$) and represented 41% of the total association between maternal encouragement of independence and mathematics grades ($.13/.31$). The indirect effect of paternal nurturance upon girls' mathematics grades, via the influence of paternal nurturance upon impulse control (.47), impulse control upon mastery behaviors (.26), and mastery behaviors upon mathematics grades (.30) was .04 ($.47 \times .26 \times .30$). This indirect effect represents 13% of the relation between paternal nurturance and girls' grades in mathematics ($.04/.31$). In total, the indirect effect of paternal nurturance upon girls' grades in mathematics, via task orientation (both impulse control and mastery behaviors), was .17 ($.13 + .04$). This effect represents 55% of the relation between paternal nurturance and girls' grades in mathematics. The direct effect of cognitive ability upon girls' mathematics grades (.44) also was statistically significant.

The direct and indirect effects for both the hypothesized and the trimmed models pertaining to girls' grades in mathematics are summarized in Table 8. Overall, 49% of the variance in girls' mathematics grades was accounted for in the trimmed model. Together, the results indicate that cognitive ability, maternal

achievement of independence (via mastery behaviors), and paternal nurturance (via impulse control) influence girls' grades in mathematics.

Path models for girls' English grades. The hypothesized path model for the associations among maternal encouragement of independence, paternal nurturance, and girls' grades in English is presented in Figure 3.a. The trimmed model is presented in Figure 3.b. In contrast with the larger sample size for the analysis pertaining to overall GPA ($n = 57$) and grades in mathematics ($n = 55$), a smaller sample ($n = 33$) was used to examine the models pertaining to grades in English. This is because only a portion of the sample was enrolled in an English course.

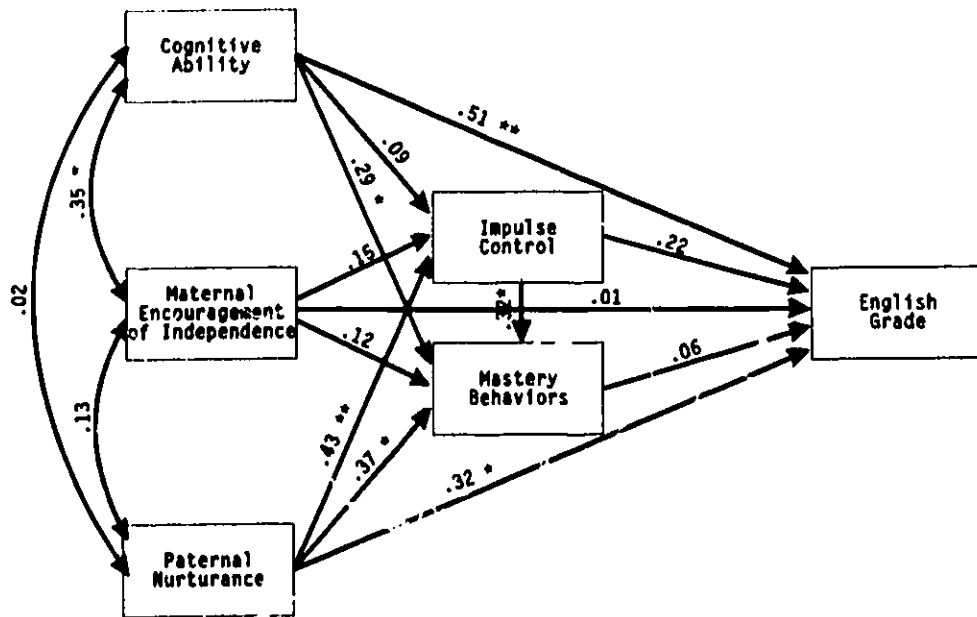
As can be seen from Figure 3.b, the mediating role of impulse control in the relation between paternal nurturance and grades in English approached significance. Specifically, the path from paternal nurturance to impulse control (.48) was statistically significant and the path from impulse control to English grades (.22) approached significance. The indirect causal effect was .10 (.10 < .22) and represented 26% of the total association between paternal nurturance and English grades (.33). However, the direct effects of both paternal nurturance (.28) and cognitive ability (.24) upon girls' English grades were statistically significant.

The direct and indirect effects for both the hypothesized and the trimmed models pertaining to girls' grades in English are

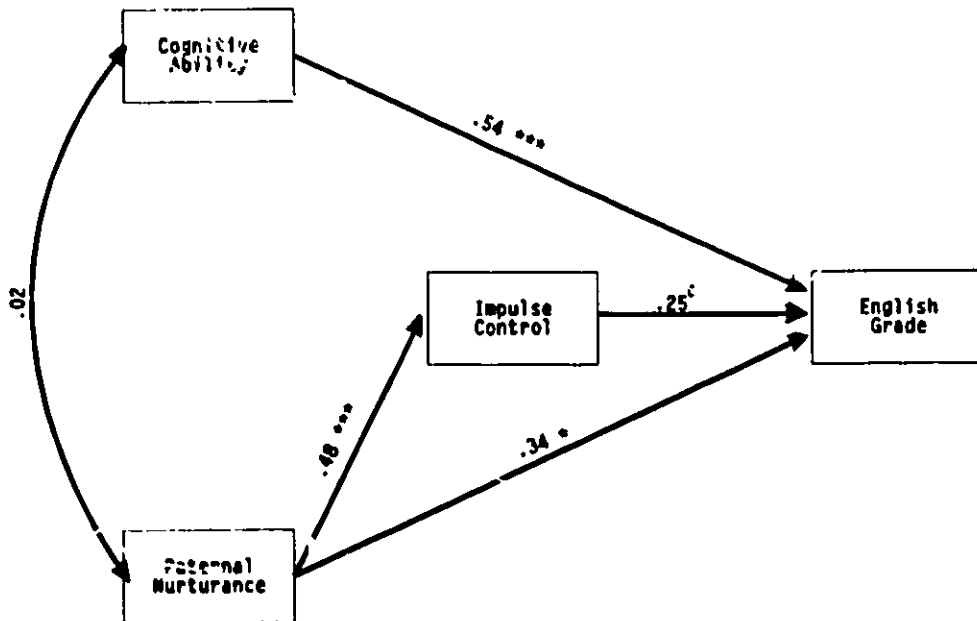
summarized in Table 9. Overall, 58 percent of the variance in girls' English grades was accounted for in the trimmed model. From the results, it appears that both cognitive ability and paternal nurturance influence girls' grades in English, with the effects of paternal nurturance being partly mediated by impulse control.

Path models for boys' French grades. As discussed previously, the only measure of academic performance associated with a parenting variable (i.e., maternal encouragement of independence) in the male sample was boys' grades in French. Consequently, the mediating role of task orientation was investigated only for this association. As shown in Figure 6.a and 6.b, neither mastery behaviors nor impulse control significantly mediated the association between maternal encouragement of independence and boys' grades in French. Instead, the direct effect for maternal encouragement of independence upon boys' grades in French approached significance (.21) when it was considered in conjunction with cognitive ability (.46). Twenty-nine percent of the variance in boys' grades in French was accounted for in the trimmed model. The direct and indirect effects for both the hypothesized and the trimmed model are summarized in Table 10.

From the results obtained for boys' grades in French, it appears that maternal encouragement of independence has a weak effect on boys' French grades and that this effect is not mediated by either mastery behaviors or impulse control. If



a) Hypothesized model



b) Trimmed model

^a $p < .10$. $^*p < .05$. $^{**}p < .01$. $^{***}p < .001$.

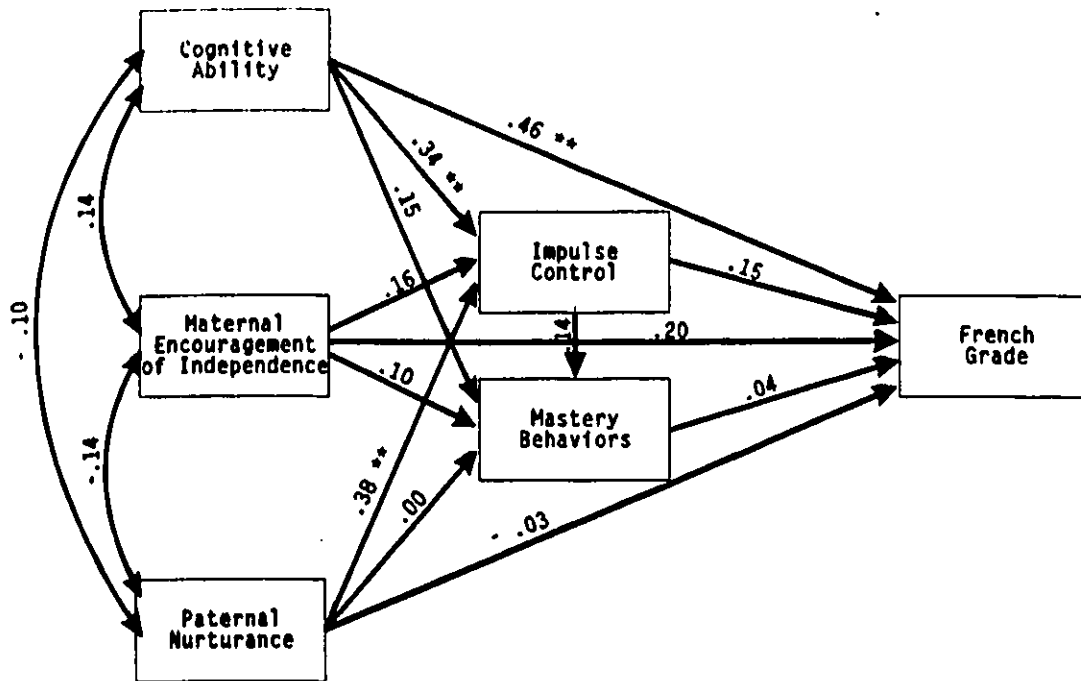
Figure 5. Path models for the relations between parenting practices and girls' English grades ($n=33$).

Table 9

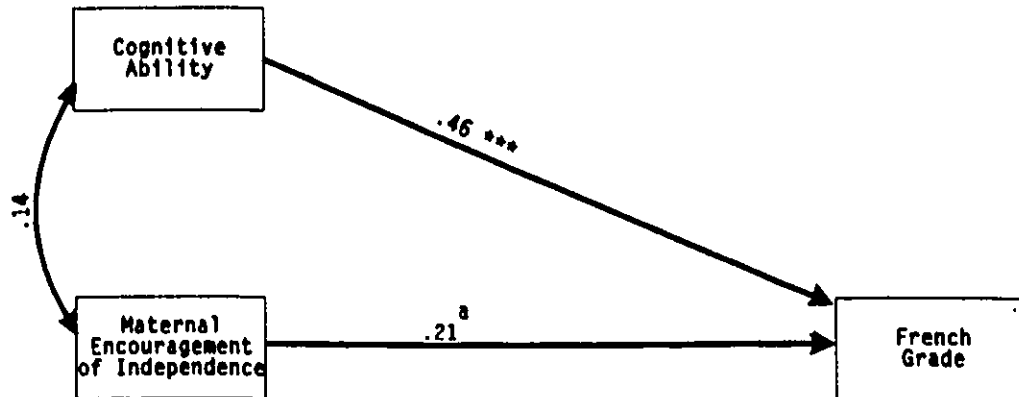
Summary of Direct and Indirect Effects of Parenting Practices and Cognitive Ability Upon Girls' English Grades (n = 33)

Variable	Pearson r	Effects			Non- Causal
		Direct	Indirect	Total	
<u>Hypothesized model</u>					
Cognitive ability					
Via impulse control			.02		
Via mastery behaviors			.02		
Via impulse-and-mastery			<u>.00</u>		
	.60***	.51**	.04	.55**	.05
Maternal encouragement of independence					
Via impulse control			.02		
Via mastery behaviors			.02		
Via impulse-and-mastery			<u>.00</u>		
	.27	.01	.04	.05	.22
Paternal nurturance					
Via impulse control			.10		
Via mastery behaviors			.01		
Via impulse-and-mastery			<u>.01</u>		
	.46**	.32*	.12	.44	.02
<u>Trimmed model</u>					
Cognitive ability	.60***	.54***		.54***	.06
Paternal nurturance					
Via impulse control			<u>.12</u>		
	.46**	.34*	.12	.46	.0

*p <.05. **p <.01. ***p <.001. (two-tailed significance).



a) Hypothesized model



b) Trimmed model

^a $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Figure 6. Path models for the relations between parenting practices and boys' French grades ($n=56$).

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Table 10

Summary of Direct and Indirect Effects of Parenting Practices and Cognitive Ability Upon Boys' French Grades (n = 56)

Variable	Pearson r	Effects			Non- Causal
		Direct	Indirect	Total	
<u>Hypothesized model</u>					
Cognitive ability					
Via impulse control			.05		
Via mastery behaviors			.01		
Via impulse-and-mastery			<u>.00</u>		
	.49***	.46**	.06	.52**	-.03
Maternal encouragement of independence					
Via impulse control			.02		
Via mastery behaviors			.00		
Via impulse-and-mastery			<u>.00</u>		
	.27*	.20	.02	.22	.05
Paternal nurturance					
Via impulse control			.05		
Via mastery behaviors			.00		
Via impulse-and-mastery			<u>.00</u>		
	-.06	-.03	.05	.02	-.08
<u>Trimmed model</u>					
Cognitive ability	.52***	.46***		.46***	.06
Maternal encouragement of independence	.27*	.21*		.21*	.06

*p <.05. **p <.01. ***p <.001. (two-tailed significance).

these results are considered in conjunction with the results obtained for girls, it is evident that there is more support for the influence of parenting practices upon girls' academic performance than upon boys' academic performance. Relatedly, stronger support for the mediating role of mastery behaviors and impulse control in the relations between parenting practices and academic performance were obtained in the female sample than in the male sample.

To demonstrate that the pattern of effects among variables was indeed different for boys and girls, path models were calculated, using the combined male and female sample. As expected, the larger sample size resulted in smaller, rather than larger, effects for the parenting and task orientation variables. These results are a function of the discrepant pattern of relations among the variables in the male and female sample. For comparison purposes, the path model for overall GPA, calculated for the combined male and female sample, is presented in Appendix G.

Associations Between Children's Cognitive Performance and Parents' Education and Socioeconomic Status

A post-hoc decision was made to determine whether parental education and SES were associated with children's cognitive ability and academic performance. Using a Bonferroni-corrected alpha of .002 (.05/28), none of the correlations were statistically significant. The correlations between children's cognitive performance and parental education and SES are

presented in Appendix H.

Linear Versus Curvilinear Relations Among Variables

In all of the above analyses, the possibility of curvilinear relations among variables was investigated. To assess curvilinear relations, the predictor variable is raised to the second power (i.e., X^2) to create a new variable, which represents the curvilinear relation (Pedhazur, 1982). This variable is entered into a hierarchical multiple regression analysis, following the entry of the linear term (i.e., X). If the variable representing the curvilinear relation results in a significant increment in the portion of variance accounted for in the multiple regression analysis, then it is concluded that the relation between the predictor and the dependent variable is not linear. In the present investigation, no evidence of curvilinear relations among variables was obtained.

Discussion

The purpose of this study was to investigate the associations among parenting practices, task orientation, and academic performance in Grade 6 boys and girls. In addition, the possible mediating role of task orientation in the associations between aspects of parenting and children's academic performance was investigated. The results obtained partially supported the hypotheses of the study, which were derived from the expectation that parenting practices influence task orientation, which in turn influences academic performance. Specifically, some measures of parenting practices were associated with both children's task orientation and academic performance, and task orientation was associated with some measures of academic performance. In addition, the mediating role of task orientation in the association between some parenting practices and some measures of academic performance was confirmed. All relations among variables were linear, rather than curvilinear. Before discussing the individual findings of the investigation, the relative contribution of cognitive ability and parenting practices to children's academic performance will be addressed.

Cognitive Ability and Children's Academic Performance

As was discussed in both the introduction and the literature review, it is evident that cognitive performance is a function of both genetic and environmental factors. In fact, it is estimated that over 50% of the variance in cognitive performance is genetically determined (Loehlin et al., 1988). As a result,

cognitive ability is an important variable to consider when investigating the predictive relations of other variables with children's academic performance. In the present study, the Canadian Cognitive Abilities Test (CCAT) was used to measure cognitive ability. Although performance on the CCAT is not solely a function of genetically determined aptitude, cognitive ability measures are considered to be influenced by socialization experiences to a lesser extent than are achievement measures (Sattler, 1982). As a result, measures of ability provide an important means of controlling for the influence of individual variations in aptitude upon academic achievement.

The results of the present investigation are consistent with the view that children's academic performance is substantially influenced by genetically determined cognitive ability (see paths from cognitive ability to grades in Figures 3 through 6). Three sets of findings in the present study, however, support the view that academic performance is also influenced by socialization experiences. First, gender differences in the relations among variables were obtained in the absence of gender differences in cognitive ability. Consequently, it appears that specific socialization experiences differentially influence boys and girls (Hess & McDevitt, 1984). Second, measures of parenting practices significantly predicted academic performance, even when they were considered in conjunction with the measure of cognitive ability (CCAT). Third, a moderate portion of variance in academic performance was not accounted for in the analyses, even though

cognitive aptitude was assessed. Consequently, socialization experiences not considered in the present study (as well as genetic factors that may not be assessed by the CCAT) appear to influence children's academic performance. It would be expected that socialization experiences other than parenting practices would affect children's academic performance, as children are exposed to a wide range of socialization influences, both at home and within the larger social context (e.g., school, media, siblings, peers). Overall, the results of the present study indicate that socialization in general, and parenting practices in particular, do indeed predict children's academic performance, even when considered in conjunction with cognitive ability.

In the discussion that follows, the specific findings of the present investigation will be examined. The associations among parenting practices, task orientation, and academic performance will be examined first, followed by a discussion of the mediating role of task orientation in the associations among parenting practices and children's academic performance. Implications of the results, suggestions for future research, and methodological limitations also will be discussed.

Parenting Practices and Children's Cognitive Performance

In the present study, three measures of parenting practices--encouragement of independence, restrictive control, and nurturance--were assessed in relation to children's academic performance. As discussed in the literature review, it was expected that parental encouragement of independence, low

restrictive control, and nurturance would be positively associated with children's academic performance. This expectation was derived from the view that parental encouragement of independence, low restrictive control, and nurturance promote mastery behaviors and impulse control by facilitating interaction with the environment. Mastery behaviors and impulse control in turn are expected to enhance academic achievement.

Encouragement of Independence and Academic Performance

With respect to the first parenting variable, it was found that maternal, but not paternal, encouragement of independence was positively associated with academic performance in both Grade 6 girls and boys. For girls, maternal encouragement of independence was significantly correlated with both overall GPA (i.e., a cumulative measure of grades across all subject areas) and grades in mathematics. The correlations between maternal encouragement of independence and girls' academic achievement in other subject areas (i.e., French, English, science, and social studies) were all in the same direction (see Table 5) but did not achieve statistical significance.

From the magnitude of the association between maternal encouragement of independence and girls' academic performance, it appears that the effect size of maternal encouragement of independence upon academic performance is in the small ($r = .10$) to medium ($r = .30$) range (Cohen, 1977). As was discussed in the hypotheses and method sections, this was consistent with both expectation and previous research. Consequently, the results of

the present study provide support for the conclusion that maternal encouragement of independence is related to girls' academic performance during the middle childhood years, although clearly it is not the sole predictor of girls' academic achievement.

For boys, the association between maternal encouragement of independence and French grades was statistically significant. For the other subject areas, however, the direction of the correlations with maternal encouragement of independence varied. Moreover, in some cases, the magnitude of the correlation between maternal encouragement of independence and academic performance was very small. Consequently, it appears that a more robust association may exist between maternal encouragement of independence and academic performance in girls than in boys.

In spite of the more consistent pattern of relations between maternal encouragement of independence and academic performance in the female sample than the male sample, it should be noted that the magnitude of the correlations in the two samples did not differ from each other at a statistically significant level. As a result, the apparent gender difference can only be considered a trend in the current data set.

The association of maternal, but not paternal, encouragement of independence with girls' academic performance was consistent with the assumption that mothers have a stronger influence on daughters than do fathers. This assumption was derived from the fact that children tend to have a closer relationship with the

cognitive performance at 7 years of age (Bradley & Caldwell, 1984). In conjunction with the present findings, this finding may indicate that only concurrent maternal encouragement of independence facilitates children's cognitive performance. Alternatively, maternal encouragement of independence may influence children's cognitive performance at older age levels, but not at 12 months of age.

The only previous study on the relation between a concurrent measure of parental encouragement of independence and cognitive performance in school-age children was conducted by Solomon et al. (1971). In this investigation, paternal, but not maternal, encouragement of independent achievement was curvilinearly associated with girls' (but not boys') academic performance. It may be, therefore, that girls benefit from moderate paternal encouragement of independent achievement, whereas paternal encouragement of independence across all domains may not affect girls' academic achievement. It should be noted that no evidence for a linear or curvilinear relation between global paternal encouragement of independence and girls' academic achievement was obtained in the present study. As will be discussed below, the nonsignificant relation may have occurred because paternal encouragement of independence did not predict girls' history achievement or language scores. Research on the association between global measures of parental encouragement of independence and children's cognitive performance has not been conducted previously at any age level. Consequently, the nonsignificant

finding in the present study is the first empirical evidence that global paternal encouragement of independence may be of less consequence than global maternal encouragement of independence for children's academic performance.

Restrictive Control and Academic Performance

With regard to the parenting variable of restrictive control, a negative correlation with children's academic performance was predicted. In both the female and male samples, however, the correlations between academic performance and both maternal and paternal restrictive control were not statistically significant. The nonsignificant findings are in contrast with the significant negative associations reported in the majority of previous investigations (e.g., Barnard et al., 1984; Dornbusch et al., 1987).

The discrepancy between the findings obtained in the current study and those obtained in most of the previous studies may have resulted from both age and measurement differences among the investigations. In earlier research, separate measures of maternal and paternal restrictive control were only obtained when children were below the age of 4 years. In these studies, scores on intellectual tests, rather than school achievement, were used to define cognitive performance (e.g., Barnard et al., 1984; Bradley & Caldwell, 1976). In school-age samples, school performance was assessed, but a combined measure of concurrent maternal and paternal restrictive control was used (Dornbusch et al., 1987; Steinberg et al., 1988). Because combined measures of

parental restrictive control were used, it could not be determined if school-age children's academic performance was associated with maternal or paternal restrictive control. Consequently, the relations investigated in the present study (i.e., between academic performance and concurrent measures of maternal and paternal restrictive control) had not been assessed previously.

If the results obtained in the present study and in previous investigations are considered together, it appears that maternal and paternal restrictive control may have weaker influences on school-age children than on preschool children. This conclusion is derived from the observation that separate measures of maternal and paternal restrictive control were negatively correlated with preschool children's cognitive performance (e.g., Bernard et al., 1984; Elardo et al., 1975, 1977), but were unrelated to school-age children's academic performance (i.e., in the present study). This pattern of effects seems plausible, as children's sensitivity to parental restrictive control may decrease with age. This suggestion is based on the fact that children become more independent of their parents as they grow older (Liebert et al., 1986), and thus the salience of parental control may decrease. Boys may become independent of their parents at an earlier age than girls (Rice, 1981), and thus moderate parental restrictive control may have little influence on boys during the middle childhood years. The effects of extreme restrictive control cannot be commented on, as extreme

restrictive control was not reported by any of the parents in the present study (i.e., the highest score was 51 out of a possible 63 and the mean scores ranged from 19.95 to 22.66 for mothers and fathers in the male and female samples). Clearly, the proposed age variation in the relation between moderate parental restrictive control and children's cognitive performance requires verification.

In contrast with the nonsignificant association between parental restrictive control and children's academic performance, maternal restrictive control was positively associated with girls' scores on the measure of cognitive ability (CCAT). This association was not predicted, as cognitive ability is considered to be influenced by socialization to a lesser extent than are academic grades (Sattler, 1982). Moreover, in previous investigations, negative, not positive, associations between parental restrictive control and children's intellectual performance were reported (e.g., Barnard et al., 1984; Elardo et al., 1975). The findings obtained in the present study may have resulted from the moderately low level of restrictive control reported by parents. With respect to maternal restrictive control, the mean score in the female sample was 20.78 (S.D. = 5.34), where the possible range of scores was 9 to 63. As was discussed in the literature review, all parents need to exert some control over their children and low levels of control may have positive effects on children. For example, mild parental control may enhance certain cognitive abilities, by fostering

self-discipline and a sense of self-determination (Lytton, 1977; Maccoby & Martin, 1983; Olson et al., 1990). Consistent with this hypothesis, researchers have found that children's cognitive ability is negatively correlated with both lax control (e.g., Steinberg et al., 1989) and restrictive control (e.g., Elardo et al., 1975; Steinberg et al., 1989). Because the actual (and possible) ranges of scores on the restrictive control measures were not reported in previous studies, it is unclear if the level of restrictive control was higher than in the present study. To clarify the effects of varying levels and forms of control, a wider range of scores on various dimensions of control would need to be obtained and correlated with children's academic and intellectual performance. Until this investigation has been conducted, the possibility that mild control may facilitate cognitive performance remains speculative.

The presence of an association between maternal restrictive control and cognitive ability in the female sample but not the male sample is consistent with the view that girls are more sensitive to restrictive control than are boys, because of a stronger desire to please (Hess & McDevitt, 1984). Moreover, as was previously discussed, boys tend to be more independent of their parents than girls (Rice, 1981) and thus may be influenced by restrictive control to a lesser extent than girls. Gender differences in the possible impact of maternal restrictive control upon children's cognitive ability only represent a trend, however, as the correlation between maternal restrictive control

and cognitive ability was not significantly stronger in the female sample than in the male sample when the two correlations were statistically compared. The finding that maternal, but not paternal, restrictive control was positively associated with girls' cognitive ability may reflect the increased salience of the behaviors of the same-gender parent, which results from the closer relationship that is usually shared with this parent (Huston, 1983).

Nurturance and Academic Performance

With respect to the third parenting variable, parental nurturance, gender differences were not consistent with expectation. It had been hypothesized that the closer relationship between fathers and sons (Huston, 1983) would result in fathers having a stronger influence upon the academic performance of sons than daughters. Paternal nurturance, however, was associated with girls', but not boys', academic performance. Moreover, the magnitude of the correlation between paternal nurturance and academic performance in mathematics was significantly higher in the female sample than in the male sample. The direction of the correlation was consistent across all academic areas in the female sample, although the magnitude varied and was only statistically significant for grades in English and mathematics (see Table 5).

As with the other parenting variables, it appears that the effect size of paternal nurturance upon girls' academic performance is in the small to medium range (Cohen, 1977). The

gender difference obtained was consistent with the other parenting variables, which may suggest that boys' academic performance is less dependent upon parenting practices than is girls' academic performance. Because boys become more independent of their parents during the middle childhood years (Rice, 1981), they may be influenced by all parenting practices to a lesser degree than are girls. Moreover, generalized social expectations for academic achievement are stronger for boys than girls (Stein & Bailey, 1973), and thus parental factors may be of less import for boys' academic performance.

The finding that paternal, but not maternal, nurturance was associated with girls' academic performance was not predicted. As with the other parenting variables, it was expected that maternal nurturance would have a stronger association with girls' academic performance because of the closer relationship that tends to exist with the same-gender parent (Huston, 1983). A possible explanation for the pattern of results obtained is that paternal nurturance may convey paternal acceptance of girls' behavior in many domains, including the achievement domain. Specifically, if fathers have a general tendency to act in an affectionate, responsive, and accepting manner toward their daughters, then they likely manifest these responses to numerous components of their daughters' behaviors, including academic accomplishments. For girls, paternal acceptance of achievement may counteract the traditional gender role stereotype that achievement belongs to the masculine domain (Stein & Bailey,

1973). This acceptance may increase girls' motivation to pursue academic interests, and this increased involvement may facilitate the development of a positive task orientation and subsequent academic performance. As will be discussed below, there is some evidence to support this explanation (i.e., a significant association between paternal nurturance and impulse control).

It is speculated that the importance of paternal nurturance for girls' academic achievement may increase as girls grow older, as awareness of gender role stereotypes increases with age (Carter & Patterson, 1982). An increased awareness of gender role stereotypes may contribute to decreased motivation to excel academically, as academic achievement is not a component of the traditional feminine gender role (Stein & Bailey, 1973). Paternal acceptance of achievement behaviors, however, may counteract the growing influence of gender role stereotypes. In support of the proposed age variations in the relation between paternal nurturance and girls' cognitive performance, paternal nurturance was unrelated to girls' cognitive performance during the preschool years (Epstein & Radin, 1975; Honzik, 1967), but was positively associated with girls' academic performance during the school years (i.e., in the present study). The proposed explanation for the association between paternal nurturance and girls' academic performance, as well as the related age differences, require confirmation. Research on the relations among paternal nurturance, acceptance of achievement, girls' academic performance, and their awareness of gender role

stereotypes would aid in clarifying the degree of support for the pattern of effects being proposed.

For boys, the nonsignificant relations between academic performance and both maternal and paternal nurturance may indicate that parental acceptance of achievement behaviors has little effect on school-age boys. This interpretation is consistent with the view that if there is a generalized expectation for a given behavior, then parental factors have relatively little influence on the occurrence of the behavior (Oldershaw, 1991). Boys do receive acceptance and encouragement of achievement behaviors from a variety of sources (e.g., teachers, other family members, media) during the school years (Block, 1983). Consequently, parental acceptance of achievement behaviors may have little effect on school-age boys. As was discussed in the literature review, the associations between concurrent measures of paternal nurturance and school-age boys' cognitive performance had not been assessed previously, whereas concurrent measures of maternal nurturance were unrelated to school-age boys' cognitive performance (Solomon et al., 1971). As a result, there is no existing evidence that parental nurturance significantly promotes boys' cognitive performance during the school years. This contrasts with the positive associations obtained for preschool boys (e.g., Elardo et al., 1977; Radin, 1972). It seems likely that parental nurturance would have a stronger influence on boys during the preschool years than the school years, as boys are exposed to fewer

socialization agents when they are younger. Consequently, parental influences would be more marked during the preschool years.

Variations in Results Across Academic Areas

A final issue to consider with respect to the association between parenting practices and children's academic performance is the inconsistent findings obtained across different academic subjects. In the present study, parenting practices (maternal encouragement of independence and paternal nurturance) were associated with girls' grades in English and mathematics, as well as overall GPA. The associations of the parenting variables with other subject areas were all in the same direction, but were not statistically significant. For boys, parenting practices (maternal encouragement of independence) were associated with grades in French. The associations of maternal encouragement of independence with the other subject areas were all in the same direction (except for social studies), but were not statistically significant. For social studies, the correlation was $-.02$ and thus did not indicate a meaningful association.

There is no clear reason why grades in English, mathematics, and French would be influenced more by parenting practices than grades in science and social studies. Instead, maternal encouragement of independence (for both boys and girls) and paternal nurturance (for girls) are probably associated with children's grades in a variety of academic areas. A larger sample size, however, may be required to consistently detect

these associations. As was discussed previously, there is stronger support for associations between parenting practices and the various academic areas in the female sample than in the male sample. This is consistent with the hypothesis that parenting practices may be more important for the academic performance of girls than boys, because of gender differences in generalized social expectations for achievement (Stein & Bailey, 1973). Thus, from the results obtained to date, there is insufficient evidence to conclude that the association between parenting practices and children's academic performance varies across subject areas. If the same variations are replicated in future investigations, however, it will be necessary to examine what factors may contribute to these deviations (e.g., different skill requirements of various academic subjects).

Parenting Practices and Academic Performance: Summary

To summarize, the results of the present investigation are consistent with the conclusion that maternal encouragement of independence enhances boys' and girls' academic achievement during the middle childhood years. In addition, paternal nurturance appears to enhance girls' academic achievement at this point in development. From these findings, it appears that efforts made to facilitate maternal encouragement of independence and paternal nurturance could be valuable in advancing children's future academic and occupational attainment. Moreover, it appears that promotion of maternal encouragement of independence and paternal nurturance toward daughters, as compared to sons,

may be of most value, as parenting practices appear to influence girls more than boys, at least during the middle childhood years.

Although the above results provide information on the associations among parenting practices and children's academic performance during the middle childhood years, the benefits of looking beyond these relations are considerable. As was discussed in the introduction, identification of the mechanisms that underlie the associations among parenting practices and children's academic performance could aid in the development of a rationale for the modification of current parenting practices. In addition, identification of factors that are influenced by parenting practices, and in turn influence academic performance, would provide information on how parenting practices could be compensated for or built upon. Given the potential importance of mediating factors in the relations among dimensions of parenting and children's academic performance, the above findings need to be considered with reference to the results that were obtained for task orientation.

Parenting Practices and Task Orientation

Parenting Practices and Impulse Control

From the results of the present study, it appears that the most consistent association between a dimension of parenting and a dimension of task orientation is for parental nurturance with children's impulse control. Positive associations were found for both maternal and paternal nurturance with boys' and girls' impulse control. From the magnitude of the correlations, it

appears that the effect size for parental nurturance upon children's impulse control is in the medium ($r = .30$) to large ($r = .50$) range (Cohen, 1977).

The relations between parental nurturance and children's impulse control are congruent with the theory that nurturance promotes interaction with the environment, which in turn enhances the ability to regulate actions without assistance from others (Bretherton, 1985). It also is consistent with Maccoby and Martin's (1983) thesis that nurturance enhances children's willingness to behave in accordance with parental standards. Although the associations between parental nurturance and children's impulse control were investigated previously, none of the earlier studies used children over the age of 6 years and none included measures of paternal nurturance. Instead, for boys, empirical evidence of an association between maternal nurturance and impulse control at 2 years (Lytton, 1977) and 6 years (Olson et al., 1990) of age was available, whereas for girls, a nonsignificant association between maternal nurturance (measured at 6 and 13 months of age) and girls' impulse control at 6 years of age was reported (Olson et al., 1990). The findings of the present investigation, therefore, provide preliminary support for the applicability of the above explanations to both middle school-age children and paternal nurturance. From the results, it appears that nurturance from both parents has a positive influence upon impulse control in both boys and girls.

The other parental correlates of children's impulse control were maternal and paternal restrictive control in the female sample. As predicted, paternal restrictive control was negatively correlated with girls' impulse control (medium effect size; Cohen, 1977). This finding is congruent with the view that restrictive control impedes the development of impulse control by limiting opportunities to interact with the environment (Bretherton, 1985) and reducing children's sense of self-determination (Maccoby & Martin, 1983). Maternal restrictive control, on the other hand, was positively correlated with girls' impulse control. Although the direction of the association between maternal restrictive control and girls' impulse control was not expected and was not consistent with the results obtained for fathers, there appears to be an explanation for the positive association that was obtained.

The possible reason for why girls' impulse control was negatively correlated with paternal restrictive control and positively correlated with maternal restrictive control is that girls may perceive paternal restrictive control as being more severe than maternal restrictive control. Consequently, paternal restrictive control may have a stronger negative impact on girls' subsequent interactions with the environment, and hence the development of self-regulatory abilities. The proposal that paternal restrictive control is perceived to be more severe than maternal restrictive control is based on the fact that fathers tend to hold a position of authority in the family (Hoffman,

1977). Consequently, even if the same objective level of restrictive control is used by mothers and fathers, restrictive control from fathers may be experienced as being more severe.

With respect to mothers, the positive relation between restrictive control and girls' impulse control also may be a function of the perceived severity of control efforts. If maternal restrictive control is not perceived as being harsh, then it may actually serve to facilitate self-control. As was discussed in the literature review (and in the above discussion of the positive relation between maternal restrictive control and girls' cognitive ability), there is evidence that mild forms of control appear to facilitate children's impulse control (Lytton, 1977; Olson et al., 1990). Consequently, if the level of maternal restrictive control manifested in the present sample was experienced as being mild, then the positive association between maternal restrictive control and girls' impulse control is consistent with theory. This interpretation is clearly speculative and requires confirmation. To determine the validity of the interpretation, an investigation of the associations among children's impulse control and multiple measures of parental restrictive control (e.g., self-report and observational measures of the frequency with which specific control techniques are used, as well as children's perceptions of parental restrictive control) is needed.

There is little previous research with which to compare the results obtained on the relations between parental restrictive

control and children's impulse control. The one investigation in which maternal restrictive control was assessed independent of paternal restrictive control was conducted with children who were 6 years of age (Olson et al., 1990). In this investigation, maternal restrictive control (measures at 13 months of age) was associated with boys', but not girls', impulse control. Consequently, the results of the present study provide preliminary information on the relation between parental restrictive control and children's impulse control during the school years. As with the relation between maternal restrictive control and cognitive ability (i.e., CCAT), the finding that parental restrictive control is associated with girls', but not boys', impulse control may reflect a stronger desire to please in girls than in boys (Hess & McDevitt, 1984). The magnitude of the correlations between parental restrictive control and impulse control were not significantly higher in the female sample than in the male sample, however, and thus gender differences in these relations are not clearly supported by the data.

The remaining parenting variable assessed in relation to children's impulse control was parental encouragement of independence. The correlations between parental (paternal and maternal) encouragement of independence and children's impulse control were not significant in either the male or female sample. The predicted positive association between these variables was based on the premise that opportunities to interact with the environment would promote the development of the ability to

regulate actions without assistance from others (e.g., Bretherton, 1985). The lack of support for this proposal is inconsistent with previous research, which was conducted with infants and toddlers (Lytton, 1977; Stayton et al., 1971). The inconsistent findings may indicate that parental encouragement of independence only influences children's impulse control at early ages, whereas other factors may influence impulse control in older children (e.g., parental nurturance). Older children may have sufficient independence opportunities to develop a basic level of impulse control, and additional encouragement of independent behaviors may not result in further enhancement of impulse control.

To summarize, boys' impulse control was correlated with both maternal and paternal nurturance, but not parental encouragement of independence or restrictive control. For girls, impulse control was positively associated with maternal and paternal nurturance and mild maternal restrictive control; it was negatively correlated with paternal restrictive control. These findings are consistent with the theory that impulse control is strengthened by parenting behaviors that promote children's interaction with the environment by enhancing children's sense of competence and security (Bretherton, 1985). Moreover, the findings are consistent with the theory that those parenting practices that enhance children's willingness to behave in accordance with parental standards promote the development of impulse control (Maccoby & Martin, 1983). Active encouragement

of independent behaviors may not enhance children's impulse control during the middle childhood years, as encouragement of independence may promote a different type of interaction with the environment than do nurturance and low restrictive control. This possibility is discussed in more detail at the end of this section.

Parenting Practices and Mastery Behaviors

With respect to mastery behaviors, parenting practices (maternal encouragement of independence and maternal nurturance) were associated with girls', but not boys', mastery behaviors. The magnitudes of the correlations in the female and male samples were not significantly different, however, and thus gender difference in the associations between parenting practices and mastery behaviors are not clearly supported. If there is a trend for parenting practices to be more strongly associated with mastery behaviors in girls than in boys, it may be because generalized expectations for mastery behaviors (i.e., task approach, independence, persistence, and a desire to master skills) appear to be stronger for boys than for girls (Block, 1983), and thus parental influences upon mastery behaviors would be weaker for boys than for girls (Oldershaw, 1991). This is probably particularly true during the school-age years, as expectations for boys' mastery-related behaviors likely increase with age.

Previous findings on the relations among parenting practices and boys' mastery behaviors are consistent with the proposed age-

related decrease in the effects of parenting practices upon boys' mastery behaviors. Although the relations among parenting practices and boys' mastery behaviors had not previously been investigated in school-age samples, there is evidence that boys' mastery behaviors during the preschool years are positively associated with maternal and paternal encouragement of independence and nurturance, as well as with low maternal restrictive control (Baumrind & Black, 1967; Epstein & Radin, 1975; Harrington et al., 1978). When considered in conjunction with the nonsignificant findings in the present study, it appears that the influence of parenting practices upon boys' mastery behaviors decreases with age and is not detectable by middle childhood.

If the results obtained in the present investigation are considered in conjunction with previous findings for girls, it appears that there also are age variations in the effects of parenting practices upon girls' mastery behaviors. In contrast with the results obtained for boys, both maternal encouragement of independence and nurturance appear to become more important for girls' mastery behaviors as girls grow older. In preschool samples, maternal nurturance was not associated with girls' mastery behaviors and only maternal encouragement of independence in a teaching situation was associated with preschool girls' mastery behaviors (Baumrind & Black, 1967; Harrington et al., 1978). Given that both maternal encouragement of independence and nurturance were associated with girls' mastery behaviors in

the present study, it appears that parenting behaviors that promote a sense of competence and security, as well as interaction with the environment, increase in importance as girls grow older. This may be because these behaviors counteract increasing pressure to conform to a traditional gender role (Stein & Bailey, 1973).

With respect to parental restrictive control, the nonsignificant associations with girls' mastery behaviors may have resulted from the fact that high levels of parental restrictive control were not reported in the present study (see earlier discussion). However, because nonsignificant results were consistently obtained in previous investigations (Baumrind & Black, 1967; Epstein & Radin, 1975; Harrington et al., 1978), it may be that parental restrictive control is less salient for girls' mastery behaviors than are parental encouragement of independence and nurturance. As will be discussed below, this may be because restrictive control results in a different type of interaction with the environment than do parental encouragement of independence and nurturance. The finding that only maternal practices were associated with girls' mastery behaviors was consistent with the view that girls tend to be influenced more by mothers than fathers because of the closer relationship that typically is shared with the same-gender parent (Huston, 1983). The nonsignificant associations between the paternal variables and girls' mastery behaviors correspond with the nonsignificant association between paternal encouragement of independence and

girls' mastery behaviors in previous investigations (Baumrind & Black, 1967; Harrington et al., 1978) and the inconsistent evidence for an association between girls' mastery behaviors and paternal nurturance (Epstein & Radin, 1975; Harrington et al., 1978) in preschool samples.

To summarize, boys' mastery behaviors were not correlated with any of the parenting measures, whereas girls' mastery behaviors were associated with maternal encouragement of independence and nurturance. The lack of significant findings for boys may result from the generalized social expectations for boys to engage in mastery behaviors (Block, 1983). For girls, it appears that parenting behaviors that promote interaction with the environment do result in mastery behaviors during the middle childhood years. Parental restrictive control, however, appears to be less significant for girls' mastery behaviors than parental encouragement of independence and nurturance. Clear support for gender differences in the associations between parenting practices and mastery behaviors was not obtained, however, as the magnitude of the correlations were not significantly different in the male and female samples.

Parenting Practices and Task Orientation: Summary

The finding that maternal encouragement of independence was associated with girls' mastery behaviors but not impulse control may indicate two processes. First, the two dimensions of task orientation may benefit from somewhat different experiences. Second, different parenting practices may result in somewhat

different patterns of interaction with the environment. It is speculated that mastery behaviors may benefit from varied and challenging interactions with the environment, which may best be promoted by parental encouragement of independence. Impulse control, in contrast, may be facilitated by experiences that are less challenging, but which still provide opportunities for the development of self-regulatory abilities. These experiences may be facilitated more by parental nurturance and low restrictive control, as these parenting behaviors are characterized by less pressure to attempt new challenges than is parental encouragement of independence. Low parental restrictive control may result in less environmental exploration than high parental nurturance, as nurturance may have a more direct effect upon children's sense of security in the environment. As a result, it is postulated that parental encouragement of independence fosters the highest level of environmental interaction, followed by parental nurturance, and low restrictive control. Furthermore, mastery behaviors may directly benefit from challenging interactions, whereas impulse control may benefit most from less challenging interactions, perhaps because a lower level of frustration is induced. This explanation is very tentative and represents a hypothesis for future research. If it is correct, though, it would appear that parenting practices that promote involvement in activities ranging from low to high levels of challenge would be most beneficial for the development of both mastery behaviors and impulse control in girls.

Task Orientation and Cognitive Performance

Based on theory and previous research, it was predicted that mastery behaviors and impulse control would be correlated with children's academic performance. In the female sample, mastery behaviors and impulse control were associated with overall GPA, and grades in French, English, mathematics, and science. The magnitude of the relations fell in the medium ($r = .30$) to large ($r = .50$) range (Cohen, 1977). The positive associations of mastery behaviors and impulse control with grades in social studies were not statistically significant, but this was partly due to the reduced sample size. As reported in the results section, only 39 of the 63 girls were enrolled in social studies. The correlations between grades in social studies and both mastery behaviors and impulse control were of a sufficient magnitude, however, to suggest a meaningful association ($r(39) = .30$ and $.24$, $p > .05$, respectively).

In the male sample, mastery behaviors and impulse control were positively associated with overall GPA and grades in social studies. The associations with grades in other academic areas (i.e., French, English, mathematics, and science) were all in the same direction (r 's ranged from $.10$ to $.25$, $p > .05$). Consequently, the expected associations of mastery behaviors and impulse control with children's academic performance were supported, with the associations being somewhat more consistent (i.e., across multiple academic areas) for girls than for boys. It should be recalled, however, that the magnitude of the

correlations between task orientation and academic performance were not significantly stronger in the female sample than in the male sample when they were statistically compared. Thus, regardless of the gender difference in the consistency of the relations between academic performance and both mastery behaviors and impulse control, it appears that both dimensions of task orientation facilitate the academic performance of both boys and girls during the school years.

The Mediating Role of Task Orientation

One of the expectations of the present study was that mastery behaviors and impulse control would mediate the associations among parenting practices and children's academic performance. Clearly, task orientation could only operate as a mediator when parenting variables were correlated with children's academic performance. Consequently, the mediating role of task orientation was investigated for the associations of maternal encouragement of independence and paternal nurturance with children's academic performance. The aspects of academic performance that were addressed were girls' overall GPA, their grades in English and mathematics, and boys' grades in French. In all cases, cognitive ability was considered simultaneously when assessing the mediating role of task orientation in the associations among parenting practices and children's academic performance.

Path Model for Overall GPA in the Female Sample

When the statistical effects of variables upon girls' overall GPA were investigated, it was found that impulse control mediated the effect of paternal nurturance upon girls' overall GPA. This finding is consistent with the positive associations among paternal nurturance, girls' impulse control, and girls' overall GPA. It should be noted that although the zero-order correlation between paternal nurturance and girls' GPA was not statistically significant ($r(62) = .21, p > .05$), the correlation would have been significant if a somewhat larger sample had been used. Consequently, it appears that paternal nurturance may indeed have a small effect (Cohen, 1977) upon girls' overall GPA, which is mediated by impulse control.

With respect to maternal encouragement of independence, the direct and indirect effects upon overall GPA were not statistically significant. This pattern of results occurred in spite of the fact that the zero-order correlation between maternal encouragement of independence and girls' overall GPA was statistically significant. The difference between the zero-order correlation and the statistical effects of maternal encouragement of independence occurred because paternal nurturance was considered simultaneously in the model. If maternal encouragement of independence had been considered independently of paternal nurturance, the indirect effect of maternal encouragement of independence (via mastery behaviors) would have been statistically significant (this model is presented in

Appendix I for comparison purposes). When paternal nurturance and maternal encouragement of independence were considered together, however, only paternal nurturance, via impulse control, predicted girls' overall GPA.

The difference between the results obtained when maternal encouragement of independence was considered separately and in conjunction with paternal nurturance may indicate two processes. First, maternal encouragement of independence may have a small indirect effect (via mastery behaviors) on girls' overall GPA. A larger sample size may be required to detect the effect when it is considered in conjunction with paternal nurturance. Second, paternal nurturance may have a stronger indirect effect (via impulse control) upon girls' overall GPA than does maternal encouragement of independence. Thus, again, only paternal nurturance may have a statistically significant effect upon girls' overall GPA, unless a very large sample is used. As will be seen, there is evidence that the indirect effect of maternal encouragement of independence upon girls' academic performance is statistically significant when individual subject areas are considered. Therefore, the conclusion that maternal encouragement of independence has a weak indirect effect upon girls' overall GPA appears to be justified. The theoretical and practical implications of the mediating role of task orientation in the relations between girls' academic performance and both maternal encouragement of independence and paternal nurturance will be considered following an overview of the results obtained

in all of the path models investigated.

Path Model for Mathematics Grades in the Female Sample

With respect to girls' grades in mathematics, significant indirect effects were obtained for both maternal encouragement of independence and paternal nurturance. Mastery behaviors mediated the association between maternal encouragement of independence and girls' grades in mathematics, whereas impulse control mediated the association between paternal nurturance and girls' grades in mathematics. The mediating variable in each association was consistent with the results obtained for overall GPA. Moreover, impulse control indirectly affected grades in mathematics, via mastery behaviors (i.e., the paths from paternal nurturance to impulse control, impulse control to mastery behaviors, and mastery behaviors to grades in mathematics all were statistically significant). Together, the pattern of effects obtained in the path model for girls' grades in mathematics are consistent with the zero-order correlations among the parenting variables and the measures of task orientation (i.e., paternal nurturance was correlated with impulse control and maternal encouragement of independence was correlated with mastery behaviors). Collectively, the results suggest that both maternal encouragement of independence and paternal nurturance influence girls' grades in mathematics through their influence upon girls' task orientation.

Path Model for English Grades in the Female Sample

With respect to girls' grades in English, the direct effect

of paternal nurturance was significant and the indirect effect of paternal nurturance, via impulse control, approached significance. Neither the direct nor indirect effect of maternal encouragement of independence upon girls' grades in English was significant. This is consistent with the nonsignificant zero-order correlation between maternal encouragement of independence and girls' grades in English. The nonsignificant effect of mastery behaviors upon girls' grades in English, however, contrasts with the significant zero-order correlation between the two variables. The nonsignificant path appears to have resulted from the moderate correlation between cognitive ability and mastery behaviors ($r(33) = .36, p < .05$). The value of this correlation differs from the value reported in Table 5, as it is only for the portion of the female sample that was enrolled in an English course and for which CCAT scores were available ($n = 33$). Given that the correlation between mastery behaviors and girls' cognitive ability in the total sample was not significant ($r(59) = .17, p > .05$), the correlation in the partial sample likely occurred by chance. Consequently, it is not appropriate to interpret the relation. The correlation between impulse control and cognitive ability was nonsignificant in both the partial sample ($r(33) = .15, p > .10$) and the total sample ($r(59) = .15, p > .10$). Thus, the near significant path between impulse control and girls' grades in English appears to be an accurate reflection of the pattern of relations among the variables.

Path Models in the Female Sample: Conclusions

From the results obtained in the above models, it appears that mastery behaviors mediate the association between maternal encouragement of independence and girls' academic performance. In addition, impulse control appears to mediate the relation between paternal nurturance and girls' academic performance. Although there may be some variations in the patterns of relations across different academic areas, interpretation of these variations is considered to be unwarranted at this time (see earlier discussion of this point).

The mediating role of mastery behaviors in the relation between maternal encouragement of independence and girls' academic performance is consistent with the theory that maternal encouragement of independence fosters exploratory behaviors, which in turn promote cognitive growth and performance. As was discussed previously, encouragement of independence may result in more varied and challenging interactions with the environment than do parental nurturance and low restrictive control. Varied and challenging experiences may be particularly important for the development of mastery behaviors, as they may contribute to an appreciation of the satisfaction associated with being effective. Encouragement of independence from parents may be particularly important for girls, as generalized expectations for independent behaviors appear to be weaker for girls than for boys (Block, 1983). Moreover, encouragement of independence from mothers as compared to fathers may have a stronger influence on girls, as

the closer relationship that tends to exist between mothers and daughters as compared to fathers and daughters (Huston, 1983) may intensify the effects of maternal encouragement of independence upon girls.

The mediating role of impulse control in the relation between paternal nurturance and girls' academic performance provides support for the view that paternal nurturance stimulates the development of impulse control, which in turn promotes girls' academic performance. Nurturance appears to facilitate the development of impulse control more than encouragement of independence, perhaps because nurturance promotes less challenging interactions with the environment, which result in a lower level of frustration. It seems plausible that nurturance from fathers, as compared to mothers, may be particularly important for promoting involvement in activities that have traditionally been assigned to the male gender role. This assumption is based on the hypothesis that paternal acceptance of achievement-related interests and activities may lead girls to view these activities as gender appropriate (Stein & Bailey, 1973). Involvement in achievement-related activities may provide girls with important opportunities to develop their abilities to regulate their actions in these settings. This ability, in turn, seems to enhance girls' academic performance.

There is little previous research with which to compare the results obtained on the mediating role of task orientation in the relations among parenting practices and girls' academic

performance. In an investigation by Steinberg et al. (1989), the mediating role of psychosocial maturity (a construct related to mastery behaviors) in the association between parental acceptance and 11- to 16-year-old children's academic achievement approached significance. The indirect effect of parental nurturance was weaker in Steinberg et al.'s study (.04) than in the present study (.16), although this would partly be a function of the other variables included in both models. Because mothers and fathers and boys and girls were considered together, however, Steinberg et al.'s finding has little relation to the results obtained for paternal nurturance in the present study. Moreover, because of dissimilarities between psychosocial maturity and task orientation (this point was discussed in the literature review), the results obtained in the two studies are not comparable.

In the second previous investigation on the mediating role of task orientation in the associations among parenting practices and children's cognitive performance, paternal nurturance and restrictive control were assessed (Epstein & Radin, 1975). In this investigation, the mediating role of task orientation was not investigated for girls, however, as neither of the paternal variables were associated with 4-year-old girls' cognitive performance. As was pointed out in the literature review, these nonsignificant relations were inconsistent with the results obtained in some other investigations (e.g., Dornbusch et al., 1987; Honzik, 1967). Additionally, the mediating role of task orientation in the relations among maternal variables and girls'

cognitive performance was not assessed. Consequently, the results obtained in the present investigation appear to be the first information available on the mediating role of mastery behaviors and impulse control in the relations between children's academic performance and both paternal and maternal behaviors.

Path Model for French Grades in the Male Sample

For boys, the only significant correlation between a parenting variable and a measure of academic performance was for maternal encouragement of independence and grades in French. Consequently, the mediating role of task orientation in this association was investigated. From the results, it was evident that neither mastery behaviors nor impulse control mediated the relation between maternal encouragement of independence and boys' grades in French. Instead, when considered in conjunction with cognitive ability, only the direct effect of maternal encouragement of independence upon grades in French approached significance. This finding suggests that task orientation does not operate as a mediator in the association between maternal encouragement of independence and boys' grades in French. The mediating role of task orientation in this relation had not been investigated previously.

Additional Variables to Consider in Models of Academic Performance

From the results obtained for boys, it appears that variables other than task orientation mediate the relation between maternal encouragement of independence and academic

performance. Alternative mediators may be a need to achieve resulting from pressure to excel (Farmer, 1985), independent problem-solving skills resulting from problem-solving practice (Sigel, 1982), and self-esteem resulting from a realization of abilities (Wylie, 1979). These variables also may partly mediate the relations between girls' academic performance and both maternal encouragement of independence and paternal nurturance. This hypothesis is based on the expected finding that task orientation did not entirely mediate these relations in the female sample. Consequently, the assumptions that parenting practices influence children in a variety of ways and that multiple factors determine children's academic performance appear to be warranted.

To improve our understanding of how parenting practices may influence children's academic performance, it is recommended that a wide variety of potential mediating variables should be considered in future research. Following identification of statistically significant mediators of the relations among parenting practices and children's academic performance, a comprehensive model of the influences of parenting practices upon children's academic performance could be developed and assessed. At present, however, the formulation of a comprehensive model seems premature, as there is an insufficient basis for determining the components of the model. Consequently, much research remains to be conducted on possible mediating variables of the relations among parenting practices and children's school

achievement.

Implications of the Results for the Modification of Parenting
Practices and the Facilitation of Task Orientation

Based on the findings of the present study, it is recommended that attention should be given to the promotion of maternal encouragement of independence toward both boys and girls and of paternal nurturance toward girls. The results obtained indicate that an appropriate rationale for mothers would be that encouragement of independence appears to promote varied and challenging interactions with the environment, which in turn seem to assist children in developing a positive approach to tasks. A positive approach to tasks appears to be important for children's achievement in school, as well as for their future accomplishments and personal satisfaction. Encouragement of independence may be particularly important for girls, as generalized expectations for independent behaviors appear to be weaker for girls than for boys. Moreover, it seems that encouragement of independence from mothers as compared to fathers has a stronger influence on children, perhaps because children tend to spend more time with their mothers. In addition, for girls, encouragement of independence from mothers may be particularly salient, as the closer relationship that girls tend to share with their mothers may heighten the effects of maternal efforts to promote independence.

For fathers, the results of the present study suggest that a rationale for promoting nurturance toward daughters could be

based upon the relations among nurturance, impulse control, and academic performance. For example, it could be stated that nurturance seems to help girls develop the ability to regulate actions without assistance from others, by promoting their comfort in interacting with the environment. If fathers are accepting of their daughters' involvement in a wide variety of activities, including academically-related activities, then their daughters may be more likely to engage in these activities. Through these experiences, girls appear to learn how to regulate their own actions in these settings, which in turn appears to enhance their school performance. Fathers' acceptance of their daughters' involvement in achievement-related activities may be more powerful than mothers' acceptance, perhaps because it is more likely to lead girls to view these activities as being gender-appropriate. In addition, if fathers are accepting and responsive toward their daughters, then their daughters may be more willing to behave in accordance with their fathers' standards for regulation of impulses.

In addition to promoting the modification of parenting practices, the results of the present study indicate that efforts to enhance girls' mastery behaviors and impulse control may be an appropriate means of enhancing academic performance. Although programs to facilitate impulse control have been developed (e.g., Kendall & Braswell, 1985), it does not appear that much attention has been directed toward promoting mastery behaviors. From the literature in this area, it appears that encouraging children to

try a wide variety of tasks, enhancing their self-confidence, and providing them with success experiences may be helpful in fostering mastery behaviors (e.g., Harter, 1981). Provision of these experiences in both schools and intervention services may be relatively easy to integrate into existing programs. The consequences may be substantial, however, with respect to children's academic performance and subsequent accomplishments and personal satisfaction. Hence, attention to both the modification of parenting practices and the development of children's task orientation are recommendations that result from the findings of the present investigation.

Fit with Other Parenting Constructs and Models

As discussed in the literature review, both specific and global conceptualizations of parenting practices exist in the literature. Typically, the parenting variables addressed in a study are chosen because of their relevance for a particular theory. Often, however, the parenting variables can be interpreted from the perspective of divergent theoretical frameworks (Maccoby & Martin, 1983). This is true for the parenting variables assessed in the present investigation. In this section, the congruence between the results obtained in the present research and different theoretical and conceptual frameworks will be considered.

As discussed in the introduction, parental encouragement of independence, low restrictive control, and nurturance were hypothesized to facilitate children's academic performance by

promoting a positive task orientation. The rationale for this proposal was that encouragement of independence and low restrictive control are assumed to promote interaction with the environment, which in turn is assumed to provide children with an opportunity to develop and recognize their own competencies. Parental nurturance also is assumed to facilitate interaction with the environment, by enhancing children's sense of comfort in a variety of settings. Again, these interactions with the environment are presumed to provide children with an opportunity to develop and recognize their abilities. This opportunity is expected to facilitate both mastery behaviors and impulse control, which in turn will facilitate academic performance. The finding that the dimensions of task orientation (mastery behaviors and impulse control) statistically mediated the associations of maternal encouragement of independence and paternal nurturance with children's academic performance is consistent with this model.

Although the results obtained are congruent with the model being investigated, the findings also are consistent with other interpretations of parental influence. For example, it is plausible that parents who encourage independence in their children tend to be independent themselves. Consequently, parental encouragement of independence may be associated with children's task orientation and academic performance because children are imitating the behaviors that are modelled by their parents. Parental nurturance may be associated with children's

impulse control and academic performance because nurturance plays a significant role in facilitating imitation of a model (Mischel, 1970).

In addition to modelling effects, parental encouragement of independence and nurturance may be associated with children's task orientation and academic performance for other reasons. For example, it has been proposed that children are more willing to comply with parental requests when they feel that their compliance is voluntary, rather than externally induced (Maccoby & Martin, 1983). Parenting practices that convey respect for childrens' competencies and are affection-based are assumed to promote perceptions of voluntary compliance. Restrictive control, in contrast, is assumed to induce feelings of external manipulation (Maccoby & Martin, 1983). Maccoby and Martin point out that even if children are aware of externally imposed demands, they may feel intrinsically motivated to comply, if they have a positive relationship with their parents. Thus, parental encouragement of independence and nurturance may be associated with children's task orientation and academic performance because they enhance children's willingness to behave in accordance with parental standards.

Just as the results of the present investigation are congruent with alternate theoretical explanations, they also are congruent with alternate conceptualizations of parenting. In the present investigation, individual dimensions of parenting (i.e., encouragement of independence, restrictive control, and

nurturance) were considered separately. More global conceptualizations of parenting, however, could have been used. For example, the finding that parental encouragement of independence and nurturance both were associated with children's task orientation and academic performance is congruent with the view that Authoritative-Reciprocal parenting results in optimal socialization outcomes (Maccoby & Martin, 1983). As may be recalled from the literature review, Authoritative-Reciprocal parenting is characterized by both demandingness and acceptance. Although the parenting variables associated with children's task orientation and academic performance are congruent with Authoritative-Reciprocal parenting, it seems preferable to consider the two dimensions of parenting (encouragement of independence and nurturance) separately. This is because the two dimensions appear to be differentially associated with task orientation and academic performance in boys and girls. For example, maternal encouragement of independence was associated with mastery behaviors and academic performance (but not impulse control) in the female sample only. The identification of specific associations can only be accomplished by assessing predictors separately. Attention to possible interaction effects between predictors is important, though, and thus inclusion of both specific and global conceptualizations of parenting will be useful in future research.

Limitations of the Study

The present study provides important information about the pattern of relations among parenting practices, task orientation, and academic performance during the middle childhood years. The sample size used in the present investigation was adequate for identifying important predictors of academic performance and was certainly comparable (and in many cases superior) to the sample sizes used in previous investigations. If a larger sample had been used, however, the statements made about the pattern of associations among variables could have been more conclusive. Specifically, a larger sample size would have served to negate arguments that nonsignificant findings may have resulted from insufficient power to detect their existence.

A second benefit of a larger sample is that a Bonferroni correction could have been used to set a more stringent alpha level for significance tests. As was discussed prior to the presentation of the results, some of the significant findings in the present study may have been obtained by chance. This possibility does not seem likely, as the relations were proposed on an a priori basis and, in most cases, the zero-order correlations were documented in previous research. Nonetheless, a larger sample size would have allowed for more definitive conclusions about the associations among the variables investigated.

A second characteristic of the present study that may limit definitive conclusions about the relations among parenting

practices, task orientation, and academic performance is the measures used in the study. Although evidence exists for the validity of the parenting and task orientation measures, it cannot be stated that the measures provided an error-free assessment of the variables of interest. Effort was taken to minimize response biases by using Q-sort measures. However, it remains possible that participants may not have been completely honest in completing the questionnaires. Inclusion of multiple measures of variables would have allowed for the derivation of a composite index of each construct, which would have minimized measurement error. This procedure is used in structural equation modelling (e.g., LISREL) and appears to be appropriate for investigating the patterns of relations addressed in the present study.

As with any nonexperimental design, the present research could not identify the pattern of causation among variables. Consequently, the results obtained do not unequivocally demonstrate that parenting practices influence children's task orientation and academic performance. Instead, it remains possible that children who manifest certain behaviors elicit particular responses from their parents. For example, children who exhibit mastery behaviors and impulse control may elicit nurturance from their mothers. In most cases, the results obtained in the present study were consistent with theory. The implicit assumption of unidirectional causality, however, requires verification. Only an extensive longitudinal study

could provide convincing evidence for the direction of effects among parenting practices, task orientation, and academic performance.

Although not a limitation per se, it should be noted that the results obtained in the present study are applicable to a specific population. Because developmental specificity is expected in the associations among parenting practices, task orientation, and academic performance, the results obtained in this investigation can only be generalized to the middle childhood years. Moreover, the results may not be applicable to children of lower socioeconomic status families or to children from various cultural backgrounds. It has been suggested that both socioeconomic status and culture may affect the levels of some parenting practices and the social value of task orientation and academic performance (Hoffman, 1984; Jordan et al., 1975; Maccoby & Martin, 1983). Consequently, confirmation of the results obtained in the present study is recommended with other samples, before generalizing the findings to other populations.

Conclusions

This investigation provides some of the first information on the associations among parenting practices and children's academic performance during the middle childhood years. Moreover, it represents one of the first attempts to investigate the mediating role of task orientation in the associations among parenting practices and children's academic performance. From the investigation, it appears that maternal encouragement of independence and paternal nurturance influence girls' academic performance and maternal encouragement of independence influences boys' academic performance, during the middle-childhood years. Parental restrictive control does not appear to influence the academic performance of either boys or girls at this age level. These results indicate that modification of parenting behaviors, perhaps particularly for girls, may have far-reaching implications for academic and occupational attainment.

With respect to the mediating role of task orientation, it appears that the relation between maternal encouragement of independence and girls' academic performance is partly mediated by mastery behaviors, whereas the association between paternal nurturance and girls' academic performance is partly mediated by impulse control. The pattern of relations among the parenting variables and the dimensions of task orientation may indicate that the two parenting behaviors result in different forms of interaction with the environment. In turn, these forms of interaction may differentially affect the development of mastery

behaviors and impulse control. Both of the task-oriented behaviors are positively associated with enhanced cognitive performance. Attention to other possible mediators of the relations among dimensions of parenting and children's academic performance are clearly required before we can claim to understand fully the mechanisms that underlie the associations among parenting practices and children's academic performance. It is clear, however, that task orientation cannot be ignored in future formulations of the relations among dimensions of parenting and children's academic performance.

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Appendix A

Child-Rearing Practices Report

Specific Instructions for O-Sorting

In trying to gain more understanding of young children, we would like to know what was important to you as a parent and what kinds of methods you used in raising your child--in particular, your child who is now in Grade Six. You are asked to indicate your opinions by sorting through a special set of cards that contain statements about bringing up children.

The WHITE cards are to be used by MOTHERS; the GREEN cards are to be used by FATHERS. Please do the task separately and do not discuss the card placements with your spouse. After you have each completed the task on your own, then you may find it interesting to discuss the sorts, but please don't change your sorts after this discussion. It is very important that we find out the real differences, as well as the similarities, between mothers and fathers in their child-rearing attitudes and behavior.

The Cards and Envelopes

Each set or deck contains 91 cards. Each card contains a sentence having to do with child rearing. Some of these sentences will be true or descriptive of your attitudes and behavior in relation to your child. Some sentences will be untrue or undescriptive of your feelings and behavior toward this child. By sorting these cards according to the instructions below, you will be able to show how descriptive or undescriptive each of these sentences is for you.

Together with the cards you have been given 7 envelopes which are labelled as follows:

Category 7. These items are MOST DESCRIPTIVE.

Category 6. These items are QUITE DESCRIPTIVE.

Category 5. These items are FAIRLY DESCRIPTIVE.

Category 4. These items are NEITHER DESCRIPTIVE NOR UNDESCRIPTIVE.

Category 3. These items are FAIRLY UNDESCRIPTIVE.

Category 2. These items are QUITE UNDESCRIPTIVE.

Category 1. These items are MOST UNDESCRIPTIVE.

Your task is to choose 13 cards that fit into each of these categories and to put them into their proper envelopes.

Appendix A Continued

How to Sort the Cards

(You may wish to check off each step as completed)

1. Mothers take the White cards and shuffle them a bit first.
Fathers take the Green cards and shuffle them a bit first.
2. Find a large cleared surface, like a kitchen table or desk, and spread out the envelopes in a row, going from 7 to 1 (Most Descriptive to Most Undescriptive):

7 6 5 4 3 2 1

3. Now take the shuffled deck of cards, and read each sentence carefully. Then make three piles of cards: one pile containing cards that are generally true or descriptive of you; one pile that you're not certain about, and one pile of cards that are generally not true or descriptive.

It doesn't make any difference how many cards you put in each of the three piles at this time, since you'll probably have to do some switching around later. But you may find it helpful if each pile contains about the same number of cards.

Now your cards and envelopes look like this:

7	6	5	4	3	2	1 -envelopes
"Descriptive"	"Not Sure"	"Undescriptive"				
Cards	Cards	Cards				

4. Now, take the pile of descriptive cards and pick out the 13 cards that are most descriptive of your behavior with your child. Put these cards on top of envelope #7. Don't put them inside yet, because you might want to shift some of them later.
5. Next, from the cards that remain, pick out 13 cards that you think are quite descriptive of your behavior and put these on top of envelope #6. (If you run out of cards from your "descriptive" pile, you'll have to add some of the more descriptive cards from your "Not Sure" pile.)
6. Now, begin at the other end. Take the pile of "Undescriptive" cards and pick out the 13 cards that are most undescriptive of you. Put these on top of envelope #1.

Appendix A Continued

7. Then pick out the 13 cards which are quite undescriptive and put them on envelope #2. (Again, you may have to "borrow" from your "Not Sure" pile to make the necessary 13 cards for envelope #2.)
8. You should now have 39 cards left over. These are now to be sorted into three new piles with 13 cards in each: 13 cards that are fairly descriptive of you (to be put on envelope #5); 13 cards that are neither descriptive or undescriptive (to be put on envelope #4); and 13 cards that are fairly undescriptive (to be put on envelope #3.)

You may find it hard, as others have, to put the same number of cards in each pile but we must ask you to follow these directions exactly, even if you feel limited by them.

9. Now, as a last step, look over your sort to see if there are any changes you want to make. When the cards seem to belong where you have put them, double-check to be sure you have 13 cards in each pile. Then put each pile in the proper envelopes and tuck in the flaps.

Thank you for your cooperation.

Item List

1. I respect my child's opinions and encourage (him) (her) to express them.
2. I encourage my child always to do (his) (her) best.
3. I put the wishes of my mate before the wishes of my child.
4. I help my child when (he) (she) is being teased by his friends.
5. I often feel angry with my child.
6. If my child gets into trouble, I expect (him) (her) to handle the problem mostly by (himself) (herself).
7. I punish my child by putting (him) (her) off somewhere by (himself) (herself) for a while.
8. I watch closely what my child eats and when (he) (she) eats.
9. I don't think young children of different sexes should be allowed to see each other naked.
10. I wish my spouse were more interested in our children.
11. I feel a child should be given comfort and understanding when (he) (she) is scared or upset.
12. I try to keep my child away from children or families who have different ideas or values from our own.

Appendix A Continued

13. I try to stop my child from playing rough games or doing things where (he) (she) might get hurt.
14. I believe physical punishment to be the best way of disciplining.
15. I believe that a child should be seen and not heard.
16. I sometimes forget the promises I have made to my child.
17. I think it is good practice for a child to perform in front of others.
18. I express affection by hugging, kissing, and holding my child.
19. I find some of my greatest satisfactions in my child.
20. I prefer that my child not try things if there is a chance (he) (she) will fail.
21. I encourage my child to wonder and think about life.
22. I usually take into account my child's preferences in making plans for the family.
23. I wish my child did not have to grow up so fast.
24. I feel a child should have time to think, daydream, and even loaf sometimes.
25. I find it difficult to punish my child.
26. I let my child make many decisions for (himself) (herself).
27. I do not allow my child to say bad things about (his) (her) teachers.
28. I worry about the bad and sad things that can happen to a child as (he) (she) grows up.
29. I teach my child that in one way or another punishment will find (him) (her) when (he) (she) is bad.
30. I do not blame my child for whatever happens if others ask for trouble.
31. I do not allow my child to get angry with me.
32. I feel my child is a bit of a disappointment to me.
33. I expect a great deal of my child.
34. I am easy going and relaxed with my child.
35. I give up some of my own interests because of my child.
36. I tend to spoil my child.
37. I have never caught my child lying.
38. I talk it over and reason with my child when (he) (she) misbehaves.
39. I trust my child to behave as (he) (she) should, even when I am not with (him) (her).
40. I joke and play with my child.
41. I give my child a good many duties and family responsibilities.
42. My child and I have warm, intimate times together.
43. I have strict, well-established rules for my child.
44. I think one has to let a child take many chances as (he) (she) grows up and tries new things.
45. I encourage my child to be curious, to explore and question things.

Appendix A Continued

46. I sometimes talk about supernatural forces and beings in explaining things to my child.
47. I expect my child to be grateful and appreciate all the advantages (he) (she) has.
48. I sometimes feel that I am too involved with my child.
49. I believe in toilet training a child as soon as possible.
50. I threaten punishment more often than I actually give it.
51. I believe in praising a child when (he) (she) is good and think it gets better results than punishing (him) (her) when (he) (she) is bad.
52. I make sure my child knows that I appreciate what (he) (she) tries or accomplishes.
53. I encourage my child to talk about (his) (her) troubles.
54. I believe children should not have secrets from their parents.
55. I teach my child to keep control of (his) (her) feelings at all times.
56. I try to keep my child from fighting.
57. I dread answering my child's questions about sex.
58. When I am angry with my child, I let (him) (her) know it.
59. I think a child should be encouraged to do things better than others.
60. I punish my child by taking away a privilege (he) (she) otherwise would have had.
61. I give my child extra privileges when (he) (she) behaves well.
62. I enjoy having the house full of children.
63. I believe that too much affection and tenderness can harm or weaken a child.
64. I believe that scolding and criticism makes my child improve.
65. I believe my child should be aware of how much I sacrifice for (him) (her).
66. I sometimes tease and make fun of my child.
67. I teach my child that (he) (she) is responsible for what happens to (him) (her).
68. I worry about the health of my child.
69. There is a good deal of conflict between my child and me.
70. I do not allow my child to question my decisions.
71. I feel that it is good for a child to play competitive games.
72. I like to have some time for myself, away from my child.
73. I let my child know how ashamed and disappointed I am when (he) (she) misbehaves.
74. I want my child to make a good impression on others.
75. I encourage my child to be independent of me.
76. I make sure I know where my child is and what (he) (she) is doing.

Appendix A Continued

77. I find it interesting and educational to be with my child for long periods.
78. I think a child should be weaned from the breast or bottle as soon as possible.
79. I instruct my child not to get dirty while (he) (she) is playing.
80. I don't go out if I have to leave my child with a stranger.
81. I think jealousy and quarrelling between brothers and sisters should be punished.
82. I think children must learn early not to cry.
83. I control my child by warning (him) (her) about the bad things that can happen to (him) (her).
84. I think it is best if the mother, rather than the father, is the one with the most authority over the children.
85. I don't want my child to be looked upon as different from others.
86. I don't think children should be given sexual information before they can understand everything.
87. I believe it is very important for a child to play outside and get plenty of fresh air.
88. I get pleasure from seeing my child eating well and enjoying (his) (her) food.
89. I don't allow my child to tease or play tricks on others.
90. I think it is wrong to insist that young boys and girls have different kinds of toys and play different sorts of games.
91. I believe it is unwise to let children play a lot by themselves without supervision from grown-ups.

Appendix B

CRPR Items Comprising the Scales of Parental Encouragement of
Independence, Restrictive Control, and Nurturance

Encouragement of independence

1. I respect my child's opinions and encourage (him)(her) to express them. (1)
2. I encourage my child to be independent of me. (75)
3. If my child gets into trouble, I expect (him)(her) to handle the problem mostly by himself/herself. (6)
4. I let my child make decisions for (himself)(herself). (26)
5. I teach my child that (he)(she) is responsible for what happens to (him)(her). (67)
6. I give my child a good many duties and family responsibilities. (41)
7. I encourage my child to be curious, to explore and question things. (45)
8. I prefer that my child not try things if there is a chance (he)(she) will fail. (20; reverse coded)
9. I trust my child to behave as (he)(she) should, even when I am not with (him)(her). (39)
10. I think one has to let a child take many chances as (he)(she) grows up and tries new things. (44)
11. I encourage my child to wonder and think about life. (21)

Restrictive control

1. I believe children should not have secrets from their parents. (54)
2. I believe that a child should be seen, and not heard. (15)
3. I do not allow my child to say bad things about (his)(her) teacher. (27)
4. I believe physical punishment to be the best way of disciplining. (14)
5. I teach my child to keep control of (his)(her) feelings at all times. (55)
6. I do not allow my child to question my decisions. (70)
7. I do not allow my child to get angry with me. (31)
8. I talk it over and reason with my child when (he) (she) misbehaves. (38; reverse coded)
9. I believe in praising a child when (he) (she) is good and think it gets better results than punishing (him) (her) when (he) (she) is bad. (51; reverse coded)

Item deleted:

I have strict, well-established rules for my child. (43)
I don't allow my child to tease or play tricks on others.
(89)

Appendix B Continued

Nurturance

1. I often feel angry with my child. (5; reverse coded)
2. There is a good deal of conflict between my child and me. (69; reverse coded)
3. I feel my child is a bit of a disappointment to me. (32; reverse coded)
4. I feel a child should be given comfort and understanding when (he)(she) is scared or upset. (11)
5. I joke and play with my child. (40)
6. My child and I have warm, intimate times together. (42)
7. I express affection by hugging, kissing, and holding my child. (18)
8. I make sure my child knows that I appreciate what (he)(she) tries or accomplishes. (52)
9. I believe that too much affection and tenderness can harm or weaken a child. (63; reverse coded)
10. I find some of my greatest satisfactions in my child. (19)
11. I find it interesting and educational to be with my child for long periods. (77)
12. I let my child know how ashamed and disappointed I am when (he)(she) misbehaves. (73; reverse coded)

Item deleted:

I enjoy having the house full of children. (62)

Note. Numbers in parentheses indicate item number on the CRPR.

Appendix C

The California Child Q-Set

Q-sort Instructions

The Q-sort instructions are similar to those reported for the CRPR (see Appendix A).

Item List

1. Prefers non-verbal methods of communication.
2. Is considerate and thoughtful of other children.
3. Is warm and responsive.
4. Gets along well with other children.
5. Is admired and sought out by other children.
6. Is helpful and cooperative.
7. Seeks physical contact with others (touching, hugging, holding).
9. Develops genuine and close relationships.
10. Has transient interpersonal relationships; is fickle.
11. Attempts to transfer blame to others.
12. Reverts to more immature behaviour when under stress (e.g., whines, has tantrums, etc.).
13. Characteristically pushes and tries to stretch limits; sees what s/he can get away with.
14. Is eager to please.
15. Shows concern for moral issues, e.g., reciprocity, fairness, and the welfare of others.
16. Tends to be pleased with and proud of his/her products and accomplishments.
17. Girls: Behaves in a feminine style and manner.
Boys: Behaves in a masculine style and manner.
(N.B. The cultural and subcultural standard should be applied.)
18. Expresses negative feelings toward peers directly and openly. (N.B. Frequency or amount of negative feeling is not an issue; this item is concerned with directness of expression.)
19. Is open and straightforward. (When placed low, implies sneakiness or deceit.)
20. Tries to take advantage of others.
21. Tries to be the center of attention (e.g., by showing off, demonstrating accomplishments, volunteering, etc.).
22. Tries to manipulate others by ingratiation (e.g., by charm, coyness, or seductiveness.)
23. Is fearful and anxious.
24. Tends to brood and ruminate or worry.
25. Uses and responds to reason.
26. Is physically active.

Appendix C Continued

27. Is visibly deviant from peers in appearance, size, or physical condition (e.g., markedly tall or short, under- or overweight, physically handicapped).
28. Is vital, energetic, lively.
29. Is protective of others.
30. Tends to arouse liking and acceptance in adults.
31. Shows recognition of the feelings of others; is empathic.
32. Tends to give, lend, and share. (When placed very low, implies retentiveness.)
33. Cries easily.
34. Is restless and fidgety.
35. Is inhibited and constricted.
36. Is resourceful in initiating activities.
37. Likes to compete; tests and compares self against others.
38. Has unusual thought processes; thinks and perceives in uncommon ways. (N.B. Quality of thinking is not evaluated; see item 96 for quality rating.)
39. Tends to become rigidly repetitive or immobilized when under stress.
40. Is curious and exploring, eager to learn, open to new experiences.
41. Is persistent in activities; does not give up easily. (When placed very high, implies perseveration.)
42. Is an interesting, arresting child.
43. Can recoup or recover after stressful experiences.
44. When in conflict or disagreement with others; tends to yield and give in.
45. Tends to withdraw and disengage when under stress.
46. Tends to go to pieces under stress, becomes rattled and disorganized.
47. Has high standards of performance for self.
48. Seeks reassurance from others about his/her worth or adequacy.
49. Shows specific mannerisms or behavioral rituals (e.g., taps fingers, has tics, bites nails, bites lips, stuttering, etc.).
50. Has bodily symptoms as a function of tension and conflict (e.g., headaches, stomach, aches, nausea, etc.).
51. Is agile and well coordinated.
52. Is physically cautious.
53. Tends to be indecisive and vacillating.
54. Has rapid shifts in mood; is emotionally labile.

Appendix C Continued

55. Is afraid of being deprived; is concerned about getting enough (e.g., with respect to affection, food, toys, etc.).
56. Is jealous and envious of others.
57. Tends to dramatize or exaggerate mishaps.
58. Is emotionally expressive (facially, gesturally, or verbally).
59. Is neat and orderly in dress and behaviour. (When placed very high, implies fussiness and overconcern.)
60. Becomes anxious when the environment is unpredictable or poorly structured.
61. Tends to be judgmental of the behaviour of others.
62. Is obedient and compliant.
63. Has a rapid personal tempo; reacts and moves quickly. (N.B. Brightness is not necessarily implied; only speed of response is at issue.)
64. Is calm and relaxed, easy-going.
65. Is unable to delay gratification; cannot wait for satisfactions. (When placed low, implies needless or excessive delay.)
66. Is attentive and able to concentrate.
67. Is planful; thinks ahead.
68. Appears to have high intellectual capacity (Whether or not expressed in achievement).
69. Is verbally fluent; can express ideas well in language.
70. Daydreams; tends to get lost in reverie.
71. Looks to adults for help and direction.
72. Has a readiness to feel guilty; puts blame on self (whether verbalized or not).
73. Responds to humor.
74. Becomes strongly involved in what s/he does.
75. Is cheerful. (When placed low, implies unhappiness, despondency).
76. Can be trusted; is dependable.
77. Appears to feel unworthy; thinks of self as "bad".
78. Is easily offended; sensitive to ridicule or criticism.
79. Tends to be suspicious and distrustful of others.
80. Teases other children (including siblings).
81. Can acknowledge unpleasant experiences and admit to own negative feelings.
82. Is self-assertive.
83. Seeks to be independent and autonomous.
84. Is a talkative child. (N.B. No reference to verbal quality or fluency is intended; only the amount of talk is at issue.)
85. Is aggressive (physically or verbally).
86. Likes to be by him/herself, enjoys solitary activities.

Appendix C Continued

87. Tends to imitate and take over the characteristic manners and behaviors of those admired.
88. Is self-reliant, confident; trusts own judgement.
89. Is competent, skillful.
90. Is stubborn.
91. Is inappropriate in emotive behaviour (reactions are excessive, insufficient, or out of context).
92. Is physically attractive, good-looking.
93. Behaves in a dominating manner with others.
94. Tends to be sulky or whiny.
95. Overreacts to minor frustrations; is easily irritated and/or angered.
96. Is creative in perception, thought, work, or play (a judgment of creative quality, rather than intelligence per se, is intended).
97. Has an active fantasy life.
98. Is shy and reserved; makes social contacts slowly.
99. Is reflective; thinks and deliberates before speaking or acting.
100. Is easily victimized by other children; tends to be treated as a scapegoat.

Appendix D

CCQ Items Comprising Persistence, Mastery Motivation,
and Impulse Control

Persistence

1. Tends to become rigidly repetitive or immobilized when under stress. (39; reverse coded)
2. Is persistent in activities; does not give up easily. (41)
3. Tends to withdraw and disengage when under stress. (45; reverse coded)
4. Tends to go to pieces under stress, becomes rattles and disorganized. (46; reverse coded)
5. Has high standards of performance for self. (47)
6. Becomes anxious when the environment is unpredictable or poorly structured. (60; reverse coded)
7. Becomes strongly involved in what (he)(she) does. (74)

Items deleted:

Can recoup or recover after stressful experiences. (43)

Mastery motivation

1. Is inhibited and constricted. (35; reverse coded)
2. Is resourceful in initiating activities. (36)
3. Is curious and exploring, eager to learn, open to new experiences. (40)
4. Is self-assertive. (82)
5. Seeks to be independent and autonomous. (83)
6. Is self-reliant, confident; trusts own judgement. (88)
7. Is fearful and anxious. (23; reverse coded)
8. Likes to compete; tests and compares self against others. (37)
9. Tends to be pleased with and proud of his/her products and accomplishments. (16)
10. Seeks reassurance from others about his/her worth or adequacy. (48; reverse coded)

Items deleted:

Is physically cautious. (52)
Looks to adults for help and direction. (71)

Appendix D Continued

Impulse control

1. Reverts to more immature behavior when under stress (e.g., whines, has tantrums, etc.). (12; reverse coded)
2. Is restless and fidgety. (34; reverse coded)
3. Has rapid shifts in mood; is emotionally labile. (54; reverse coded)
4. Is obedient and compliant. (62)
5. Has a rapid personal tempo; reacts and moves quickly. (63; reverse coded)
6. Is unable to delay gratification; cannot wait for satisfaction. (65; reverse coded)
7. Is attentive and able to concentrate. (66)
8. Is planful; thinks ahead. (67)
9. Is aggressive (physically or verbally). (85; reverse coded)
10. Overreacts to minor frustrations; is easily irritated and/or angered. (95; reverse coded)
11. Is reflective; thinks and deliberates before speaking or acting. (99)

Note. Numbers in parentheses indicate item numbers on the CCQ.

Appendix E

Item Confounding Among Q-Sort Scales

When Q-sort scales were examined for similar items on two or more scales, three items on the mastery behaviors scale were judged to be similar in content with three items on the parental encouragement of independence scale. The three items on the mastery behaviors scale were removed to protect against inflated correlations between parental encouragement of independence and children's mastery behaviors. The items were removed from the mastery behaviors scale instead of the parental encouragement of independence scale because the former scale was comprised of more items and was more internally consistent. The similar items on the two scales are listed below.

Parental encouragement of independence items

I encourage my child to be curious, to explore and question things. (45)

I encourage my child to be independent of me. (75)

I trust my child to behave as (he)(she) should, even when I am not with (him)(her). (39)

Mastery behaviors items

Is curious and exploring, eager to learn, open to new experiences. (40)

Seeks to be independent and autonomous. (83)

Is self-reliant, confident; trusts own judgement. (88)

After the above three items were deleted from the mastery behaviors scale, the estimates of internal consistency for the resulting scale was .76 and .65 in the female and male samples, respectively. For females, the mean was 92.48, the standard deviation was 13.68, and the range was 44-113. For males, the mean was 90.87, the standard deviation was 11.78, and the range was 59-112.

Appendix F

Transformations of Variables

Square root transformations were conducted on the following variables:

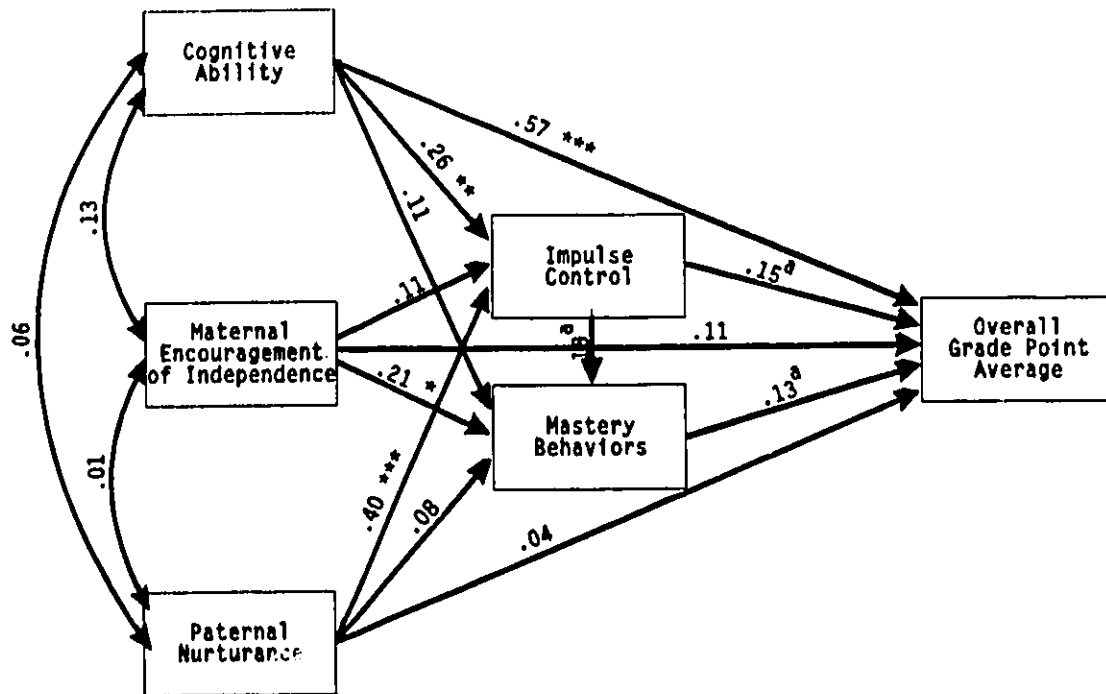
- Paternal encouragement of independence (girls and boys)
- Paternal nurturance (girls and boys)
- Maternal nurturance (girls)
- Mastery behaviors (girls)
- Impulse control (boys)
- Maternal restrictive control (girls)
- Paternal occupation (boys)

Log transformations were conducted on the following variables:

- Paternal restrictive control (girls and boys)
- Maternal restrictive control (boys)

Appendix G

Path Model for the Relations Between Parenting Practices and
Boys' and Girls' Overall GPA (n=107)



Appendix H

Correlations Between Girl's Cognitive Performance and Parents' Education and Socioeconomic Status

	Overall GPA	French	English	Math-ematics	Science	Social Studies	Cognitive Ability
Maternal years of education	.21	.23	.36 ^a	.13	.17	.37 ^a	.38 ^b
Maternal SES	.16	.19	.25	.10	.17	.12	.29
Paternal years of education	.25	.23	.26	.20	.33 ^a	.11	.32 ^a
Paternal SES	.07	.06	.07	.03	.07	.08	.24

Note. $n = 62$ for overall GPA, French and mathematics grades; $n = 38$ for English and social studies grades; $n = 39$ for science grade; $n = 57$ for cognitive ability.

^a $p < .05$. ^b $p < .01$.

Correlations Between Boy's Cognitive Performance and Parents' Education and Socioeconomic Status

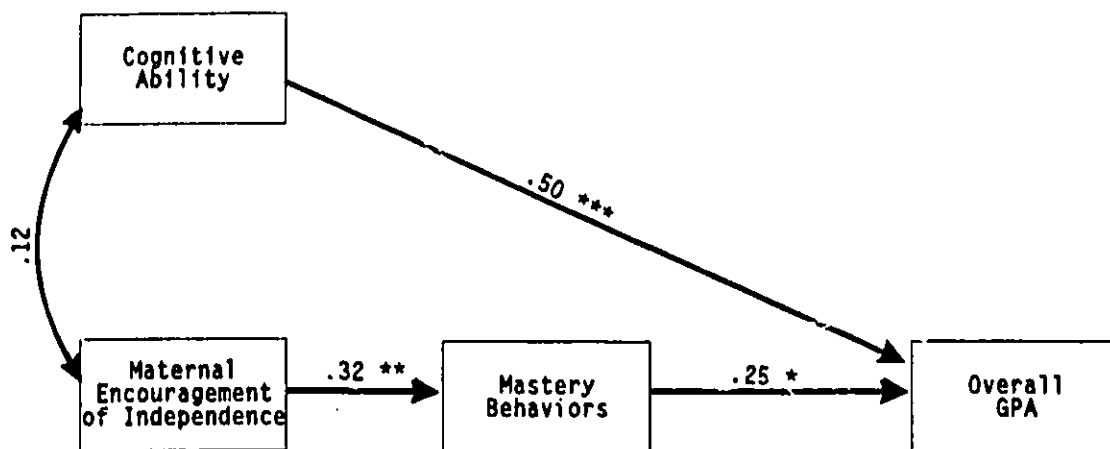
	Overall GPA	French	English	Math-ematics	Science	Social Studies	Cognitive ability
Maternal years of education	-.08	-.14	-.03	.01	.01	-.02	.20
Maternal SES	-.04	-.19	-.12	.05	.21	-.03	.07
Paternal years of education	.29 ^a	.20	.28	.27 ^a	.17	.29	.47 ^b
Paternal SES	.28 ^a	.29 ^a	.25	.27 ^a	.06	.35 ^a	.32 ^a

Note. $n = 60$ for overall GPA, French and mathematics grades; $n = 46$ for English and social studies grades; $n = 50$ for science grade; $n = 55$ for cognitive ability.

^a $p < .05$. ^b $p < .01$.

Appendix I

Path Model for the Relation Between Maternal Encouragement of Independence and Girl's Overall GPA (n=57)



* $p < .05$. ** $p < .01$. *** $p < .001$.