Children at Risk for Academic Failure: A Model of Individual and Family Factors

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Abstract

The purpose of this study was to identify individual and family risk factors that may explain why some students are at risk for academic failure. Students' self-concept, academic motivation, and their parents' involvement in education were reported by both students and teachers. A latent variable path model fit the data well (Comparative Fit Index = .92) and converged in eleven iterations, with a standardized residual mean error of .03, $\chi^2(9) = 41.23$, $p < .001$. The model indicates that students with low parental involvement in their education may exhibit a low sense of competence and motivation towards learning, and achieve minimal academic success. Results of the present study are discussed in accordance with Eccles' (1994) achievement theories, which help identify children at-risk for academic failure.

A substantial amount of research has investigated risk and protective factors related to student academic achievement. Factors within microsystems (e.g., individual characteristics) and macrosystems (e.g., family, school, or societal contexts) have been examined separately in relation to achievement, with few studies examining more than one or a few. Some studies that have attempted to simultaneously investigate multiple factors have been conducted outside of Canada (e.g., Obach, 2003; Spinath & Spinath, 2005). Generalization of these studies is limited due to cultural, social, demographic, and educational differences that exist among countries (Boulton, Bucci, & Hawker, 1999). As a result, it is important to validate the interrelationships among the multiple factors that are related to Canadian students' academic achievement. The focus of the present study is to develop and test a comprehensive model of achievement for a Canadian sample of students in grades 5 and 6. Much of the following review is based on American research, which suggests that these factors may be relevant, and need to be examined, in a Canadian setting.

Achievement

Achievement can be defined as students' overall understanding of particular information and development of specific skills within the school setting (Ebel & Frisbie, 1986). Indeed, many achievement tests measure student learning from instruction on the basis of performance of basic skills (Wilson, 1989). Eccles' Expectancy-Value Theory and Model of Achievement Related Choices is based on over 20 years of research and is the most comprehensive theoretical model of achievement to date (Anderman et al., 2001; Denissen, Zarrett, & Eccles, 2007; Durik, Vida, & Eccles, 2006; Eccles, 1994; Eccles et al., 1983; Fredricks & Eccles, 2005; Frome, Alfeld, Eccles, & Barber, 2006; Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002; Jacobs, Vernon, & Eccles, 2004; Simpkins, Davis-Kean, & Eccles, 2006). According to the theories, achievement involves the cultural, social, and environmental "fit" of schools for students. At school, students progress into wider social contexts from their homes, which influence their cognitive, behavioural, and socio-emotional development (Eccles, Roeser, Wigfield, & Freedman-Doan, 1999). Thus, in addition to the school environment, characteristics of a child's family will influence the child's intellectual and interpersonal development. Also, students who experience academic and social difficulties may become frustrated, resulting in a negative pattern of adaptation towards school (Eccles et al., 1999). Thus, academic success is dependent on developing a positive view of one's level of competence in learning that is based on many family and individual factors. According to this framework, the present investigation examined multiple factors related to achievement and determined which factor, or combination of factors, explain why some students are at risk for poor academic achievement.

Individual Factors

Academic motivation. Academic motivation refers to a student's enjoyment of learning characterized by an orientation toward mastery, curiosity, persistence, and the learning of challenging, difficult, and novel tasks (Gottfried, Gottfried, Cook, & Morris, 2005). Students' academic motivation has been shown in several studies to predict their achievement in school (Broussard & Garrison, 2004; Gottfried et al., 2005). However, Stipek and Ryan (1997) found no relationship between classroom motivation and achievement in a sample of kindergarten students. Given that students' academic motivation becomes more stable in later childhood versus early childhood (Gottfried, Fleming, & Gottfried, 2001), we expect that for students at about grades 5–6 there is an association between academic motivation and achievement. Specifically, children who lack curiosity and persistence may perform less well in school than children who are curious, persistent, and generally enjoy learning challenging academic tasks.

Self-concept. In addition to academic motivation, students at risk for poor achievement have been found to experience low self-concept. Self-concept is defined as a multidimensional and dynamic system of self-beliefs (Cole et al., 2001; Marsh, 1990). These beliefs often refer to an individual's perceived competence within the domains of academics, physical appearance, athletics, social skills, and family. In a meta-analysis, Valentine, DuBois, and Cooper (2004) found a positive and reciprocal relationship between self-beliefs and academic achievement, which is generally held across age, gender, and cultural background (Gonzalez-Pienda et al., 2002; Guay, Marsh, & Boivin, 2003). In addition, previous studies have indicated that children learn to value and invest in activities in which they perceive themselves as relatively competent

(Anderman et al., 2001; Denissen et al., 2007; Durik et al., 2006; Eccles et al., 1983; Simpkins et al., 2006). Accordingly, children with a sense of competence, who value and invest in school-related activities, are likely to achieve academic success. This self-concept, in combination with academic motivation, is likely to more strongly predict achievement than either factor alone.

Parental Involvement

A family characteristic that has received considerable research attention as a risk factor for poor school achievement is parental involvement. In a meta-analysis, Jeynes (2005) found a positive association between parental involvement and academic achievement. The extent to which parents promote learning in the home and have direct and regular contact with school seems to increase their children's achievement (Englund, Luckner, Whaley, & Egeland, 2004; Fantuzzo, Davis, & Ginsburg, 1995; Marchant, Paulson, & Rothlisberg, 2001; McWayne, Hampton, Fantuzzo, Cohen, & Sekino, 2004). In contrast, some studies have found no evidence of a direct relationship between parental involvement and school achievement (Bobbett, French, Achilles, & Bobbett, 1995; Fan, 2001; Okpala, Okpala, & Smith, 2001). These studies vary in their method with some using teacher interviews about parents, parent report questionnaires, and number of volunteer hours. It is expected that general questions to parents about their involvement with their children's school will be associated with achievement (Fan, 2001). Also, some types of parental involvement, such as parental attitudes and expectations for achievement, have been found to be related to achievement whereas support with homework may indicate student difficulty with schoolwork (Shumow & Miller, 2001). Also, perhaps parents are indirectly involved in their children's achievement by increasing their motivation and positive self-concept. These student characteristics may be directly related to their academic success, and their parents' encouragement of these characteristics may be indirectly related to their academic achievement. In sum, the current study examined whether parental involvement is directly related to achievement or mediated by student motivation and self-concept.

To obtain a broad understanding of achievement, we developed a comprehensive model of achievement-related factors. Students who exhibit positive self-concept about learning and who are highly motivated to learn are expected to obtain high levels of achievement. In addition, student self-concept and motivation are likely to be more strongly related to achievement than is their parents' involvement. These proximal and distal factors have been examined separately in previous research and were examined simultaneously in the present study to develop a comprehensive model of achievement for students in grades 5 and 6 who may be at risk for academic failure.

Method

Participants

A total of 26 schools in Calgary, Alberta were randomly selected and contacted, with administrators at four of them agreeing to participate. Three schools from the Calgary Board of Education and one school from the Calgary Catholic School Division (both are public school divisions) were obtained, including one school in the northwest quadrant, one in the southeast, and two in the southwest (one non-Catholic and one Catholic). Of the 582 grade 5 and 6 students invited to participate, 26% ($N = 154$) obtained signed parental consent. In addition, their

teachers ($n = 21$) provided informed consent and were included in the study. Of the 154 participants, responses from six students and their teachers were not included in the analyses due to a large proportion of missing cases. Thus, 148 students and corresponding teacher responses were included in the analyses. As shown in Table 1, an equal number of boys and girls were included, and the majority of students were 9–11 years of age and Caucasian.

Table 1
Demographic Characteristics of the Students (N = 148)

Variable	Total	Percentage
Gender of child		
Male	74	50.0
Female	74	50.0
Age of child		
9–10	66	44.6
11	67	45.3
12–13	15	10.2
Ethnicity of child		
Caucasian	114	77.0
Chinese	9	6.1
East Indian	5	3.4
Korean	4	2.7
Filipino	4	2.7
Vietnamese	3	2.0
Israeli	2	1.4
Aboriginal	2	1.4
Other	5	3.2

Measures

Achievement. Teacher reports of achievement have been utilized in many studies and are considered accurate measures of children's achievement (Englund et al., 2004; Hecht & Greenfield, 2002; Nansel et al., 2001). Thus, in the present study students' level of academic achievement was determined from responses to three questions from the students' homeroom teacher: "Knows as much as the other children in [student name] class," "Doesn't do well in school, even when [student name] tries," and "The teacher thinks [student name] is smart." Responses were based on a 5-point scale from "always true" to "always false." Coding was reversed for the positively worded question so that high scores indicated a high level of achievement.

In addition to teacher reports of achievement, achievement was assessed using children's school grades from the most recent grading period. A mean score was calculated from grades reported in mathematics, science, social studies, and language arts using a 5-point scale (i.e., 5 = 90% and above, 4 = 80–89%, 3 = 60–79%, 2 = 50–59%, 1 = 49% and below). Teachers reported students' grades utilizing the 5-point system in three of the participating schools. The fourth school reported percentages, which were then converted to the same 5-point scale.

Academic motivation. Academic motivation was measured by students' and teachers' responses to 18 items from the Children's Academic Intrinsic Motivation Inventory (CAIMI; Gottfried, 1986). It has good criterion-related validity, internal consistency, and test-retest reliability (e.g., Cohen's alpha ranges between .80 and .83; Gottfried, 1986). The scale measures

students' general enjoyment of learning, as well as their curiosity and persistence towards challenging and novel tasks. Students were asked to respond to statements such as "I like to learn." Homeroom teachers also rated students' academic motivation by responding to items that were modified to be applicable for teachers; for example, "[student name] likes to learn." Responses were based on a 5-point scale from "strongly agree" to "strongly disagree." Coding was reversed so that high scores indicated a high level of motivation.

Self-concept. Self-concept was measured with the Tennessee Self-Concept Scale—Second Edition (TSCS: 2; Fitts & Warren, 1996). It measures students' perceived competence within academic, personal, physical, social, moral, and family domains. The 20-item structured interview scale shows high internal consistency (e.g., Cronbach's $\alpha = .91$) and adequate test-retest reliability, content validity, and criterion-related validity (Fitts & Warren, 1996). Students rated their self-concept by responding to statements such as "I know as much as other children in my class." Teachers reported the self-concept of these same students by responding to items that were modified to be appropriate for teachers (e.g., "[student name] knows as much as other children in our class"). Indeed, teacher reports of children's self-concept are considered to be an accurate indication of children's self-concept (Marsh & Craven, 1991; Marsh, Parker, & Smith, 1983; Marsh, Smith, & Barnes, 1983). Responses were based on five categories: "always true" to "always false." Coding was reversed so that high scores indicated high self-concept.

Parental involvement. Parental involvement in their children's education was assessed with the Parental Involvement Scale (Paulson, 1994). The 16-item structured interview scale provides information on parental interest in schoolwork and involvement in school events. Paulson (1994) reported that the scale items demonstrate good internal reliability and criterion-oriented validity. Students were asked to rate their parents' involvement through items such as "My parents usually go to activities that I am involved in at school." Homeroom teachers also rated parental involvement in their students' education by responding to items that were modified to be appropriate for teachers (e.g., "Parents usually go to activities that he/she is involved in at school"). Responses to the Parental Involvement Scale are rated on a 5-point scale from "strongly agree" to "strongly disagree." Coding was reversed so that high scores indicated high involvement.

Procedure

Student participants individually completed the questionnaires in their classrooms during regular school hours, but when a small number of children in a classroom participated they went to the library. The three questionnaires were administered in a counterbalanced order. Student participants were asked to report their age, gender, and ethnicity; it took participants 15–30 minutes to complete the questionnaires. Next, teachers completed similar questionnaires and reported school grades for ten randomly selected students from those who had completed the questionnaires. Only 10 students for each teacher (one teacher reported on eight students) were selected to limit the number of questionnaires teachers were asked to complete. The teacher questionnaires were collected from each school two weeks later. None of these students were identified as having reading difficulties or any other difficulties in answering the questions; thus, students' responses were likely valid.

Model testing. Based on empirical results from previous research and theoretical considerations, a latent variable path model was developed and tested using EQS: A Structural Equation Program software package (Version 6.1; Bentler, 2004). Structural equation modeling was used to determine the degree of association among achievement, academic motivation, self-concept, and parental involvement. Its advantage over other correlational methods is that it combines measured variables to calculate latent variables, which partial out measurement error. Thus, they are a better indicator of the constructs than are measured variables. The model was fit to the covariance matrix using Maximum Likelihood estimation. To create the most parsimonious model of the previously untested simultaneous relationships among these variables, the model was re-specified.

Since each teacher completed questionnaires for about 10 students, responses across questionnaires for each teacher are likely to be similar. This clustering creates the problem of dependence of observations. Thus, partial correlation coefficients of the dependent variables were determined using indicator variables (Hays, 1994) and used in the model analyses.

Results

The mean, standard deviation, skewness, kurtosis, range, and minimum and maximum values of the variables used in the model are presented in Table 2. Some variables were skewed (see Tabachnick & Fidell, 1996) including teacher report of achievement, teacher and student report of motivation, and student report of self-concept. According to Glass and Hopkins (1996), however, minimal deviations from normality have a negligible effect on the results. Multivariate analyses of variance were conducted to investigate gender, age, and ethnic differences for students' and teachers' reports of achievement, academic motivation, self-concept, and parental involvement. Age was analyzed by comparing grades 5 and 6 students, and ethnicity was analyzed by comparing Caucasian and Non-Caucasian students. Effect sizes for all the variables were below .06.

Correlations

Table 3 presents the correlations between the variables initially utilized in the model. The correlation matrix presents a range of low to high correlations, with the highest correlation between teachers' reports of school grades and overall academic achievement ($r = .76$, $p < .001$).

Table 2
Descriptive Statistics of the Variables (N = 148)

Variable	M	SD	Skewness	Kurtosis	Range	Min	Max
Teacher report of achievement	11.82	2.66	-.86	.37	11	4	15
Teacher report of school grades	3.37	.72	.18	-.14	3	2	5
Student report of academic motivation	54.01	6.67	-.60	.52	37	30	67
Teacher report of academic motivation	58.47	9.46	-.57	.59	47	29	76
Student report of parental involvement	45.00	5.14	-.24	-.44	23	32	55
Teacher report of parental involvement	57.11	8.78	-.10	-.38	42	33	75
Student report of self-concept	74.00	8.53	-.44	-.03	40	50	90
Teacher report of self-concept	67.64	8.10	-.07	-.00	40	47	87

Table 3
Pearson Product Correlations for Achievement and Achievement-Related Variables (N = 148)

Variable	1	2	3	4	5	6	7	8
Student report of academic motivation	-	.23**	.44**	.08	.17	.12	.38**	.16*
Teacher report of academic motivation		-	.16	.49**	.64**	.75**	.05	.55**
Student report of parental involvement			-	.27**	.13	.15*	.40**	.21*
Teacher report of parental involvement				-	.48**	.51**	.06	.43**
Mean grade					-	.76**	.12	.22*
Teacher report of overall achievement						-	.06	.36**
Student report of self-concept							-	.21*
Teacher report of self-concept								-

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

These variables were also highly correlated with teachers' reports of academic motivation, self-concept, and parental involvement in education. In contrast, correlations between academic achievement and students' reports of academic motivation, self-concept, and parental involvement were low. These results suggest that the teacher-reported variables share method variance, as do the student-reported variables, thus, inflating the magnitude of the coefficients. To account for this variance, both student and teacher reports were included in the latent variable path model to obtain a good estimate of the model's variables.

Model

The partial correlations from the correlation matrix were included in the model and the pattern of correlations served as a guide in specifying the model. Student report of self-concept did not improve the model and lowered the overall fit of the model to the data; thus, it had to be removed from the model calculations. The model converged in 11 iterations providing a good fit for the data, $\chi^2(9) = 41.2.3$, $p < .000$; SRMR = .03; Confidence Fit Index = .92. This fit index suggests that the model accounted for 92% of the variance in the data, and all variable paths in the model were significant.

Figure 1 illustrates the multiple relationships among achievement and family and individual characteristics. The latent variable achievement, on the far right of the model, was measured by teachers' reports of children's grades and overall academic achievement. Achievement was positively correlated with motivation (as measured by students and teachers). Thus, students who, according to their teachers, seem to enjoy learning and are curious and persistent towards novel and challenging tasks are likely to have high levels of achievement. Achievement was also positively correlated with self-concept (as measured by teachers). Hence, students whose teachers perceive them as competent individuals are likely to have high levels of academic achievement. Lastly, achievement was positively and directly related to parental involvement (as measured by students and teachers). Thus, children who perceive that their parents have positive values about education and take an interest in their school are likely to have high levels of achievement. In sum, it appears that achievement was directly related to parental involvement and academic motivation, and to a lesser extent, self-concept.

Additionally, the proposed model demonstrated several significant inter-correlations between achievement-related factors. For instance, motivation and parental involvement were positively correlated ($r = .56$). Therefore, students who are curious, persistent, and generally

Figure 1
Latent Variable Path Model of Academic Achievement Employing Maximum Likelihood Estimation
(N = 148)¹

¹ The standard errors of the coefficients are as follows: Teacher Report of Parental Involvement = 1.41; Teacher Report of Achievement = .33; and Teacher Report of Academic Motivation = 1.92. The standard error for Student Report of Parental Involvement, Teacher Report of School Grades, and Student Report of Academic Motivation are 0.00 because these paths were fixed at one to identify the model.

enjoy learning often perceive their parents as valuing and involved in their education. Parental involvement and teacher reported self-concept were also positively correlated ($r = .50$). Thus, children whose parents are interested and involved in their school seem generally competent as individuals. Finally, academic motivation and self-concept were positively related ($r = .55$). This indicates that students who are motivated and enjoy learning are also perceived by their teachers to be competent.

Discussion

This study extends our understanding of elementary students who are at risk for poor academic achievement by simultaneously examining the interrelationships among academic achievement, individual factors, and parental involvement. The main results indicate that children whose parents do not actively participate in their education are likely to be perceived by their teachers as having low confidence in their abilities, show low motivation towards completing school assignments, and achieve minimal academic success. Also, parental involvement was both directly and indirectly related to achievement. These results, in brief, suggest that children who are at-risk for poor academic achievement are likely to be seen as having low confidence, showing little motivation, and receiving little parental support.

Academic Motivation and Achievement

Past research has indicated that elementary students with low motivation to learn are at risk academically (Broussard & Garrison, 2004; Gonzalez-Pienda et al., 2002). The results of the current study confirm that grades 5 and 6 students perform poorly in school when they are not highly motivated to learn. In terms of Eccles' theories of achievement, students who do not value academic achievement are not likely to persist at or invest in challenging academic tasks.

Self-Concept and Achievement

The relationship between students' general self-concept and academic achievement was also examined, with past research showing a positive relationship (Gonzalez-Pienda et al., 2002; Guay et al., 2003). However, the present study utilized students' and teachers' ratings of self-concept and found conflicting results. Teachers' ratings of students' self-concept were moderately related to academic achievement whereby children perceived as lacking competence are at risk of obtaining low marks. Perhaps these children lack the confidence to persevere on challenging tasks in an effort to avoid failure.

However, no significant relationship was found between students' reports of personal competence and achievement. Moreover, these students' reports did not fit in the model of factors related to achievement. This illustrates a discrepancy between students' and teachers' perceptions of students' general competence and self-worth. Whereas, teachers report high student self-concept for high achievement, children's reports of self-concept may be high even though their achievement scores may be low. In addition, our study shows that students may report a more optimistic level of personal competence, compared to a more realistic level of student self-concept reported by teachers—as shown by the higher mean than the teacher-report mean. Perhaps children are centered more on their own accomplishments and improvements

than on others' as they have not yet fully developed capacity to understand others' achievements and how their own compare. Past research indicates that reports of self-concept tend to become more realistic and more related to teachers' ratings as children grow older and move into Grade 7 and higher (Fredricks & Eccles, 2002; Jacobs et al., 2002; Marsh, Craven, & Debus, 1998). Previous research has frequently collected only one source of information to assess children's self-concept, and the present study highlights the importance of obtaining multiple sources of information to gain a more complete understanding of children's development.

Parental Involvement and Achievement

Our results show that parental involvement in combination with student motivation and teacher-reported self-concept strongly predicts student achievement. When parents provide little encouragement to study and work hard at school, and give little positive feedback about their abilities and progress, their children are likely to show poor achievement. Thus, children who develop positive attitudes about learning that are supported by their parents' involvement in school activities are likely to do well academically.

In addition to this combined relationship, we found that parental involvement is directly related to achievement. This latter finding is supported by some previous research also showing this link between parental involvement and children's academic success (Englund et al., 2004; Fantuzzo et al., 1995; Marchant et al., 2001; McWayne et al., 2004). Hence, the extent to which parents actively promote learning in the home and have direct and regular contact with school has a positive and direct relationship with students' grades. For instance, children whose parents actively discuss homework, teachers, friends, future goals, and so on; participate in school-related activities (e.g., attend parent-teacher conferences, concerts, and sporting events); and generally promote hard work and good grades are likely to perform well in school. It is also likely that success at school invites parental involvement to praise and further encourage their children.

The interrelationships among parental involvement, self-concept, academic motivation, and achievement can be understood in terms of Eccles' theories of achievement. Eccles and her colleagues claim that the extent to which children value an activity guides their choices and performances on tasks. That is, children's perception of how important the task is, how much they enjoy doing the task, the physical and emotional costs of the task, and how a task fits into future plans influence whether a child values a particular task and is motivated to succeed. For instance, parents involved in their child's education actively promote the importance of doing well in school and discuss future academic goals (e.g., graduating from high school, attending university). Furthermore, highly involved parents encourage children to view school as a priority and limit their access to other activities (e.g., part-time job, friends, sports, shopping) to perform well in school. As a result, children may genuinely enjoy learning in school and view education as an important aspect of their life. In turn, children with high parental involvement in their education are likely to value academic success and be motivated to succeed.

In addition to Eccles' theories, the factors in our present model have been examined in other models of achievement. In a review of social and emotional processes related to achievement, Zins, Bloodworth, Weissberg, and Walberg (2007) identified numerous non-cognitive variables such as health, safety, motivation, and parental involvement. Although this framework is supported by empirical studies, the degree of association among such variables has not been determined empirically. Our present study advances these theoretical arguments of the relevance

of a variety of individual and family factors explaining why some children are at risk for poor school achievement. There are implications, moreover, for education and strategies for parents to help them support and motivate their children's learning at school to reduce the risk for academic failure.

Limitations

Although the proposed model adds to the research of factors related to school achievement, certain limitations should be considered. First, a relatively small proportion of students attending the selected elementary schools agreed to participate in the present study. Many school administrators told us that their families found the language complexity of the consent forms cumbersome and declined to participate.

Given the design of the present study, it is difficult to conclude whether the bi-directional relation between parental involvement and achievement is stable over time. For instance, it is possible that parents may be highly involved and provide assistance when children initially display poor academic success. However, over time parents may feel tired, discouraged and stressed, and possibly reduce personal efforts to help improve their child's academic experience. Longitudinal research is needed to investigate the causal relationship between parental involvement in children's education and academic achievement.

Our study's method may explain the relationship between achievement and self-concept. Specifically, achievement was measured using teachers' reports of school grades and their overall perception of children's achievement. Given that teachers' perceptions of children's sense of competence are likely influenced by children's performance in school, it stands to reason that teachers reported high levels of self-concept for those students who obtained high levels of achievement. Thus, it is not surprising that teacher ratings of academic achievement are related to teacher ratings of students' self-concept. In addition, the model includes only teacher reports of students' self-concept, because the students' reports prevented the model from fitting the data. Previous research has demonstrated a strong association between students' academic self-concept and achievement. Future research should attempt to supplement the present findings with multiple reports of students' academic self-beliefs to provide a more reliable measure of self-concept.

Third, the study focused on a specific number of factors as a simultaneous examination of every possible factor related to academic achievement was beyond the scope of the study. Clearly, the nature of academic achievement is complex, and other variables are likely to be related to students' academic success. Future research can consider factors such as students' intelligence, past achievement, and level of emotional and behavioural functioning; family factors such as parenting style and socio-economic status; and school factors such as class size, teachers' level of expertise, and school resources, as these may also be related to school performance. Despite these limitations, this study provides insights about several key factors that can be used to identify children who are at risk for academic failure. Early identification and support to parents are critical to increase at-risk children's opportunities for academic success.

References

- Anderman, E. M., Eccles, J. S., Yoon, K. S., Roeser, R., Wigfield, A., & Blumenfeld, P. (2001). Learning to value mathematics and reading: Relations to mastery and performance-oriented instructional practices. *Contemporary Educational Psychology*, 26(1), 76–95.
- Bentler, P. M. (2004). *EQS 6: Structural equations program manual*. Encino, CA: Multivariate Software.
- Bobbett, G. C., French, R. L., Achilles, C. M., & Bobbett, N. C. (1995, November). *An analysis of Nevada's report cards on high school*. Paper presented at the annual meeting of the Mid-South Educational Research Association Annual General Meeting, Biloxi, MI.
- Boulton, M. J., Bucci, E., & Hawker, D. D. S. (1999). Swedish and English secondary school pupils' attitudes towards, and conceptions of, bullying: Concurrent links with bully/victim involvement. *Scandinavian Journal of Psychology*, 40, 277–284.
- Broussard, S. C., & Garrison, M. E. B. (2004). The relationship between classroom motivation and academic achievement in elementary-school-aged children. *Family Consumer Sciences Research Journal*, 33(2), 106–120.
- Cole, D. A., Maxwell, S. E., Martin, J. M., Peeke, L. G., Seroczynski, A. D., Tram, J. M., et al. (2001). The development of multiple domains of child and adolescent self-concept: A cohort sequential longitudinal design. *Child Development*, 72(6), 1723–1746.
- Denissen, J. J. A., Zarrett, N. R., & Eccles, J. S. (2007). I like to do it, I'm able, and I know I am: Longitudinal couplings between domain-specific achievement, self-concept, and interest. *Child Development*, 78(2), 430–447.
- Durik, A. M., Vida, M., & Eccles, J. S. (2006). Task values and ability beliefs as predictors of high school literacy choices: A developmental analysis. *Journal of Educational Psychology*, 98(2), 382–393.
- Ebel, R. L., & Frisbie, D. A. (1986). *Essentials of educational measurement* (4th ed.). Englewood Cliffs, NJ: Prentice-Hall.
- Eccles, J. S. (1994). Understanding women's educational and occupational choices: Applying the Eccles et al. model of achievement-related choices. *Psychology of Women Quarterly*, 18, 585–609.
- Eccles, J. S., Adler, T. F., Futterman, R., Goff, S. B., Kaczala, C. M., Meece, J. L., et al. (1983). Expectations, values and academic behaviors. In J. T. Spence (Ed.), *Perspective on achievement and achievement motivation* (pp. 75–146). San Francisco: W. H. Freeman.
- Eccles, J. S., Roeser, R., Wigfield, A., & Freedman-Doan, C. (1999). Academic and motivational pathways through middle school. In L. Balter & C. S. Tamler-LeMonda (Eds.), *Child psychology: A handbook of contemporary issues* (pp. 287–317). Philadelphia: Psychology Press.
- Englund, M. M., Luckner, A. E., Whaley, G. J. L., & Egeland, B. (2004). Children's achievement in early elementary school: Longitudinal effects of parental involvement, expectations, and quality of assistance. *Journal of Educational Psychology*, 96(4), 723–730.
- Fan, X. (2001). Parental involvement and students' academic achievement: A growth modeling analysis. *Journal of Experimental Education*, 70, 27–61.
- Fantuzzo, J. W., Davis, G. Y., & Ginsburg, M. D. (1995). Effects of parental involvement in isolation or in combination with peer tutoring on student self-concept and mathematics achievement. *Journal of Educational Psychology*, 87(2), 272–281.
- Fitts, W. H., & Warren, W. L. (1996). *Tennessee self-concept scale* (2nd ed.). Los Angeles, CA: Western Psychological Services.
- Fredricks, J. A., & Eccles, J. S. (2002). Children's competence and value beliefs from childhood through adolescence: Growth trajectories in two male-sex-typed domains. *Developmental Psychology*, 38(4), 519–533.
- Fredricks, J. A., & Eccles, J. S. (2005). Family socialization, gender, sport motivation and involvement. *Journal of Sport Psychology*, 27(1), 3–31.

- Frome, P. M., Alfeld, C. J., Eccles, J. S., & Barber, B. L. (2006). Why don't they want a male-dominated job? An investigation of young women who changed their occupational aspirations. *Educational Research and Evaluation, 12*(4), 359–372.
- Glass, G. V., & Hopkins, K. D. (1996). *Statistical methods in education and psychology* (3rd ed.). London: Allyn and Bacon.
- Gonzalez-Pienda, J. A., Nunez, J. C., Gonzalez-Pumariega, S., Alvarez, L., Roces, C., & Garcia, M. (2002). A structural equation model of parental involvement, motivational and aptitudinal characteristics, and academic achievement. *The Journal of Experimental Education, 70*(3), 257–287.
- Gottfried, A. E. (1986). *Children's Academic Intrinsic Motivation Scale*. Lutz, FL: Psychological Assessment Resources.
- Gottfried, A. E., Fleming, J. S., & Gottfried, A. W. (2001). Continuity of academic intrinsic motivation from childhood through late adolescence: A longitudinal study. *Journal of Educational Psychology, 93*, 3–13.
- Gottfried, A. W., Gottfried, A. E., Cook, C. R., & Morris, P. E. (2005). Educational characteristics of adolescents with gifted academic intrinsic motivation: A longitudinal investigation from school entry through early adulthood. *Gifted Child Quarterly, 49*(2), 172–185.
- Guay, F., Marsh, H. W., & Boivin, M. (2003). Academic self-concept and academic achievement: Developmental perspectives on their causal ordering. *Journal of Educational Psychology, 95*(1), 124–136.
- Hays, W. L. (1994). *Statistics*. Belmont, CA: Thomson.
- Hecht, S. A., & Greenfield, D. B. (2002). Explaining the predictive accuracy of teacher judgments of their students' reading achievement: The role of gender, classroom behavior, and emergent literacy skills in a longitudinal sample of children exposed to poverty. *Reading and Writing: An Interdisciplinary Journal, 15*, 789–809.
- Jacobs, J. E., Lanza, S., Osgood, D. W., Eccles, J. S., & Wigfield, A. (2002). Changes in children's self-competence and values: Gender and domain differences across grades one through twelve. *Child Development, 73*(2), 509–527.
- Jacobs, J. E., Vernon, M. K., & Eccles, J. S. (2004). Relations between social self-perceptions, time use, and prosocial or problem behaviors during adolescence. *Journal of Adolescent Research, 19*(1), 45–62.
- Jeynes, W. H. (2005). Effects of parental involvement and family structure on the academic achievement of adolescents. *Marriage & Family Review, 37*(3), 99–115.
- Marchant, G. J., Paulson, S. E., & Rothlisberg, B. A. (2001). Relations of middle school students' perceptions of family and school contexts with academic achievement. *Psychology in the Schools, 38*(6), 505–519.
- Marsh, H. W. (1990). *Self Description Questionnaire (SDQ) II: A theoretical and empirical basis for the measurement of multiple dimensions of adolescent self-concept*. San Antonio, TX: The Psychological Corporation.
- Marsh, H. W., & Craven, R. G. (1991). Self-other agreement on multiple dimensions of preadolescent self-concept: Inferences by teachers, mothers, and fathers. *Journal of Educational Psychology, 83*(3), 393–404.
- Marsh, H. W., Craven, R., & Debus, R. (1998). Structure, stability, and development of young children's self concepts: A multicohort–multioccasion study. *Child Development, 69*, 1030–1053.
- Marsh, H. W., Parker, J. W., & Smith, I. D. (1983). Preadolescent self-concept: Its relation to self-concept as inferred by teachers and to academic ability. *British Journal of Educational Psychology, 53*(1), 60–78.
- Marsh, H. W., Smith, I. D., & Barnes, J. (1983). Multitrait–multimethod analyses of the self-description questionnaire: Student-teacher agreement on multidimensional ratings of student self-concept. *American Educational Research Journal, 20*(3), 333–357.

- McWayne, C., Hampton, V., Fantuzzo, J., Cohen, H. L., & Sekino, Y. (2004). A multivariate examination of parent involvement and the social and academic competencies of urban kindergarten children. *Psychology in the Schools, 41*(3), 363–377.
- Nansel, T. R., Overpeck, M., Pilla, R. S., Ruan, W. J., Simons-Morton, B., & Scheidt, P. (2001). Bullying behaviors among US youth: Prevalence and association with psychosocial adjustment. *Journal of the American Medical Association, 285*, 2094–2100.
- Obach, M. S. (2003). A longitudinal-sequential study of perceived academic competence and motivational beliefs for learning among children in middle school. *Educational Psychology, 23*(3), 323–338.
- Okpala, C. O., Okpala, A. O., & Smith, F. E. (2001). Parental involvement, instructional expenditures, family socio-economic attributes, and student achievement. *Journal of Educational Research, 95*, 110–115.
- Paulson, S. E. (1994). Relations of parenting style and parental involvement with ninth-grade students' achievement. *Journal of Early Adolescence, 14*, 250–267.
- Shumow, L., & Miller, J. D. (2001). Parents' at-home and at-school academic involvement with young adolescents. *Journal of Early Adolescence, 21*, 68–91.
- Simpkins, S. D., Davis-Kean, P. E., & Eccles, J. S. (2006). Math and science motivation: A longitudinal examination of the links between choices and beliefs. *Developmental Psychology, 42*(1), 70–83.
- Spinath, B., & Spinath, F. M. (2005). Longitudinal analysis of the link between learning motivation and competence beliefs among elementary school children. *Learning and Instruction, 15*, 87–102.
- Stipek, D., & Ryan, R. (1997). Economically disadvantaged preschoolers: Ready to learn but further to go. *Developmental Psychology, 33*(4), 711–723.
- Tabachnick, B. G., & Fidell, L. S. (1996). *Using multivariate statistics* (3rd ed.). New York: Harper Collins.
- Valentine, J. C., DuBois, D. L., & Cooper, H. (2004). The relation between self-beliefs and academic achievement: A meta-analytic review. *Educational Psychologist, 39*(2), 111–133.
- Wilson, V. (1989). *Academic achievement and aptitude testing: Current practices and test reviews*. Austin, TX: Pro-Ed.
- Zins, J. E., Bloodworth, M. R., Weissberg, R. P., & Walberg, H. J. (2007). The scientific base linking social and emotional learning to school success. *Journal of Educational and Psychological Consultation, 17*(2), 191–210.

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