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Maternal Influence on Children's Achievement-Related Beliefs

Abstract

This study addresses the role that mothers play in the development of children's self- and task- concepts regarding math and English. Data for this study are part of a longitudinal investigation (The Michigan Study of Adolescent Life Transitions-MSALT-PI: Jacquelynne Eccles) of students', mothers', and teachers' attitudes during the transitions from elementary to middle school, and from middle to high school. The data reported here were collected in the fall and spring of the students' sixth grade year. For these analyses we examined children's self- and task- concepts regarding math and English, and mothers' concepts and beliefs about their child in relation to math and English. Previous researchers have noted a discrepancy between findings that boys do not perform better than girls in math in primary and middle school and findings that, compared to girls, boys are consistently more confident of their math ability. For this sample, sixth grade girls received significantly better grades than boys in math and English. However, for math boys rated themselves higher than girls in self-concept of math ability. For English, girls had significantly higher self-concept of English ability, higher expectancies for success in English, and thought that English was significantly easier than boys. It was found that mothers' beliefs mediated the effect of the child's grades on their self- and task-perceptions in both math and English. Mothers' beliefs also mediated the effects of children's gender on their self- and task-perceptions in English.

Introduction

This paper examines the influence that mothers have on their children's self-and task-perceptions in math and English and the influence that mothers have on the sex differences in these perceptions.

It is not reality itself that most directly determines children's expectations, but rather the interpretation of reality (Eccles[Parsons],1983).

Support has been found for the hypothesis that mothers are one of the forces that shape children's interpretation of reality (Parsons, Adler & Kaczala, 1982). For example, Parsons et al. (1982) found the mothers are a major socializing force in the development of children's math achievement related beliefs and attitudes. This paper tests the expectancy socializer hypothesis which posits that mothers influence their child's self- and task-perceptions by conveying their expectations for their child through communication regarding their perceptions about their child and about certain achievement tasks.

Despite the fact that during the junior high school years girls performance in math is equal to, or better than, that of boys, they are frequently found to have lower self-concepts of ability than boys (Eccles[Parsons], 1984). In English, however, girls are found to outperform boys and have self-concepts that are congruent with this sex difference (Stevenson & Newman, 1986). That is, girls have higher self-concepts of ability in English than boys. The incongruity between the sex difference in math grades and self-concepts of ability in math suggests that children form their self- and task-perceptions on the basis of something other than their own performance (Jacobs, 1991). This study examines the contribution that mothers might make to these sex differences in self-concept of ability.

Methods

The data presented in this paper were collected as part of a larger investigation-The Michigan Study of Adolescent Life Transitions. The data reported here were collected in the fall and spring of the students' sixth grade year. All children whose mother and father had participated in the study were included in these analyses. The sample size was 941 children and their mothers. The students in this study are primarily Caucasian and come from low- to middle-income communities.

The constructs in this study assess children's self-concepts of ability in math and English, perceptions of the difficulty of math and English, and expectancies for success in math and English. The mother constructs assess mothers' perceptions of their child's ability in math and English, and their perception of the effort their child would need to exert to do well in math and English. The children's grades used in these analyses are their yearly average grades in math and English from the previous year (5th grade).

Results and Discussion

The data used was collected from the mothers in the fall of the child's sixth grade year, while the data collected from the children was from the spring of their sixth grade year in order to test the temporal relationship predicted in the model.

Sex Differences in Children's Grades-Math and English

In both the 5th and 6th grade years, girls received significantly higher year average grades in math than did boys, $F(1,827)= 6.43, p = .01, F(1, 913)= 21.24, p=.00$. In both the 5th and 6th grade years, girls also received significantly higher year average grades in English than did boys, $F(1,830)=42.03, p = .00, F(1,913)=58.09, p = .00$. Thus, if children estimate their ability level by accurately interpreting their grades, girls should have higher self-concepts of ability than boys in both math and English.

Sex Differences in Children's Self- and Task-Perceptions Regarding Math and English

Contrasting with their actual grades, boys had a significantly higher self-concept of ability in math than did girls, $F(1, 926)= 3.9, p = .05$. There were no significant differences between girls' and boys' expectancies for success in math, or their perceptions of the difficulty of math.

Girls had a significantly higher self-concepts of ability in English than did boys, $F(1, 917) = 17.03, p < .01$. Girls also had significantly higher expectancies for success in English than boys, $F(1, 912) = 27.64, p < .01$, and thought that English was significantly easier than boys, $F(1, 905) = 14.83, p < .01$.

Mean Level Analyses: Gender of Child Effects on Maternal Beliefs Regarding Math and English

Results of an ANOVA test showed that, although girls received better grades in math than boys, mothers of girls rated their child's ability in math equally to the ratings of mothers of boys. Consequently, either mothers of girls underestimated their daughters' abilities in math or mothers of boys overestimated their son's abilities in math. Mothers of daughters also thought that their child needed to exert more effort to do well in math than did mothers of sons, $F(1, 939) = 7.56, p<.01$.

Congruent with the fact that daughters received higher grades in English than did sons, mothers of daughters rated their child has having

significantly higher ability in English versus the ratings of mothers of sons, $F(1,939)=60.53, p=.00$). Thus, mothers' beliefs about children's abilities seem to correspond with the children's actual grades. Mothers of daughters had higher expectancies for success in English than did mothers of sons, $F(1,935)=68.59, p=.00$. Mothers of sons felt that their child has to exert significantly more effort to do well in English than did mothers of daughters, $F(1,939)=21.57, p=.00$.

Correlation of Parental Beliefs to Children's Self- and Task- Attitudes Regarding Math and English

In testing whether the maternal beliefs are predictive of the children's self- and task-perceptions the existence of any correlations between parent and child beliefs must be determined. In math, both mother beliefs were significantly and highly correlated ($R \leq .40$) to the three child beliefs. In English, both mother beliefs were also significantly and highly ($R \leq .30$) correlated to the three child beliefs.

Path Analysis

Two path analytic models were developed. These models were based on the model tested by Parsons et al. (1982). The path coefficients were estimated using a series of multiple regression equations. At each step the criterion variables in a given level (or column) of the model were regressed on the prediction variables from all previous levels (or columns). The coefficients were standardized, thus their size provides an estimate of the relative strength of the relations specified by each path. However, since these estimates are based on multiple regressions, they are dependent on the set of variables used in each analysis and should not be taken as absolute estimates of any given relationship.

Support can be found for the hypothesis of mediation if the Beta value from the equation which regresses the dependent variable on the mediator and the independent variable is significantly different from the Beta value from the equation which regresses the dependent variable on the independent variable only. This significance is shown if the Beta from the first equation falls outside of the confidence interval of the Beta from the second equation (Charles Judd, personal communication to Jacquie Eccles). These were the criteria used to determine mediation in this paper.

The results showed that both mother beliefs mediated the effect of child's grades on child beliefs in both math and English. Mother beliefs did

not mediate the effect of child's sex on child beliefs in math. However, the mother's perception of child's ability mediated the effect of child's sex on child self-concept of ability and perception of task difficulty in English

Discussion

From these results, it becomes apparent that children are not interpreting their grades in math and English in the same way. Girls do better in both math and English, but they have a lower self-concept of ability in math than boys, and a higher self-concept of ability in English than boys. Thus, there must be some mediating factors which prevents girls from having a higher self-concept of ability than boys in math. The current hypotheses suggested that mothers may be a mediating factor.

The results support the hypothesis that mother's beliefs influence how children interpret their grades to form self- and task-perceptions. Thus, it seems that it is not reality that forms children's self- and task perceptions, but the interpretation of reality.

Due to the incongruity of the sex differences in grades and self-concept of ability in math, it appears that there are factors that mediate self-concepts of ability and contributes to girls having lower self-concepts than boys. However, the results show that at this age it is not mother's beliefs that mediate sex differences in self-concept of math ability. It is unclear why mother's beliefs mediated the effect of sex on child beliefs in English, but not in math. It is possible that as the children move through adolescence that the correlation between gender and self-concepts of ability in math, mother beliefs will begin to mediate the effects of child's gender on child's beliefs.

References

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Constructs

Child Math (English) Composites

Self-Concept of Ability $\alpha=.82$ ($\alpha=.80$)

- How good at math(English) are you? (1)not at all good...(7)very good
- If you were to rank all the students in your math(English) class from the worst to the best in math(English), where would you put yourself? (1)the worst...(7)the best
- Compared to most of your other school subjects, how good are you at math? (1)much worse...(7)much better

Expectancies for Success in Math(English) $\alpha=.79$ ($\alpha=.83$)

- How well do you think you will do in math (English) this year? (1)not at all well...(7)very well
- How successful do you think you'd be in a career that required mathematical (English) ability? (1)not very successful...(7)very successful

Math (English) Task Difficulty $\alpha=.68$ ($\alpha=.65$)

- In general, how hard is math (English) for you? (1)very easy...(7)very hard
- Compared to other students your age, how much time do you have to spend working on your math (English) assignments? (1)much less time...(7)much more time
- Compared to most other school subjects you have taken or are taking, how hard is math (English) for you? (1)my easiest course...(7)my hardest course

Mother Math (English) Composites

Perception of Child's Ability $\alpha=.89$ ($\alpha=.88$)

- In general, I believe that my child is, (1)not at all good to (7)very good in math (English).
- How well is your child doing in math (English) this year? (1)not at all well...(7)very well
- How much natural talent does your child have in math (English)? (1)a little...(7)a lot

Perception of Effort Needed to do Well $\alpha=.85$ ($\alpha=.75$)

- My child finds math (English), (1)very easy to (7)very hard.
- To do well in math (English) , my child has to try (1)a little to (7)a lot.
- How much will your child have to try in order to do well in future math courses? (1)a little...(7)a lot

Mean Ratings of Children's Self- and Task Perceptions Time 2

Variables	Girls		Boys		F Value
	Mean	SD	Mean	SD	
Math:					
Self-Concept of Ability	5.07		5.21		3.85*
Expectancies for Success	5.61		5.62		.01
Difficulty	5.01				5.25 8.65
English:					
Self-Concept of Ability	5.27		4.95		17.03**
Expectancies for Success	5.49		5.05		27.64**
Difficulty	3.31				3.60 14.83**

Mean Ratings of Mothers' Perceptions of Their Children and of Achievement Tasks Time 1

Variable	Mothers		F Value
	Daughter	Sons	
Math:			
Perception of Ability	5.38	5.35	.19
Expectancies for Success	-.01	.02	2.37
Effort needed to do well	4.30	4.04	7.56**
English:			
Perception of Ability	5.54	4.95	60.53**
Expectancies for Success	.26	-.24	68.59**
Effort needed to do well	3.67	4.13	21.57**

* p < .05

**p < .01

Correlation Matrix of Mother and Child Beliefs

Math

	Child's Math Grades	Child's Gender	Child's Self-Concept of Math Ability	Child's Expectancies for Success in Math	Child's Perception of Difficulty of Math	Mother's Perceptions of Child's Math Ability
Child's Math Grades						
Child's Gender	-.10**					
Child's Self-Concept of Math Ability	.38**	.09**				
Child's Expectancies for Success in Math	.36**	-	.79**			
Child's Perception of Difficulty in Math	-.37**	-.06*	-.62**	-.54**		
Mother's Perception of Child's Math Ability	.60**	-	.54**	.50**	-.46**	
Mother's Perception of Effort Child Needs to do Well in Math	-.44**	-.09**	-.47**	-.40**	.42**	-.67**

Correlation Matrix of Mother and Child Beliefs

English

	Child's English Grades	Child's English Grades	Child's Gender	Child's Self-Concept of English Ability	Child's Expectancies for Success in English	Child's Perception of Difficulty of English	Mother's Perceptions of Child's English Ability
Child's English Grades							
Child's Gender	-.22**						
Child's Self-Concept of English Ability	.33**	-.12**					
Child's Expectancies for Success in English	.35**	-.17**	.78**				
Child's Perception of Difficulty in English	-.27**	.12**	-.46**	-.46**			
Mother's Perception of Child's English Ability	.57**	-.22**	.40**	.41**	-.33**		
Mother's Perception of Effort Child Needs to do Well in English	-.43**	.14**	-.34**	-.35**	.30**	-.70**	

Tests of Mother Beliefs as Mediators of Child Ability and Sex on Child Beliefs.

	Child Beliefs			
	Self-Concept of Math Ability		Perception of Difficulty of Math	
	Step 1	Step 2	Step 1	Step 2
Child's Math Ability (IV)	.18**(.15-.21)	.04*	-.17**((-).20)-(-.14)	-.07**
Mother's Perception of Ability (MV)		.47**		-.35**
Child's Math Ability (IV)	.18**(.15-.21)	.10**	-.17**((-).20)-(-.14)	-.11**
Mother's Perception of Effort(MV)		-.29**		.25**
Child's Sex (IV)	.15*(.00-.29)	.17*	-.10((-).24)-(.05)	-.12
Mother's Perception of Ability(MV)		.51**		-.43**
Child's Sex(IV)	.15*(.00-.29)	.12	-.10((-).24)-(.05)	-.01
Mother's Perception of Effort(MV)		-.36**		.33**
	Self-Concept of English Ability		Perception of Difficulty of English	
	Step 1	Step 2	Step 1	Step 2
	B(CI)	B	B(CI)	B
Child's English Ability(IV)	.20**(.16-.24)	.09**	-.16**((-).19)-(-.12)	-.07**
Mother's Perception of Ability (MV)		.32**		-.25**
Child's English Ability (IV)	.20**(.16-.24)	.13**	-.16**((-).19)-(-.12)	-.10**
Mother's Perception of Effort (MV)		-.19**		.17**
Child's Sex (IV)	-.32**((-).48)-(-.17)	-.09	.29**(.14-.44)	.11
Mother's Perception of Ability (MV)		.39**		-.30**
Child's Sex (IV)	-.32**((-).48)-(-.17)	-.20**	.29**(.14-.44)	.19**
Mother's Perception of Effort (MV)		-.26**		.22**

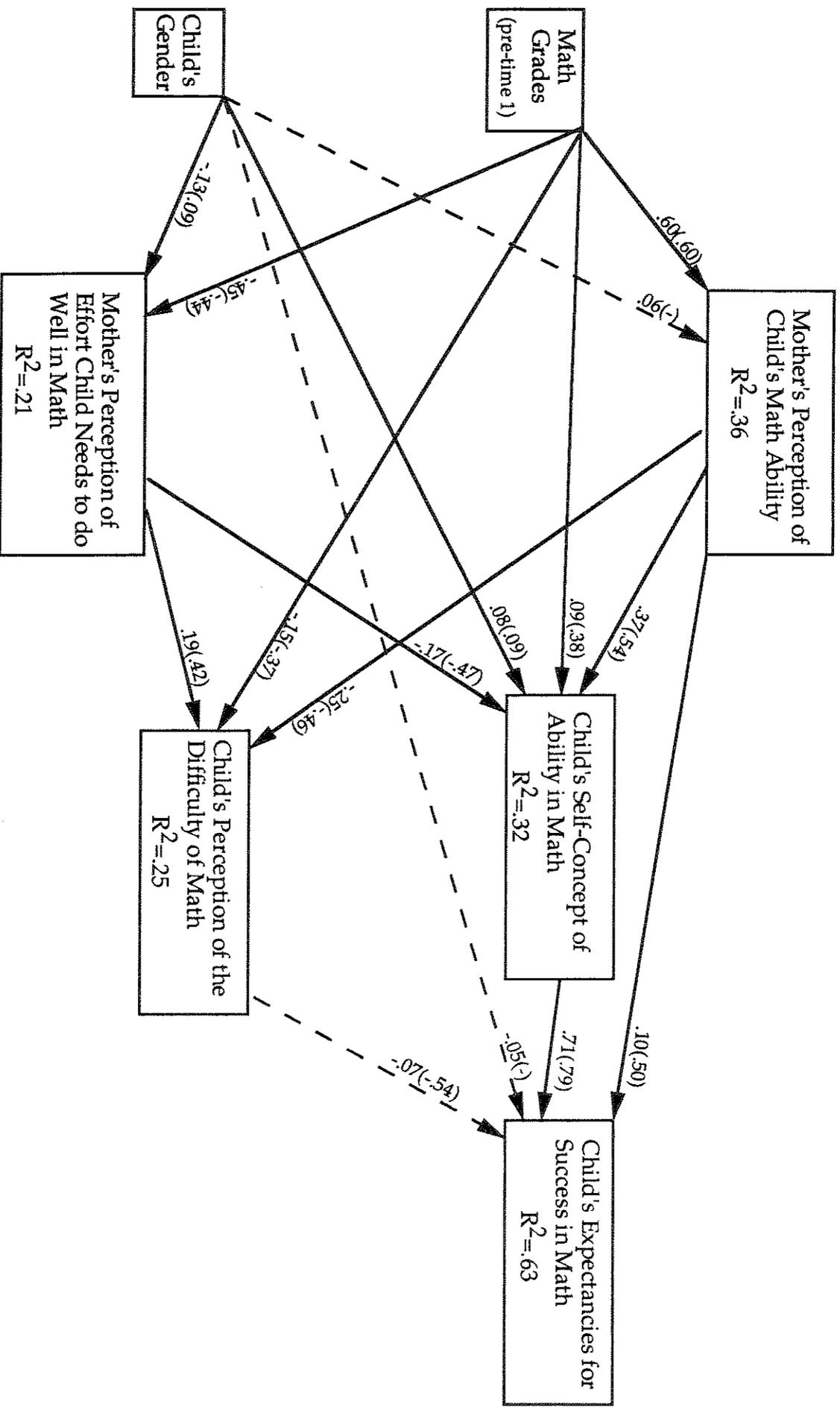
NOTE: Significant mediated relations are indicated in bold type. IV = Independent variable, MV = Mediating variable. Values in the chart are unstandardized regression coefficients, values in parentheses are the confidence intervals.

a. The first step in each column is the regression of the child belief on the independent variable.

b. The second step in each column is the regression of the child belief on the independent variable and the mediating variable.

Math

Mother's Beliefs at Time 1 and Child Beliefs at Time 2



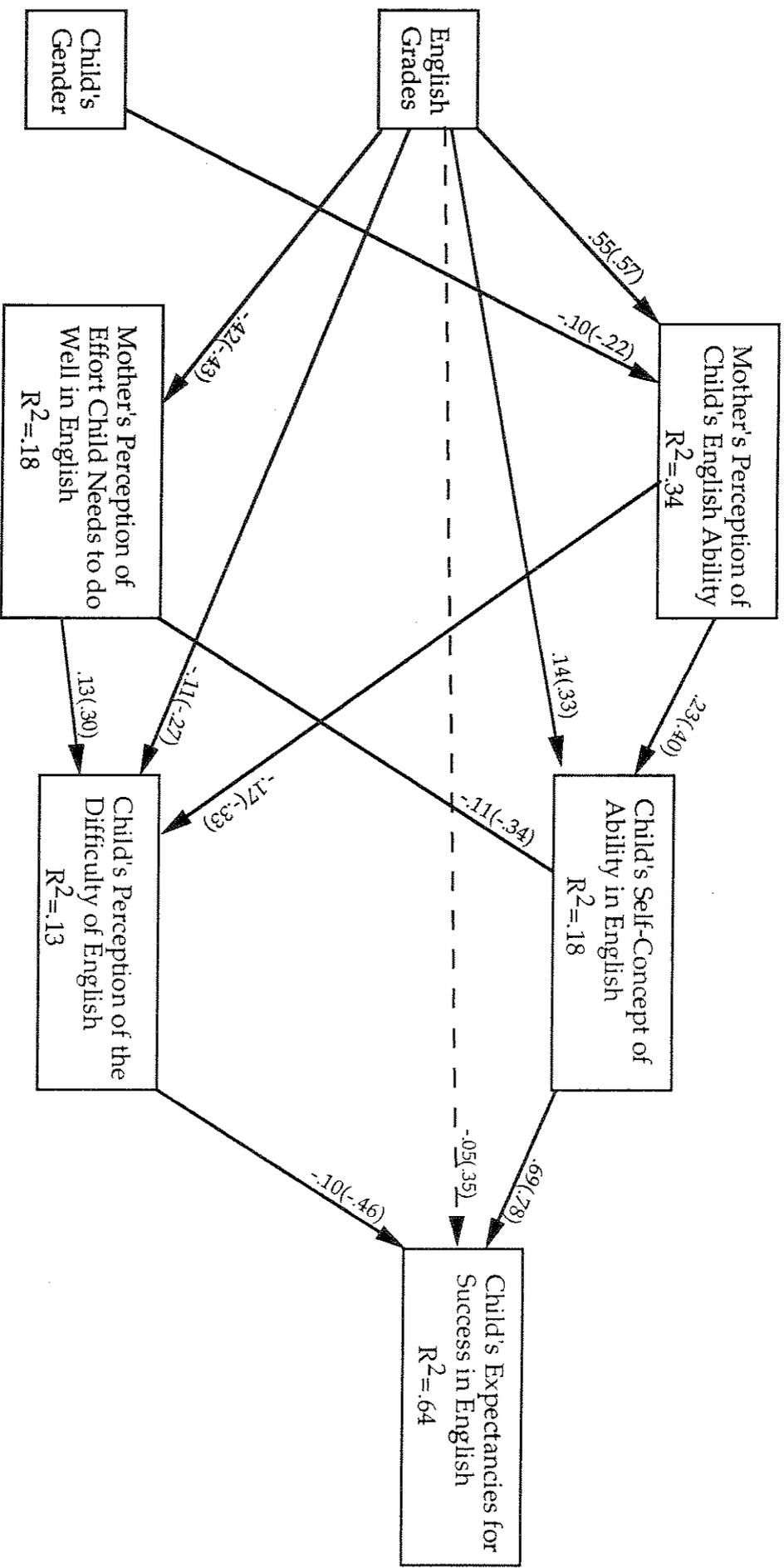
Standardized regression value (zero-order correlation)

Solid lines represent Betas significant at $p \leq .01$.

Dashed lines represent Betas significant at $p \leq .05$.

English

Mother's Beliefs at Time 1 and Child Beliefs at Time 2



Standardized regression value (zero-order correlation)

Solid lines represent Betas significant at LE .01.

Dashed lines represent Betas significant at LE .05.

