

Running Head: EDUCATIONAL INFLUENCES ON PARENTING AND ACHIEVEMENT

How Does Parents' Education Level Influence Parenting and Children's Achievement?

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## ABSTRACT

*Objective.* This study examined the process of how distal factors such as parent's education and income can influence the change in child achievement through the beliefs and behaviors of parents. *Design.* Data from a national, longitudinal study of children, the 1997 and 2002 Child Development Supplement of the Panel Study of Income Dynamics, was used for this study (Hofferth, Davis-Kean, Davis, & Finkelstein, 1999). The participants are 1,534 8-19 year olds, divided approximately equally across gender (752 females, 782 males). This sample was 54% non-Hispanic European American and 46% African American. In both years, PSID families completed an extensive battery of interviews and questionnaires regarding up to two randomly chosen children from their family. *Results.* Using a structural equation model, it was found that socioeconomic variables do influence parenting beliefs and behaviors and that these parenting variables influence subsequent change in child's achievement. However, these influences vary by race. *Conclusion.* It is important to understand the processes that influence children's achievement across time. These processes are influenced by both economic and human capital and this influence differs by race. Understanding these influences is an important step in designing programs that can specifically help families promote achievement in the home.

## How Does Parents' Education Level Influence Parenting and Children's Achievement?

The literature on achievement has consistently shown that parent education is an important SES factor in predicting children's achievement (Klebanov, Brooks-Gunn, & Duncan, 1994; Haveman & Wolfe, 1995; Smith, Brooks-Gunn, & Klebanov, 1997). The mechanisms, however, for understanding this influence have not been well studied. Successful families pass on optimal values, beliefs, and behaviors regarding the importance of education, work, relationships, and good mental health to their children. How parents provide these socialization experiences is dependent on a variety of proximal factors including such characteristics as their own personality, their beliefs regarding appropriate child rearing strategies, and the parenting behaviors that are manifested toward their children. These factors are also influenced by more distal socio-economic characteristics (SES) such as the parents' own education, occupation, and income, as well as contextual factors, such as the characteristics of the neighborhood in which the family lives, children's schools, and children's after-school activities. Given these factors, how do parents create optimal environments for children's development and learning and how do these environments differ by SES and other parental characteristics (e.g., performance beliefs) as well as by gender and race? This paper will examine how parents' educational attainment influences both the physical and social home environment of their children and how this environment may predict to changes in children's achievement across time. Also, prior research suggests that this educational influence may differ by race and gender (Davis-Kean, 2005). Thus, we will test for group differences in these pathways for predicting change in achievement. Understanding these pathways can lead to educational interventions that can target both family resources and interfamily resources, such as making sure reading material is available to the

home, working with parents on how to create stimulating reading and math environments, increasing the efficacy parents feel they have in influencing their children's educational outcomes, and reducing barriers between the home and school environments.

### *The Influence of Parents' Education on Parenting*

The majority of the literature on parents' education pertains to its positive, direct influence on achievement (Corwyn & Bradley, 2004; Jimerson et al., 1999; Linver et al., 2002; Yeung et al., 2002). For example, in their recent review of SES research, Hoff and colleagues (2002) found that most studies have examined only the effects of parent education on children's outcomes, without exploring how education affects parenting behaviors and children's experiences in and out of the home. Only recently has research begun to examine the multiple pathways by which parent education may influence both parenting and child outcomes (see work by Corwyn and Bradley, 2003; Davis-Kean, 2005). The previous research, however, does provide us with some possible pathways to consider when examining the influence of parent's education.

Compared to parents with lower levels of education, for example, more highly educated parents are more likely to explicitly define higher levels of education as desirable, encourage their children to do well in school, and have higher expectations for their children's academic achievement (Alexander, Entwisle, & Bedinger, 1994; Cohen, 1989; Dauber, Alexander, Entwisle, 1996; Davis-Kean & Schnabel, 2002; Grolnick & Slowiaczek, 1994; Lee & Croninger, 1994). Parents with higher levels of educational attainment have teaching styles that promote children's development (Bee et al., 1969; Harris, Terrel, & Allen, 1999; Laosa, 1980), engage their children in higher quality verbal interactions, (Hoff, 2003; Richman, Miller & Levine, 1992; Uribe, Levine & Levine, 1993), provide cognitively stimulating learning

environment and literacy activities in the home (Davis-Kean & Schnabel, 2001; Kohl, Legua, & McMahan, 2000; Linver et al., 2002), and are more comfortable and involved with their children's education, teachers, and educational institutions (Brody & Flor, 1998; Stevenson & Baker, 1987). Finally, higher levels of parents' education are associated with higher levels of warmth in parent-child interactions (Klebanov, Brooks-Gunn, & Duncan, 1994; Bradley, et al., 1989), and lower levels of hostility in parent-child interactions (Fox, Platz, & Bentley, 1995).

### *Theoretical Model of Educational Influence*

As discussed earlier, even though there is some research that begins to address the issue of the influence of parent's education, the studies have generally only looked at one or two aspects of parenting or child outcomes. Consequently, we know very little about the relative importance of its effects on various parental education beliefs or parenting behaviors. In addition, this research is often cross-sectional rather than longitudinal, and this hinders an understanding of whether effects on differing parenting practices increase or decrease in relative importance as children develop, as well as accumulate and interact in children's lives. For example, it may be that education promotes children's academic success because more highly educated parents are more likely to use better teaching strategies with preschool age children, and be involved with their child's formal schooling at later ages. Finally, by conducting research without embedding it in a more holistic theoretical framework, research has left critical aspects of the mediating process unexamined. Thus, in order to understand how parent's education might be influencing parental beliefs and behaviors and subsequent child outcomes, a model was constructed that used elements of both family and socialization processes to help understand the complicated nature of parental influence on the individual child (see Figure 1). Using this model as a guide, we test two hypotheses: (1) that change in

children's achievement is influenced by parenting beliefs and behaviors that are formed by the parent's educational attainment and (2) that race and gender may moderate this influence.

## METHODS

### *Participants*

Data from a national, longitudinal study of children, the 1997 and 2002 Child Development Supplements of the Panel Study of Income Dynamics (PSID-CDS) were used for this study (Hofferth, Davis-Kean, Davis, & Finkelstein, 1999). In 1997, all PSID families who had children between birth and 12 years of age were recruited to participate in the Child Development Supplement. When there were more than two children in the home that met the eligibility requirement, a random selection process was performed to select those children who would be included in the study. The 1997 supplement contained an extensive battery of interviews, assessments, and home observations. During this wave (1997) of data collection, information was obtained for 3,563 children in 2,394 families. In 2002, the same families were contacted and asked to complete a similar series of interviews and assessments. Of the original CDS sample, 2,907 children from 2,006 families completed the study.

The sample, for this study, consists of 1,534 8-19 year olds (in grades three through twelve at the time of the 2002 assessment),  $M = 13.66$  ( $SD = 2.81$ ), divided approximately equally across gender (752 females, 782 males). This sample was 54% non-Hispanic European American and 46% African American. Due to the small percentage of other ethnic or racial groups in this study ( $n = 211$ ), only European American ( $n = 834$ ) and African American ( $n = 700$ ) families were examined.

### *Procedures and Measures*

In both 1997 and 2002, the primary caregivers of the children in the sample answered

questions regarding their children's health, behavior, home environment, childcare arrangements, schooling, and food security. This survey (*Primary Caregiver Interview*) had approximately the same response rate in 1997 and 2002 (88% and 89%, respectively) and was administered either in the home or through a telephone interview. Participants were given a small monetary gift for their participation in the project. During the home interview visit, children age 3-18 were administered between 2 and 4 subscales of the Woodcock-Johnson Achievement test (Letter-Word, Passage Comprehension, Calculations, and Applied Problems) and also received a small gift for their participation. Interviewer observations of the home environment were also collected. The response rate (*Child Interview Survey*) was approximately 81% for both waves of data collection. However, in 2002, the response rate on the child assessments increased from 81% to 91%. That is, there is more assessment data available in 2002 than in 1997.

*Parent and Family Characteristics.* For this study, five indicators were used to characterize family socioeconomic status and structure: parent education, parent income, family size, family type, and sibling status. The PSID-CDS II provides information on the education of the head of the household (either male or female but generally male) and the spouse or cohabitor in the household if one is present. The education of the spouse or cohabitor is only available when there are two adult individuals in the household. Thus, there is no spouse or cohabitor data when a single mother or father heads the household and does not specify another adult as cohabitor. In order to get the most accurate picture of the education that is available in the household, we used the highest education in the household as our indicator of family education. This decision allowed us to use data on education for almost all family structures, thus reducing missing data. This construct was highly related to the head of household education ( $r = .89$ ). The

mean for highest education in the household was approximately 13.61, slightly more than a high school education.

The family income for this sample was based on an average of the income reported in the core PSID interview for the years 1997, 1999, and 2001 (because of the wording of the PSID income items, these reports reflect the prior year's income – e.g., 1996 for 1997). This average was used to provide a more specific idea of the income resources available to the household in the years leading up to the time of the assessment in 2002. The mean for family income was \$59,848; the median was \$45,811. Family size is a continuous variable ranging from 2 to 11 individuals ( $M = 4.21$ ; *Median*, 4.00). Family type refers to the marital status of the head of household. In 2001, the PSID generated a marital status that allowed for both married and permanently cohabiting couples to be identified as “married”. The family type variable is a dichotomous variable identifying those families in which the head of household is either married or cohabiting ( $M = 0.67$ ,  $SD = 0.47$ ). Additionally, a sibling indicator was used to identify which families had more than one child participating in the CDS interview. This sibling indicator is a dichotomous variable and is included in all analyses to control for potential interdependence among family members.

Finally, a measure of the primary caregiver's literacy was assessed using the Woodcock-Johnson Passage Comprehension Test (Woodcock & Johnson, 1989, 1990). The raw scores for this measure ranged between 9 and 43 with a mean of 31.09 ( $SD = 5.47$ ). This measurement was given during the 1997 wave of the PSID-CDS.

*Child Demographic Characteristic Measures.* Three variables were used to represent the child's demographic characteristics: age, gender, and ethnic background. Age was measured in terms of months from birth to the time of the primary caregiver interview in 2002. It ranged from



102 months to 230 months. For gender, *males* were given a code of “0” and *females* a code of “1.”

*Parents' Educational Expectations.* Parents' expectation for achievement was measured with an ordinal variable that asked the parent “How much schooling do you expect that (Child) will complete?” The choices ranged from eleventh grade or less (*education* = 1) to M.D, Law, Ph.D., or other doctoral degree (*education* = 8). The mean for the sample was 4.99 (*SD* = 1.84) indicating that, on average, the parents expected their children to graduate from a 2-year college. Approximately half the sample (47.4 %) expected that their child would graduate from a 4-year college.

*Parent Behavior Measures.* Latent variables were created for three aspects of the home environment: reading resources, parent-child play behavior, and parental warmth. Both reading and warmth have been examined in prior studies on the home environment; however, the type of play stimulation that the parent provides for the child is a new home behavior scale that typically has not been used to examine parental behavior. It was used as an additional variable that taps the cognitive stimulation in the home that a parent provides but is different from other cognitive stimulation scales by incorporating parental participation with the child in the measure.

The reading scale was comprised of four items reported by the primary caregivers on: the number of visits the child has made to the library in the last 12 months (1 = never; 5 = more than once a month), how many books the child has (1 = none; 5 = 20 or more), the number of magazines the family regularly receives (range = 0 – 50, *M* = 2.84, *SD* = 3.36), and whether the family receives a daily newspaper (1 = yes, 0 = no). Other items were examined to see if they could be additional indicators for reading or cognitive stimulation but items related to the parent reading to the child or time doing homework were negatively related to the other indicators and

to the achievement measure, perhaps indicating a compensatory behavior. Because of the skewed nature of the number of magazines variable, a log-transformed version was created by taking the natural log of the original value plus one. This logged version was used in all of the structural models.

The warmth scale was an interviewer rating scale that assessed six items of parent-child interaction in the home during the home interview. Examples of items include: "Parent's voice conveys positive feeling to child?" and "How often did primary caregiver spontaneously praise child for his/her behavior, helpfulness, looks or other positive qualities." The interviewers scored the parents based on a 4-point rating scale from 1 = never and 4 = four or more times.

The final parent behavior indicator had four items involving participation with child in play activities (board games, sports, video games, and arts and crafts). Primary caregivers were asked to indicate how often they participated in these activities across a month's time (1=not in the past month; 5 = everyday).

*Child Achievement Measure.* Two age-standardized achievement scores of the Woodcock-Johnson-Revised Tests of Achievement were used to measure achievement. This assessment is widely used in national longitudinal studies (e.g., National Head Start Transition Project, NICHD National Child Care Project), and has good psychometric properties with reliabilities reported at .89 and above for 8-18 year olds (Woodcock & Johnson, 1989, 1990). Two subscales were used with this sample, Letter-Word and Applied Problems. Only these two subscales (of the four subscales used in the CDS-I) were used because children younger than 6 were not given the calculation or passage comprehension components. Additionally, the calculation subscale was not obtained for any participants in the second wave of the study (CDS-II). Therefore, in order to control for prior achievement it was necessary to select only the

achievement measures which were obtained for participants both at time 1 (1997) and time 2 (2002). The scores used in these analyses are the standardized scores. The Woodcock-Johnson is standardized with a mean of 100 and a standard deviation of 15. The means for each subscale in this sample are as follows by year of assessment: 1997, LW:  $M = 103.50$ ,  $SD = 17.09$ ; AP:  $M = 106.29$ ,  $SD = 17.81$ ; 2002, LW:  $M = 103.30$ ,  $SD = 19.44$ ; AP:  $M = 102.97$ ,  $SD = 16.53$ . (See Table 1 for additional information on means by race)

### *Analysis Plan*

In order to test our hypothesis that parent education and income indirectly influence children's achievement through parental beliefs and behaviors (see Figure 1), we used the Amos 4.0 program for the analysis of moment structures (Arbuckle & Worthke, 1999) to estimate our structural equation model. Amos uses a maximum likelihood method for obtaining estimates of the parameters. It allows a robust analysis when data on some measures are missing (Arbuckle & Worthke, 1999; Byrne, 2001). As Table 1 indicates, although there are various amounts of missing data across the variables in this study, the largest amount of data missing is 19% which is well within the generally accepted bounds for obtaining accurate estimates with AMOS's maximum likelihood procedure. We measured the goodness of fit of our models with three generally accepted indices of fit.

In general, the overall fit of a SEM model is determined by the chi-square statistic that test for comparability between the proposed model and the independence model where constructs are assumed to be unrelated (Bollen, 1989). This statistic, however, can be influenced by large sample sizes and thus other goodness-of-fit indices are used to provide additional information on the adequacy of fit of the proposed model (Byrne, 2001). There is a broad array of indices that are calculated by the AMOS program, but recent research (McDonald & Ho,

2002) recommended that two of these indices (CFI, RMSEA) along with  $\chi^2$  information are adequate for examining the consistency of fit. The  $\chi^2$  ratio ( $\chi^2/df$ ) statistic will be examined which adjusts for the  $\chi^2$  statistic's sensitivity to sample size and the complexity of the model (Byrne, 2001). In general,  $\chi^2$  ratios between 1 and 3 indicate good model fit (Arbuckle & Wothke, 1999). Two other indices that have been shown to be good indicators of fit, the comparative fit index (CFI) and the root mean square error of approximation (RMSEA) will also be reported for the models. Models are considered a good fit if CFI's are greater than .90 and RMSEA's are less than .05 (McDonald & Ho, 2002).

## RESULTS

Descriptive statistics (means, standard deviation, ranges, and correlations) for the variables in this study are shown in Tables 1 and 2. The correlations also provide some initial evidence that parent's education and income are moderate predictors of achievement for both European and African American group ( $r^2$ 's = .15-.34), with stronger prediction from parent's education for European Americans ( $r^2$ 's = .30-.34). Only the *Reading Resource* scale shows a moderate association in both racial groups with the two SES indicators ( $r^2$ 's = .07-.44). Additionally, for African Americans, indicators of the *Warmth* scale show small but significant associations ( $r^2$ 's = .07-.18). As expected, all of the indicator variables for the latent variable are at least moderately related to each other, with the highest relations appearing in the *Warmth* scale (see Table 2). Finally, parental expectations for educational outcomes in the European American sample have strong relations to the SES indicators ( $r^2$ 's = .47, .25; respectively) as well as the achievement indicators ( $r^2$ 's = .33-.38). They are also moderately related to the *Reading Resources* indicators ( $r^2$ 's = .15-.32) and *Warmth* indicators ( $r^2$ 's = .07-.19). For the African American sample, the relations are also significant but with lower effect size (see Table 2). Thus,

the correlations lend some initial support to the hypotheses that parents' SES, beliefs, and home behaviors are related to their children's achievement.

#### *Multiple-Group Comparison of Race*

The correlations also support the hypothesis that there are potential differences between the two racial groups in their pathways to achievement. Thus, prior to performing the final SEM models, a test of invariance between the two groups was performed using the theoretical process model of parenting influence in Figure 1. The analysis was conducted by examining the difference between the chi-square for a model with the structural paths constrained and one with no structural paths constrained (baseline model). This procedure directly tests whether the structural process differs across the groups (Byrne, 2001). Both the unconstrained, baseline model ( $\chi^2/df = 3.78$ ; CFI = .99; RMSEA = .04) and the constrained model ( $\chi^2/df = 4.05$ ; CFI = .98; RMSEA = .05) fit the data well on two of the three fit indices. The difference in the chi-squares, however, was significant ( $\chi^2_{(constrained)} = 2488.13/df(615)$ ;  $\chi^2_{(unconstrained)} = 1866.70/df(494)$ ;  $\chi^2_{(diff)} = 621.43/df(121)$ ;  $p < .001$ ) suggesting that the processes by which family SES relates to achievement was not the same for the two racial groups. Thus, SEM analyses were conducted separately for each race and the hypothesis regarding no race difference in achievement processes in the home was rejected. The results of these analyses appear in Figures 2 and 3. For simplicity, only significant standardized path coefficients are shown for parent's education and income but as dictated by the theoretical model all direct and indirect paths except for the direct path from child's age to achievement outcomes were tested (standardized path coefficients for all variables in the study can be found in Table 3).

#### *Structural Models for Each Race*

The results from the two SEM structural models support our hypothesis that parent's

education is related to child achievement indirectly through parental expectations and beliefs.

The specifics of this indirect relation, however, differed across the two race groups. For African Americans (AA), the model fits fairly well ( $\chi^2/df = 3.00$ , CFI = .99, RMSEA = .05) and a large percentage of the variance is explained ( $R^2 = .85$ ). Education was related to parent's educational expectations ( $\beta = .19$ ,  $p < .001$ ) and reading ( $\beta = .19$ ,  $p < .01$ ). Parent's educational expectations were also related indirectly to children's change in achievement through the home behaviors for this sample ( $\beta = .12$ ). Prior achievement accounted for a large amount of variance in 2002 achievement ( $\beta = .81$ ,  $p < .001$ ). Thus, all other effects are explaining what little variance is left after accounting for the autocorrelation in the model.

For European Americans (EA), the model fit is considered good ( $\chi^2/df = 4.55$ , CFI = .99, RMSEA  $\leq .07$ ) and explained 85% of the variance in children's achievement. Again, the autocorrelation accounts for a large amount of variance ( $\beta = .83$ ,  $p < .001$ ) in 2002 achievement. Yet, there continues to be significant effects through parental beliefs and behaviors. For example, parent's education has a moderate to strong relation with parent's educational expectations ( $\beta = .30$ ,  $p < .001$ ) and expectations then predicts to both reading ( $\beta = .20$ ,  $p < .001$ ), warmth ( $\beta = .23$ ,  $p < .001$ ) and play ( $\beta = .12$ ,  $p < .01$ ).

In order to get a sense of the effects of all of the variables in the model on achievement, the standardized direct, indirect, and total effects are presented in Table 3. The total (direct and indirect) effect of parent's education on children's change in achievement was moderate in European American families and small in African American families with the largest effects predicating to parent's educational expectations and reading materials in the home. Income had a small negative effect on the change in achievement in the European American sample, but a small positive effect for African Americans. Gender had a small total effect on achievement in

both racial groups with the effect favoring males in the European American sample and favoring females in the African American sample. Having younger children was related to higher educational expectations, more reading resources in the home, many more play activities, and more displays of warmth in the home.

## DISCUSSION

The goal of this study was to test whether or not parent's education had an influence on the parenting process in the homes, which subsequently influence the change in child achievement. The PSID-CDS gave us a unique opportunity to test for these process influences on the change in achievement from 1997-2002. A family process model was used as the guiding theoretical model for understanding what home environment factors may be important. Also, earlier work on 1997 data indicated that these processes did seem to have an influence at least cross-sectionally (Davis-Kean, 2005).

The results suggest that the home environment continues to have an influence on children's achievement even after controlling for earlier achievement and important family control variables. This home environment was influenced by education and income as well as parental educational expectations. Thus, parents' human capital and economic situation are important components in understanding how family environments are created and sustained across time.

Another important aspect of this study is the racial difference found in the family processes that promote achievement. Whereas, European Americans home environments were heavily influenced by the education of the parents, the African American home environment drew from both the education in the home as well as the income. Understanding the difference in family process in these two racial groups will be important in designing programs that might

help promote achievement beliefs and activities in the home.



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Table 1

*Means, Standard Deviations, N, and Range for all Model Indicators*

Variables	<i>European Americans</i>				<i>African Americans</i>			
	<i>M</i>	<i>SD</i>	<i>N</i>	<i>Range</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>Range</i>
<b>Parent and Family Characteristics</b>								
Parent Education (highest)	14.33	2.17	834	7 – 17	12.75	1.97	700	3 – 17
Family Income (average – 1997, 1999, 2001)	\$80,278.92	\$78,249.44	834	\$8,281.50 - \$746,401	\$35,506.28	\$27,480.19	700	\$0.00 – \$199,259
Family Size	4.24	1.03	834	2 – 9	4.17	1.42	700	2 – 11
% Married/Cohabiting	0.86	0.35	834	0 – 1	0.45	0.50	700	0 – 1
% Siblings in CDS	0.73	0.45	834	0 – 1	0.61	0.49	700	0 – 1
Caregiver Literacy (WJ-PC) - 1997	33.74	3.93	702	17 – 43	27.81	5.32	567	9 – 42
<b>Child Characteristics</b>								
Age (at 2002 assessment)	13.56	2.80	834	8.58 – 19.17	13.77	2.82	700	8.50 – 18.83
% Female	0.51	0.50	834	0 – 1	0.46	0.50	700	0 – 1
<b>Parental Expectations</b>								
Expected Schooling:	5.36	1.63	829	1 – 8	4.56	1.98	699	1 – 8
% High school diploma or less	14.0			1, 2	32.2			1, 2
% Some college/Voc. Training	6.7			3, 4	7.6			3, 4
% Graduate from 2 year college	11.2			5	9.9			5
% Graduate from 4 year college	53.2			6	40.5			6
% Post-graduate degree	14.8			7, 8	9.9			7, 8

*Table 1 continued*

Table 1 continued

Variables	European Americans				African Americans			
	<i>M</i>	<i>SD</i>	<i>N</i>	<i>Range</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>Range</i>
<b>Home Behaviors:</b>								
Number of books	4.71	0.73	831	1 – 5	4.35	0.93	698	1 – 5
# Visits to the library	3.26	1.34	821	1 – 5	3.12	1.28	697	1 – 5
# Magazines family receives <sup>a</sup>	3.23	3.08	829	0 – 30	2.38	3.62	691	0 – 50
% Receive daily newspaper	0.51	0.50	833	0 – 1	0.38	0.49	694	0 – 1
Arts and Crafts	1.63	0.85	834	1 – 5	1.57	0.86	700	1 – 5
Sports	1.85	1.05	834	1 – 5	1.87	1.09	700	1 – 5
Video Games	2.04	1.12	834	1 – 5	2.18	1.29	700	1 – 5
Board games and puzzles	2.04	0.98	834	1 – 5	2.05	1.15	700	1 – 5
Positive feelings	3.07	0.84	777	1 – 4	2.65	0.97	598	1 – 4
Warm and affectionate	2.78	0.95	777	1 – 4	2.30	1.02	599	1 – 4
Respond positively	3.01	0.90	777	1 – 4	2.60	0.96	599	1 – 4
Praise	2.27	0.98	777	1 – 4	1.88	0.93	599	1 – 4
Spontaneously spoke	3.19	0.84	777	1 – 4	2.87	0.90	599	1 – 4
Showed warmth	1.49	0.79	777	1 – 4	1.24	0.57	599	1 – 4
<b>Achievement</b>								
Letter-Word 1997	107.75	17.42	714	59 – 197	98.22	15.10	575	51 – 148
Letter-Word 2002	109.11	18.61	834	45 – 183	96.38	18.10	700	35 – 184
Applied Problems 1997	112.17	16.35	712	32 – 158	98.94	16.82	570	28 – 152
Applied Problems 2002	109.88	15.36	834	49 – 171	94.73	13.90	700	43 – 168

Note: Percentages are noted for dichotomous and ordinal scale data

a – These descriptives are for the actual variable. For the analyses (including the correlations in Table 2), the number of magazines was log transformed. The logged variable had the following characteristics: range = 0 – 3.43,  $M = 1.23$ ,  $SD = 0.67$  for European Americans; range = 0 – 3.93,  $M = 0.92$ ,  $SD = 0.75$  for African Americans.



Table 2

*Correlations among Study Variables for European and African Americans*

Variables	EA	AA	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
<b>Fam. Char.</b>	1 Par. Ed		<b>.44</b>	<b>-.09</b>	<b>.29</b>	<b>-.10</b>	<b>.35</b>	-.02	-.05	<b>.35</b>	<b>.20</b>	<b>.14</b>	<b>.19</b>	.07	-.04	-.05	.01	<b>-.08</b>	<b>.12</b>	<b>.18</b>	.07	<b>.14</b>	<b>.12</b>	<b>.14</b>	<b>.20</b>	<b>.25</b>	<b>.12</b>	<b>.16</b>	
	2 Fam. Inc.		<b>.41</b>		.07	<b>.53</b>	<b>-.12</b>	<b>.33</b>	<b>.13</b>	-.04	<b>.29</b>	<b>.17</b>	.07	<b>.22</b>	<b>.17</b>	<b>-.09</b>	-.05	-.03	<b>-.15</b>	<b>.16</b>	<b>.18</b>	<b>.11</b>	<b>.10</b>	<b>.10</b>	<b>.10</b>	<b>.25</b>	<b>.23</b>	<b>.19</b>	<b>.21</b>
	3 Fam. size		.06	.04		<b>.31</b>	<b>.46</b>	-.04	<b>.08</b>	.01	<b>-.08</b>	-.03	.00	<b>.09</b>	<b>.10</b>	.05	-.02	.01	.04	<b>-.09</b>	<b>-.12</b>	<b>-.11</b>	-.05	<b>-.11</b>	<b>-.09</b>	-.06	-.05	-.02	-.07
	4 Fam. type		<b>.26</b>	<b>.20</b>	<b>.45</b>		-.02	<b>.12</b>	<b>.09</b>	-.05	<b>.17</b>	<b>.09</b>	.05	<b>.19</b>	<b>.10</b>	.00	.00	-.01	<b>-.08</b>	.01	<b>.08</b>	-.06	-.01	-.04	.06	<b>.16</b>	<b>.11</b>	.07	.04
	5 Siblings		.04	-.01	<b>.43</b>	<b>.10</b>		<b>-.11</b>	<b>-.08</b>	.02	<b>-.08</b>	-.04	.03	.04	.05	.04	.00	.03	.05	-.06	<b>-.12</b>	.07	-.05	-.01	-.03	-.06	-.05	.01	.01
	6 PCG Lit.		<b>.44</b>	<b>.23</b>	<b>.10</b>	<b>.13</b>	.05		.07	-.06	<b>.36</b>	<b>.16</b>	.08	.08	-.00	<b>-.09</b>	<b>-.21</b>	.04	<b>-.17</b>	<b>.19</b>	<b>.13</b>	.07	<b>.19</b>	.08	.08	<b>.25</b>	<b>.23</b>	<b>.25</b>	<b>.21</b>
<b>Child Char.</b>	7 Age		.04	<b>.10</b>	-.02	.00	<b>-.20</b>	-.03		.03	-.03	<b>-.17</b>	<b>-.14</b>	.03	-.06	<b>-.30</b>	<b>-.19</b>	<b>-.21</b>	<b>-.29</b>	-.06	-.06	<b>-.13</b>	.02	-.04	<b>-.14</b>	.07	-.07	<b>.18</b>	<b>-.15</b>
	8 Gender		-.01	.04	.01	.02	.05	<b>-.08</b>	<b>.07</b>		.06	<b>.11</b>	.06	-.04	-.06	.06	-.04	.02	.05	.02	-.01	.01	.02	.02	-.02	<b>.09</b>	<b>.13</b>	.03	-.01
<b>Par. Expect.</b>	9 Exp. Sch.		<b>.47</b>	<b>.25</b>	.04	<b>.13</b>	.06	<b>.33</b>	-.03	<b>.08</b>		<b>.25</b>	<b>.13</b>	<b>.12</b>	<b>.13</b>	-.00	-.05	.05	<b>-.10</b>	<b>.14</b>	<b>.10</b>	.04	<b>.16</b>	.03	.05	<b>.27</b>	<b>.33</b>	<b>.25</b>	<b>.30</b>
<b>Par. Behav. Reading</b>	10 # of bks		<b>.18</b>	<b>.07</b>	-.05	<b>.10</b>	-.04	<b>.17</b>	<b>-.21</b>	<b>.09</b>	<b>.22</b>		<b>.18</b>	<b>.14</b>	<b>.11</b>	<b>.11</b>	.03	<b>.07</b>	.01	<b>.14</b>	<b>.12</b>	<b>.08</b>	.04	<b>.12</b>	<b>.10</b>	<b>.13</b>	<b>.22</b>	.05	<b>.15</b>
	11 # vis. lib.		<b>.15</b>	<b>.08</b>	-.06	.04	.02	<b>.11</b>	<b>-.21</b>	-.02	<b>.17</b>	<b>.22</b>		<b>.11</b>	<b>.18</b>	<b>.15</b>	<b>.09</b>	<b>.09</b>	<b>.12</b>	<b>.11</b>	<b>.10</b>	<b>.10</b>	.05	<b>.11</b>	.07	<b>.08</b>	.02	<b>.09</b>	
	12 l# of magz.		<b>.44</b>	<b>.23</b>	.05	<b>.19</b>	.03	<b>.27</b>	.01	-.03	<b>.32</b>	<b>.20</b>	<b>.17</b>		<b>.19</b>	.07	<b>.08</b>	.05	.04	.02	-.04	-.02	<b>-.09</b>	-.02	-.03	-.01	.07	.05	.03
<i>Play</i>	13 Newspaper.		<b>.28</b>	<b>.23</b>	.06	<b>.13</b>	.01	<b>.21</b>	<b>.10</b>	-.04	<b>.15</b>	.03	<b>.11</b>	<b>.25</b>		.05	.07	.07	.04	<b>.11</b>	.06	.01	-.03	-.02	-.02	.04	.07	.05	<b>.09</b>
	14 Arts & Cra		-.01	<b>-.09</b>	-.06	<b>-.09</b>	-.02	.06	<b>-.38</b>	<b>.10</b>	<b>.08</b>	<b>.18</b>	<b>.22</b>	.03	-.04		<b>.28</b>	<b>.28</b>	<b>.38</b>	-.03	.01	.03	.02	-.02	<b>.11</b>	-.08	-.01	<b>-.13</b>	-.05
	15 Sports		.03	.02	-.06	-.03	.05	.02	<b>-.26</b>	<b>-.08</b>	.06	<b>.12</b>	<b>.21</b>	.07	-.02	<b>.30</b>		<b>.27</b>	<b>.29</b>	-.03	-.02	.01	.00	-.01	-.02	-.05	.01	-.07	-.01
<i>Warmth</i>	16 Vid games		<b>-.12</b>	-.06	<b>-.09</b>	<b>-.12</b>	-.00	-.06	<b>-.22</b>	<b>-.08</b>	-.03	<b>.08</b>	<b>.12</b>	<b>-.07</b>	<b>-.08</b>	<b>.26</b>	<b>.30</b>		<b>.37</b>	<b>.13</b>	<b>.10</b>	<b>.10</b>	.02	<b>.10</b>	<b>.09</b>	.02	.02	-.04	.04
	17 Bd. games		-.06	<b>-.07</b>	.04	-.05	<b>.10</b>	.03	<b>-.37</b>	<b>-.08</b>	.02	<b>.12</b>	<b>.16</b>	.02	-.06	<b>.41</b>	<b>.27</b>	<b>.29</b>		.03	.07	<b>.09</b>	.05	.03	<b>.10</b>	<b>-.10</b>	<b>-.10</b>	<b>-.12</b>	-.04
	18 Pos. feel.		.02	.05	<b>-.07</b>	-.02	-.06	.05	<b>-.10</b>	<b>-.09</b>	<b>.19</b>	.06	<b>.10</b>	.04	.03	<b>.08</b>	<b>.09</b>	.06	<b>.09</b>		<b>.66</b>	<b>.49</b>	<b>.61</b>	<b>.50</b>	<b>.34</b>	<b>.12</b>	<b>.11</b>	<b>.13</b>	<b>.16</b>
	19 Warm/aff		.05	-.00	-.06	-.04	.00	<b>.10</b>	<b>-.17</b>	-.03	<b>.18</b>	<b>.11</b>	<b>.12</b>	.05	-.05	<b>.15</b>	<b>.16</b>	<b>.10</b>	<b>.14</b>	<b>.65</b>		<b>.50</b>	<b>.55</b>	<b>.46</b>	<b>.45</b>	.03	<b>.11</b>	.06	<b>.11</b>
	20 Resp. posit		-.04	.01	<b>-.10</b>	-.03	.00	.00	<b>-.14</b>	-.01	<b>.08</b>	.06	<b>.11</b>	.00	-.02	<b>.10</b>	.04	.06	<b>.07</b>	<b>.56</b>	<b>.50</b>		<b>.41</b>	<b>.65</b>	<b>.36</b>	-.03	<b>.09</b>	-.02	<b>.10</b>
	21 Praise		.05	.05	-.06	-.05	-.02	.07	<b>-.12</b>	-.05	<b>.19</b>	<b>.09</b>	<b>.15</b>	.02	.03	<b>.13</b>	<b>.12</b>	<b>.12</b>	<b>.09</b>	<b>.60</b>	<b>.61</b>	<b>.45</b>		<b>.36</b>	<b>.39</b>	.07	<b>.14</b>	<b>.10</b>	<b>.13</b>
	22 Spont. spk		-.05	.01	<b>-.08</b>	-.03	-.07	-.04	-.07	-.03	<b>.08</b>	.03	.02	-.00	-.02	.03	.02	.07	.04	<b>.59</b>	<b>.49</b>	<b>.74</b>	<b>.42</b>		<b>.32</b>	-.02	.06	-.04	-.00
<b>Achieve.</b>	23 Sh. Warm.		.01	.01	-.05	-.06	<b>.08</b>	.03	<b>-.29</b>	-.01	.07	<b>.08</b>	<b>.14</b>	.01	-.07	<b>.15</b>	<b>.12</b>	<b>.10</b>	<b>.18</b>	<b>.34</b>	<b>.46</b>	<b>.35</b>	<b>.40</b>	<b>.29</b>		-.04	<b>.10</b>	-.02	.06
	24 LW – 1997		<b>.31</b>	<b>.26</b>	<b>-.09</b>	.05	-.02	<b>.23</b>	<b>.23</b>	<b>.12</b>	<b>.31</b>	.07	<b>.11</b>	<b>.19</b>	<b>.18</b>	<b>-.10</b>	-.06	-.07	<b>-.08</b>	.04	-.00	-.03	.01	-.03	-.03		<b>.59</b>	<b>.60</b>	<b>.45</b>
	25 LW – 2002		<b>.30</b>	<b>.15</b>	-.04	.05	-.00	<b>.24</b>	-.00	.02	<b>.33</b>	<b>.08</b>	<b>.14</b>	<b>.16</b>	<b>.13</b>	-.01	.00	-.06	-.01	<b>.11</b>	<b>.12</b>	.02	<b>.10</b>	.02	.05		<b>.57</b>	<b>.34</b>	<b>.54</b>
	26 AP – 1997		<b>.32</b>	<b>.23</b>	-.05	.07	-.02	<b>.26</b>	<b>.16</b>	<b>-.12</b>	<b>.31</b>	.02	<b>.12</b>	<b>.23</b>	<b>.19</b>	<b>-.11</b>	-.06	<b>-.11</b>	-.02	.06	.02	.01	-.01	.01	-.03		<b>.57</b>	<b>.39</b>	<b>.51</b>
	27 AP – 2002		<b>.34</b>	<b>.18</b>	.02	<b>.10</b>	.06	<b>.25</b>	<b>-.18</b>	<b>-.14</b>	<b>.38</b>	<b>.10</b>	<b>.15</b>	<b>.22</b>	<b>.15</b>	.03	.00	-.05	<b>.09</b>	<b>.14</b>	<b>.16</b>	.06	<b>.13</b>	.06	<b>.07</b>	<b>.36</b>	<b>.52</b>	<b>.51</b>	

Note: Correlations presented below the diagonal represent the values for European Americans; correlations appearing above the diagonal represent the values for African Americans. Significant two-tailed correlations are in **bold**. In general, correlations between .07-.09 are significant at the  $p \leq .05$  level; .10 to .11 are significant at the  $p \leq .01$  level, and those .12 and above are significant at the  $p \leq .001$ .



Table 3

*Standardized Direct, Indirect, and Total Effects for All Variables in the Model by Race*

Predictor	Dependent Variable	<u>European American</u>			<u>African American</u>		
		Total Effect	Direct Effect	Indirect Effect	Total Effect	Direct Effect	Indirect Effect
Parent Education	Parental Expectation	.30	.30***	--	.19	.19***	--
	Reading Resources	.46	.40***	.06	.25	.19**	.06
	Parent-Child Play	.01	-.03	.04	.01	.01	.00
	Warmth	-.03	-.10*	.07	.07	.06	.01
	Achievement 2002	.13	.09	.04	.07	-.03	.10
Income	Parental Expectation	.03	.03	--	.07	.07	--
	Reading Resources	.09	.08	.01	.29	.27**	.02
	Parent-Child Play	-.01	-.01	.00	-.07	-.07	.00
	Warmth	.05	.04	.01	.18	.18**	.00
	Achievement 2002	-.09	-.09*	.00	.09	-.04	.13
Family Size	Parental Expectation	.02	.02	--	-.05	-.05	--
	Reading Resources	-.07	-.08	.01	.08	.10	-.02
	Parent-Child Play	-.02	-.03	.01	.07	.07	.00
	Warmth	-.07	-.08	.01	-.12	-.12*	-.00
	Achievement 2002	.06	.07	-.01	.02	.01	.01
Family Type	Parental Expectation	-.01	-.01	--	.06	.06	--
	Reading Resources	.16	.16**	-.00	.06	.04	.02
	Parent-Child Play	-.11	-.11	-.00	.02	.02	.00
	Warmth	-.03	-.03	-.00	-.07	-.07	.00
	Achievement 2002	-.02	-.00	-.02	-.06	-.08	.02
Siblings	Parental Expectation	.02	.02	--	-.01	-.01	--
	Reading Resources	-.01	-.02	.01	.03	.03	-.00
	Parent-Child Play	-.04	-.04	.00	-.03	-.03	.00
	Warmth	-.03	-.04	.01	.02	.02	.00
	Achievement 2002	-.01	.00	-.01	.01	-.00	.01

*Table 3 continued**Table 3 continued*

Predictor	Dependent Variable	<u>European American</u>			<u>African American</u>		
		Total Effect	Direct Effect	Indirect Effect	Total Effect	Direct Effect	Indirect Effect
Caregiver Literacy	Parental Expectation	.12	.12**	--	.21	.21***	--
	Reading Resources	.16	.14**	.02	.08	.01	.07
	Parent-Child Play	.07	.06	.01	-.12	-.12*	.00
	Warmth	.05	.02	.03	.12	.12*	.00
	Achievement 2002	.01	-.03	.04	-.01	-.06	.05
Age	Parental Expectation	-.08	-.08*	--	-.07	-.07	--
	Reading Resources	-.16	-.14**	-.02	-.37	-.35***	-.02
	Parent-Child Play	-.59	-.58***	-.01	-.44	-.44***	-.00
	Warmth	-.19	-.17***	-.02	-.10	-.10*	-.00
	Achievement 2002	-.14	--	-.14	-.14	--	-.14
Gender	Parental Expectation	.10	.10**	--	.07	.07*	--
	Reading Resources	.01	-.01	.02	.14	.12	.02
	Parent-Child Play	.02	.01	.01	.06	.06	.00
	Warmth	-.04	-.06	.02	.03	.03	.00
	Achievement 2002	-.08	-.09*	.01	.02	-.04	.06
Achievement 1997	Parental Expectation	.25	.25***	--	.18	.18***	--
	Reading Resources	.16	.11	.05	.01	-.05	.06
	Parent-Child Play	-.12	-.15**	.03	-.07	-.07	.00
	Warmth	.04	-.02	.06	-.03	-.03	.00
	Achievement 2002	.84	.83***	.01	.81	.80***	.01
Parental Expectations	Reading Resources	.20	.20***	--	.32	.32***	--
	Parent-Child Play	.12	.12**	--	.01	.01	--
	Warmth	.23	.23***	--	.02	.02	--
	Achievement 2002	.15	.10*	.05	.16	.04	.12
	Achievement 2002	.03	.03	--	.38	.38***	--
Reading Resources	Achievement 2002	.19	.19***	--	-.01	-.01	--
Parent-Child Play	Achievement 2002	.09	.09*	--	.10	.10*	--
Warmth	Achievement 2002	.09	.09*	--	.10	.10*	--

Note: Significance tests are only reported for direct effects: \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

Figure Captions

*Figure 1.* Analyses Model

*Figure 2.* Parental Influence on Achievement-European Americans. Model fit statistics:  
 $\chi^2 = 1124.69$ ,  $df = 247$ ;  $\chi^2 / df = 4.55$ , CFI = .99, RMSEA = .07  
\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

*Figure 3.* Parental Influence on Achievement-African Americans. Model fit statistics:  
 $\chi^2 = 742.04$ ,  $df = 247$ ;  $\chi^2 / df = 3.00$ , CFI = .99, RMSEA = .05  
\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$





