



Moderators in the academic development of migrant Latino children attending after-school programs

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Abstract

The current study examines how certain ecological factors influence migrant Latino children's ($N = 94$) academic outcomes following their participation in an after-school program with intensive academic instruction. Hierarchical linear regression analyses indicated that children who made the greatest academic gains were acculturated in English, were from poorly functioning families, and had families with fewer parent–teacher contacts and less engagement with children's school activities. Moderating effects were found to differ by age group. Implications of the current study are that community services may wish to focus increased attention on reducing the level of academic risk in migrant Latino populations, that after-school programs may serve a protective function for children from relatively low-functioning families and families with less school involvement, and that timing of after-school services may be important to some aspects of children's development.

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1. Introduction

A great deal of interest has recently been generated in the links between children's after-school time and their trajectories in a number of developmental spheres (see Behrman, 1999). Some of this interest has focused on the association between time spent in formal after-school programs and children's academic performance (Hock, Pulvers, Deshler, & Schumaker, 2001; Keim, McWhirter, & Bernstein, 1996; Lepper, Drake, & O'Donnell-Johnson, 1997; McArthur, Lewis, & Bishay, 1996; Morris, Shaw, & Perney, 1990; Posner & Vandell, 1994). Continuing trends of academic failure in some populations of minority, urban, and rural children (Children's Defense Fund, 2000; Hammack, 1986; Lewit, 1992) have

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led some to argue that additional services for children are greatly needed (Carnegie Council on Adolescent Development, 1992). As a result, formal after-school youth enrichment programs have increasingly been offered to provide children with supervised and constructive after-school activities.

In the year 2000, the number of youth without some kind of after-school programming exceeded 11 million (Newman, Fox, Flynn, & Christeson, 2000). Not all children without formal after-school arrangements want or need academic services; however, increased funding from federal, state and local governments, the private sector, and philanthropic foundations has recently increased the availability of after-school programs with such an aim.

Given the great number of children in need of after-school services and the recent increases in funding, there is little empirical evidence indicating which populations of children may benefit from participation in after-school programs. Furthermore, little is known with respect to characteristics of children, their families, or their communities that may moderate these academic outcomes. The current study examines child- and family-level moderators of academic development in migrant Latino children participating in an academically intensive after-school program.

1.1. Empirical links between after-school program participation and academic outcomes

There is some support suggesting that after-school programming may be effective at ameliorating poor achievement. Hock et al. (2001) demonstrated that students who were learning disabled as well as nonlearning disabled students who were failing two or more academic courses earned improved grades if they were under the after-school tutelage of trained adults. Posner and Vandell (1994) also found that after-school programming with intensive academic and homework support improved academic achievement in low-income children. Finally, Morris et al. (1990) demonstrated that second- and third-grade children who received after-school tutoring demonstrated significantly greater increases in word recognition, passage reading, and spelling when compared to nontutored children.

Others, however, have found mixed (Lepper et al., 1997; McArthur et al., 1996; U.S. Department of Education, 2003d), null (Keim et al., 1996), and even iatrogenic (Carlson, 1985) effects of after-school tutoring programs. In summary, there is mixed evidence supporting a link between after-school programs and the enhancement of children's academic trajectories. This heterogeneity in findings is likely due in part to the heterogeneity in program participants, contexts, staff activities, and quality across evaluations, as well as a general lack of methodological rigor across program evaluations.

1.2. Need for intensive academic instruction in rural migrant Latino communities

Over the past decade, nationwide studies conducted by the Department of Education's National Center for Education Statistics demonstrate a significant and consistent achievement gap in reading (U.S. Department of Education, 2003a) and math (U.S. Department of Education, 2003b) achievement between fourth- and eighth-grade Latino students and their Caucasian cohorts. In 2003, compared to 83% of all Caucasian students, only 56% of Latino students were considered to be at or above basic reading proficiency levels (U.S. Department of Education, 2003a). This gap is slightly greater for mathematics achievement with 80% of Caucasian and 48% of Latino students at or above basic math proficiency.

Limited English proficiency and school drop-out are also challenges that schools currently face when providing educational opportunities to Latino students. According to the 1999 U.S. Census Bureau, 71%

of Latino youth ages 5–17 spoke another language at home. Furthermore, 23% had difficulty speaking English, making instruction in English-speaking classrooms difficult. Finally, Latino students are among the most likely to drop out of school. Compared to a 7% rate for Caucasian students and a 13% rate for African-American students, Latino students drop out at a rate of 28% (U.S. Department of Education, 2003c).

Rural and/or migrant Latino families are populations at special risk for serious academic difficulties. This is due in part to the paucity of social networks supporting migrant populations and the relative inexperience with English. Hampton, Ekboir, and Rochin's (1995) research with rural communities characterized by large portions of Latinos in California suggest that these communities lag behind other rural communities as well in national norms in educational attainment. Specifically, the average number of school years completed in rural communities with large portions of Latinos was 9.4, compared to 12.6 for other rural towns in California, and 12.7 years for the overall state average. Research has also established that rural and/or migrant Latinos demonstrate lower high school and college completion, as well as functional literacy skills, than both urban Latinos and Caucasians (Fratoe, 1981; Hampton et al., 1995; National Center for Educational Statistics, 2001). Finally, although the drop-out rate for Latinos in general is 28%, the drop-out rate for Latinos not born in the United States is 44% (U.S. Department of Education, 2003c). Taken together, results from these studies suggest that rural and/or migrant Latinos are at heightened risk for academic failure.

There is evidence that migrant Latino children may be at even greater risk for academic failure if remedial services are not provided early in the school-age years. Reading skills, in particular, must be learned early and well because most subsequent learning in subjects as diverse as science, social studies, and math depend upon reading ability (Morris et al., 1990). Furthermore, those children who fall behind in the early school-age years tend not to catch up with their peers (Bowman, Donovan, & Burns, 2000). Thus, there is a need for services to enhance the academic development of migrant Latino children. However, at present, little is known regarding potential moderators of this academic development.

1.3. Potential moderators of academic outcomes

The developmental trajectories in children's academic spheres are likely to be embedded in comprehensive ecological models that include important factors at the levels of individual, family, school, and community. Understanding each of these developmental ecologies strengthens researchers' ability to design and implement effective after-school programs that are tailored to specific populations. The current study focuses on child- and family-level moderators of children's academic outcomes, potentially resulting from after-school experience.

1.3.1. Age

Age may be one child-level variable that influences outcomes resulting from after-school participation. Although little to no research has been conducted comparing differential academic gains in younger and older school-aged children, one study found that after-school participation was associated with low levels of concurrent behavior problems in younger school-aged children, but high levels of concurrent behavior problems in older students (Vandell & Posner, 1999). The authors suggest that such findings may be an artifact of personal characteristics with older children being selectively enrolled in after-school programs because they have already shown significant behavior problems and are in need of adult supervision.

1.3.2. *Acculturation*

Acculturation may be another child-level factor influencing academic outcomes in special populations, such as Latino-Americans. Relevant aspects of acculturation include cultural characteristics of one's social group as well as language preference. In general, Latino students have been found to attain lower academic achievement and be more susceptible to other academic difficulties than Caucasian students (Buening & Tollefson, 1987). This may be due to less acculturated children's lack of proficiency with the English language, which may prevent them from grasping concepts taught to them in English-speaking classrooms. This may also be due to a lack of a social network familiar with the academic goals and expectancies in American schools.

1.3.3. *Family functioning*

There is a growing wealth of empirical evidence supporting a positive relationship between aspects of family functioning, such as close family relationships and reasonable family expectations, and academic development. Here, families that promote supervision by monitoring and supporting their child's homework while possessing authoritative parenting styles have been demonstrated to have children with greater school success (Steinberg, Lamborn, Dornbusch, & Darling, 1992). Furthermore, positive youth development has been linked to such family characteristics as warmth and well-balanced discipline (Rutter, 1979), as well as consistently and fairly enforced rules (Werner & Smith, 1982). Levitt, Guacci-Franco, and Levitt's (1993) results suggest links between positive family functioning and positive school outcomes in European, African-American, and Latino-American children. Specifically, they found that family support was positively related to achievement test scores and that this relation increased as children aged. The authors suggest that the increase in this relation is due to adolescents becoming increasingly competent in making use of support opportunities.

1.3.4. *Parent involvement with school*

A second potential family-level moderator of children's academic outcomes is parental level of involvement with their child's school. First, parent involvement with school may send clear messages to children that their schoolwork is important. Second, open and positive communication of common academic goals and expectancies across the home and school contexts may also provide a unified front by which parents and teachers make student expectations clear. Third, by actively organizing and monitoring children's time, helping them with homework, as well as participating in and discussing school matters, parents may be able to directly promote student achievement.

There are two domains of parent involvement with school that have been shown to be differentially related to academic achievement. First, high-quality parent engagement with their children's schools has been linked to positive academic development. Here, children's academic performance has been shown to profit from aspects of parents' involvement with school, such as quality of the parent-teacher interactions, as well as parents' engagement in children's educational activities at home and at school (Epstein & Lee, 1995; Fantuzzo, Davis, & Ginsburg, 1995; Henderson & Berla, 1994; Izzo, Weissberg, Kasprow, & Fendrich, 1999).

Conversely, quantitative aspects of parent involvement with school have been associated with negative academic and/or behavioral outcomes. For example, Izzo et al. (1999) found a negative relationship between the number of parent-teacher contacts and social-emotional skills in their 3-year longitudinal investigation of 1205 urban, kindergarten through third-grade children. They suggest that more frequent parent-teacher contact resulted from greater levels of either academic or behavioral

difficulty. Taken in concert, these findings suggest that different aspects of parent involvement with school may be associated with academic achievement in different ways, with qualitative aspects of involvement positively related to children's academic performance and the quantity of parent–teacher contacts negatively related to children's academic performance.

Latino students with parents who value education and actively participate in their children's schooling have been found to have a better chance at academic success (Delgado-Gaitan, 1988). This may be due to benefits related to increased parent visits to school, parent–teacher communication about goals and expectations, and participation in activities with other parents in school organizations. However, in general, minority parents tend to demonstrate lower levels of involvement with schools (Lynch & Stein, 1987; Moles, 1993). This may be due, in part, to the positive relationships among parent–school involvement, SES (Reynolds, Weissberg, & Kaspro, 1992), and parental level of education (Dauber & Epstein, 1993), as well as a negative relation between school involvement and family mobility (Reynolds et al., 1992).

1.4. Hypotheses

The current study examined how certain child- and family-level factors influence the academic impact of *Generacion Diez* (G-10), an after-school program for migrant Latino children in middle childhood, after other important variables are taken into account. The study tested four specific hypotheses. The first was that higher levels of acculturation were expected to enhance children's outcomes potentially resulting from participation in the G-10 after-school program. This was hypothesized because it is believed that more acculturated children possess greater English proficiency skills, allowing them to grasp academic concepts taught in English-speaking classrooms. It was also believed that more acculturated children have greater involvement with social networks familiar with the academic goals and expectations of American schools.

The second hypothesis was that children with higher functioning families, that is, those whose mothers' report high levels of shared family duties, reasonable family expectations, and close family relationships, would demonstrate greater increases in their academic outcomes than children from lower functioning families. Members from highly functioning families may be able to communicate reasonable educational goals and expectations as well as possess greater emotional availability necessary to support children's academic development (Franco & Levitt, 1998; Levitt et al., 1993). Third, the number of parent–teacher contacts were hypothesized to be associated with increases in children's academic problems. The final hypothesis was that children whose parents report greater engagement in school activities would demonstrate greater academic gains while enrolled in G-10. The final two hypotheses were based on Izzo et al.'s (1999) research suggesting that different aspects of parent–teacher involvement are related to achievement in different ways.

2. Method

2.1. Participants

At pretest, the sample contained each of the 94 Latino students in the G-10 program. The mean age was 102.3 months (range 75–148 months). Forty-one of the participants were male and 53 were female.

Participants attended one of three school-based sites located in one rural Pennsylvania county. Site 1 contained 31 participants, Site 2 contained 32 participants, and Site 3 contained 31 participants. Twenty-four percent of the children were in the first grade, 26% were in the second grade, 16% were in each of third and fourth grades, 12% were in the fifth grade, and 6% were in the sixth grade.

Eighty percent of the 94 children were enrolled in the program for the entire 7 months, 3% were enrolled for 6 months, 8% were enrolled for 5 months, 4% were enrolled for 4 months, and 5% were enrolled for 3 months. Twenty-one percent of the children attended G-10 for less than 2 days per week, 26% attended between 2 and 3 days per week, 39% attended between 3 and 4 days per week, and 11% of the children attended G-10 between 4 and 5 days per week.

Due to issues related to the resident status of many of the families, the staff did not ask questions related to SES or length of U.S. residence. The staff believed that families would not have been comfortable answering these questions and would have yielded unreliable responses.

Furthermore, all immigrant parents were seriously economically depressed and had no formal education in the United States. Therefore, SES data would have suffered from serious range restriction.

2.2. Procedure

Children were selected into the program based on referrals solicited from three major school districts within the Pennsylvania county, as well as from the Office of Children and Youth and the Migrant Health Services agencies. To be selected, children had to meet at least one of the following criteria: (1) academic performance, especially in reading and writing, was poor and below grade-level; (2) poor classroom conduct (e.g., poor self-control, socially withdrawn); or (3) low parent participation or involvement in school.

A mixture of Latino and non-Latino individuals staffed G-10. Each site had a bilingual program director, two head teachers, and a number of volunteer staff. The number of volunteers varied by site, with one to three volunteers assisting children during homework time. Half of the head teachers and many of the volunteers were bilingual.

When children arrived at G-10, they were separated into two groups based on grade; first to third graders, and fourth to sixth graders. The afternoon started with a snack and homework period. When children completed their homework, and if time allowed, they participated in group activities ranging from indoor games, outdoor play, to field trips. These activities often included integration of academic concepts.

After the group activity, children were taught a lesson from either of two curricula. The first, an academic achievement curriculum, was taught twice weekly for 30–45 min per day and it focused on age-appropriate instruction in traditional school subject areas (i.e., reading, spelling, and mathematics). The second curriculum, Promoting Alternative THinking Strategies (PATHS) is a comprehensive curriculum that promotes social and emotional competence in elementary school-aged children (see [Kusche & Greenberg, 1994](#) for a description of PATHS).

2.3. Design

Pre- and posttest data were collected on all child academic measures. Groups of four to five children at a time completed academic assessments in quiet, unused classrooms. Pretest collection was completed by the end of October and posttest collection was conducted at the end of May. Measures of children's

acculturation, family function, and parent involvement with school were all collected by trained G-10 home educators. At pretest, parents completed reports of family functioning and parent–school involvement, and children completed self-reports of acculturation.

2.4. Measures

2.4.1. Independent measures

2.4.1.1. Child-level predictor: Child report of acculturation. The Short Acculturation Scale for Hispanics-Youth Version (SASH-Y; Marin, Sabogal, Marin, Otero-Sabogal, & Perez-Stable, 1987) is a 12-item measure assessing the predominant language used (8 items) in different contexts of children's day (i.e., reading, speaking, thinking, and television/radio) and the predominant ethnicity of a child's social group (4 items; i.e., close friends and visitors). Children were given the option to complete the form in either Spanish or English. During this assessment, children answered questions on a five-point Likert scale with 1 indicating *only Spanish*, 3 indicating *both Spanish and English equally*, and 5 indicating *only English*. The overall 12-item Cronbach's α scale reliability for the current sample was .93. The SASH-Y has been found to be significantly related to generational status, $r = .65$, age of arrival in the United States, $r = -.69$, and length of residence in the United States, $r = .70$ (Marin et al., 1987).

2.4.1.2. Family-level predictor: Parent report of family functioning. The Family Assessment Measure-III (FAM-III; Skinner, Steinhauer, & Sitarenios, 2000) measures family strengths and weaknesses. The FAM-III is based on the Process Model of Family Functioning and was completed by mothers of children in G-10.

The three scales include general (50 items; e.g., family duties are fairly shared), self-rating (42 items; e.g., my family expects too much of me), and dyadic (42 items; e.g., this person and I are not close to each other) ratings. Mothers responded using a four-point Likert scale with 1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strongly agree. Cronbach's α values for these three scales were .93, .89, and .95, respectively. To preserve power, these three scales were combined to form a single indicator of family functioning ($M = 50$; $SD = 10$), with an overall α of .64. Scores were reversed for ease of interpretation so that high scores indicated higher levels of family functioning. The FAM-III has been employed to successfully discriminate families with and without a host of stresses, diseases, as well as behavioral and emotional problems (Bernstein & Borchardt, 1996; Hundert, Cassie, & Johnson, 1988; Skinner et al., 2000; Woodside, Shekter-Wolfson, Garfinkel, & Olmstead, 1995).

2.4.1.3. Family-level predictor: Parent reported parent involvement with school. The Parent–Teacher Involvement Scale (PTI; Conduct Problems Prevention Research Group [CPPRG], 1991) is a 26-item measure developed to assess facets of parent and teacher involvement. One item was removed because it was deemed by G-10 staff to be culturally insensitive for the current sample. Two subscales of the PTI were used in the current study. The first, frequency of contact that occurs between parents and teachers (e.g., in the past year, you stopped by your child's school to talk to his/her teacher), is a four-item Likert scale with an α of .72. The second is a nine-item Likert scale where parents reported the frequency with which they engaged in activities (e.g., reading to their children, taking them to the library, and volunteering at school). Cronbach's α for this subscale was .89. For both subscales, a response of 0 indicated no contact/engagement, 1 indicated contact/engagement occurring once or twice a year, 2

indicated contact/engagement occurring once every month, 3 indicated contact/engagement almost every week, and 4 indicated contact/engagement more than once per week. The measure was translated into Spanish by two G-10 staff to ensure reliable translation.

2.4.2. Dependent measure: Academic achievement

The Wide Range Achievement Test-Revised (WRAT-R; Jastak & Wilkinson, 1984) was administered to all children. It consists of three subtests: reading (42 items; i.e., recognizing and naming letters and words); spelling (40 items; i.e., writing symbols, name, and words); and arithmetic (40 items; i.e., solving oral problems and written computations). Test–retest reliabilities for each of the subtests range from .91 to .98 (Jastak & Wilkinson, 1984). Administration of the WRAT-R takes approximately 10–15 min with the number of items completed dependent upon the child’s level of academic proficiency; more proficient children proceed further into the test. As the WRAT-R is standardized for children at 6-month intervals, it can “control” for normative gains in academic achievement over the school year.

3. Results

3.1. Model

Hypotheses were tested using a series of hierarchical linear regressions with posttest academic achievement (WRAT-R) entered as the dependent measure. Independent measures were entered in steps. Step 1 covaried children’s pretest age, site, attendance, and the pretest score of the dependent measure. Step 2 contained children’s acculturation score. Mother-reported family functioning was entered at Step 3. Step 4 consisted of the score for quantity of parent–teacher contact. Step 5 contained the degree of parents’ academic engagement with their children’s school activities.

The above model tested the amount of variance in posttest academic outcomes that each step in the regression is responsible for, after each preceding step has been taken into account. For example, the second step tested the variance in achievement outcomes accounted for by acculturation, after taking children’s age, attendance, pretest score, and program site into account. Order of entry into the regression model was determined based on the rationale that each preceding step was likely to influence all subsequent steps in the model. Models were tested for the entire sample of children, for children younger than 8 years of age, and for children 8 years of age and older. Models were tested for the two different age groups to determine whether the independent variables moderated academic gains differentially by age.

3.2. Management of missing data

Sixteen percent of all data points were missing. The majority of the data were missing for one of two reasons. The first is that children randomly missed school on the days that the WRAT was administered. The second is that a small number of children enrolled in the program after the completion of pretest data collection. A single imputed data set was obtained from EM parameters to replace this missing data (Graham, Hofer, Donaldson, MacKinnon, & Schafer, 1997). In cases where the imputation generated values outside the range for a particular measure, the value was rounded to either the maximum or minimum value for that measure.

3.3. Descriptive analysis

Table 1 presents demographic and baseline scores for the entire sample, for the younger group and for the older group. As expected, children's pretest reading and spelling scores were more than one standard deviation below standardized norms ($M = 100$, $SD = 15$; Jastak & Wilkinson, 1984). Thus, this sample of children was at considerable risk for academic failure. Children's mean level of acculturation indicates that they spoke slightly more Spanish than English and had slightly more Latino friends than Caucasian friends.

The FAM-III score shows that the family functioning of the Latino parents in this sample was almost one full standard deviation better (SD of standardized sample = 10) than the standardized mean of 50 (Skinner et al., 2000). Therefore, it could be that even the relatively poor functioning families are functioning in the average range. However, there is a great deal of research demonstrating that, compared to European-American families, Latino-American families have both larger and more cohesive social networks (Gamble & Dalla, 1997; Levitt et al., 1993; MacPhee, Fritz, & Miller-Heyl, 1996; Miller & Harwood, 2001; Miller-Loncar, Erwin, Landry, Smith, & Swank, 1998). Furthermore, Latino-Americans have been found to rely on their families for support, to approach their parents for advice, report more positive attitudes toward their parents, and have a greater amount of respect for their parents than European-Americans (Suarez-Orozco & Suarez-Orozco, 1995; Zayas, 1994). Thus, it may be expected that these Latino families would function at higher levels than national norms. It may also be expected that those Latino families demonstrating average scores compared to an American standard are indeed demonstrating below average levels of family functioning by Latino standards.

The mean score regarding the quantity of parent–teacher contact indicates that parents had contact with their children's teachers an average of “once or twice a year.” The mean score of parent engagement with children's school activities indicates that parents were engaged in their children's educational process “once or twice a year.”

Table 1
Mean (and SD) scores on the pretest assessments

Variable	Age group						p^a
	All ($N = 94$)		Younger ($n = 45$)		Older ($n = 49$)		
	Mean	SD	Mean	SD	Mean	SD	
Child age	102.30	19.02	85.98	6.98	117.29	13.31	.01
Attendance	87.01	35.34	89.11	37.28	85.08	33.73	
Acculturation	2.53	0.90	2.31	0.63	2.74	1.05	.05
Family function	59.17	7.82	59.45	8.05	58.91	7.66	
Quantity of PTI	0.99	0.90	0.98	0.99	1.01	0.82	
P–S engagement	0.94	1.24	0.95	1.25	0.94	1.24	
Reading	80.99	14.67	84.69	13.98	77.59	14.61	.05
Spelling	83.05	13.58	87.00	11.66	79.43	14.30	.01
Math	89.02	15.23	88.45	17.70	89.54	12.93	

PTI = PTI scores for frequency of parent–teacher contact; P–S engagement = PTI scores for frequency of engagement in various school-related activities.

^a $p = p$ value of t in tests of differences between younger and older students.

Table 2
Correlations among pretest scores with age of child partialled out ($N = 94$)

Variable	1	2	3	4	5	6	7
(1) Attendance							
(2) Acculturation	-.27**						
(3) Family functioning	.09	.04					
(4) Quantity of PTI	.04	-.04	.23*				
(5) P–S engagement	-.30**	.32**	.04	.05			
(6) Reading	.15	.24*	.14	-.07	-.06		
(7) Spelling	.02	.26*	.05	-.06	-.11	.76**	
(8) Math	.03	.01	-.07	.12	-.22*	.42**	.38**

PTI = PTI scores for frequency of parent–teacher contact; P–S engagement = PTI scores for frequency of engagement in various school-related activities.

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

3.4. Correlational analysis

Table 2 displays the correlation coefficients among pretest variables with child age partialled out. Children who attended the program fewer days were more acculturated and had parents who were less engaged with their schooling. High levels of acculturation were positively related to parent reports of more engagement with children's schooling, and to both reading and spelling achievement. Family functioning scores were positively related to quantity of parent–teacher involvement. Parents who reported more engagement with their children's schooling had children who had significantly lower math achievement.

3.5. Pre- to posttest change in academic achievement

Paired samples t tests were performed to determine if children's academic achievement changed significantly from pre- to posttest. From pre- to posttest, children's scores increased significantly in reading [M s (and SD s) = 80.99 (14.67) and 88.81 (13.93) for pre- and posttest, respectively]; in spelling [83.05 (13.58) versus 91.75 (12.86)]; and in math [89.02 (15.23) versus 97.94 (15.32)]; t s(92) = 5.99, 7.04, and 5.17, respectively; p s < .01.

3.6. Regression models testing moderation of change

3.6.1. Moderators of change in reading achievement

Acculturation, family functioning, quantity of parent–teacher contact, and parents' engagement with their children's school activities were all hypothesized to predict change in children's reading achievement over a 7-month period. Standardized β s, R^2 , and change in R^2 are shown for each of the three models (all children, children younger than age 8, and children 8 years of age and older) in Table 3. For the entire sample of children ($N = 94$), acculturation [$F(1,88) = 6.82, p < .01$]¹ and parent engagement in children's school activities [$F(1,85) = 4.81, p < .05$] were significantly related to

¹ The degrees of freedom for each of the three models decrease by 1 with the addition of each variable.

Table 3

Predictors of change in reading achievement scores over period of G-10 program

Step and variable	Age group											
	Entire sample				Younger children				Older children			
	<i>R</i>	β	<i>R</i> ²	ΔR^2	<i>R</i>	β	<i>R</i> ²	ΔR^2	<i>R</i>	β	<i>R</i> ²	ΔR^2
(1) Covariates			.50	.50**			.26	.26**			.52	.52**
Age	-.57	-.45			-.39	-.12			-.53	-.23		
Site	-.06	-.15			.01	-.08			-.23	-.11		
Pretest score	.61	.35			.42	.16			.69	.44		
Attendance	-.03	-.06			.07	-.04			-.18	.00		
(2) Acculturation	.26	.27	.53	.03**	.35	.26	.34	.08*	.42	.25	.56	.04
(3) Family functioning	-.07	-.09	.55	.02	-.39	-.24	.42	.08*	.15	.04	.57	.01
(4) Quantity of PTI	-.13	-.07	.55	.00	-.56	-.34	.55	.07**	-.26	-.17	.58	.01
(5) P–S engagement	-.06	-.17	.58	.03*	-.38	-.30	.62	.07*	-.18	-.03	.58	.00

PTI = PTI scores for frequency of parent–teacher contact; P–S engagement = PTI scores for frequency of engagement in various school-related activities.

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

improved reading achievement over the course of the G-10 program. These findings indicate that more acculturated children and those whose parents had less engagement with school activities at Time 1 demonstrated significantly greater gains in reading from Time 1 to Time 2.

For children younger than 8 years old ($n = 45$), acculturation [$F(1,39) = 4.47, p < .05$], family functioning [$F(1,38) = 5.43, p < .05$], quantity of parent–teacher contacts [$F(1,37) = 10.46, p < .01$], and parent engagement on children’s school activities [$F(1,36) = 6.22, p < .01$] were all significantly related to change in reading achievement. These findings indicate that more acculturated children, children from lower functioning families, children whose parents had fewer contacts with teachers, and children whose parents were less involved in their children’s school activities at Time 1 demonstrated significantly more gains in reading achievement across the school year. For children 8 years and older ($n = 49$), none of the assessed variables predicted change in children’s reading achievement.

3.6.2. Moderators of change in spelling achievement

Regression findings for spelling achievement are shown in Table 4. For the entire sample, acculturation [$F(1,88) = 15.80, p < .01$], family functioning [$F(1,87) = 7.07, p < .01$], and parent engagement in their children’s school activities [$F(1,85) = 6.47, p < .01$] were significantly related to change in children’s spelling achievement. These findings indicate that more acculturated children, children whose families are functioning at a lower level, and children of parents who report less school engagement demonstrated greater gains in spelling achievement.

As can be seen in Table 4, for children younger than 8 years old, acculturation [$F(1,39) = 11.00, p < .01$], family functioning [$F(1,38) = 7.44, p < .01$], quantity of parent–teacher contacts [$F(1,37) = 9.72, p < .01$], and parent engagement in their children’s school activities [$F(1,36) = 6.06, p < .05$] were significantly related to change in spelling achievement over the course of the G-10 program. These findings indicate that more acculturated children, children from lower functioning families, children from families with less parent–teacher contact, and children whose parents were less engaged in their

Table 4
Predictors of change in spelling achievement scores over period of G-10 program

Step and variable	Age group											
	Entire sample				Younger children				Older children			
	<i>R</i>	β	R^2	ΔR^2	<i>R</i>	β	R^2	ΔR^2	<i>R</i>	β	R^2	ΔR^2
(1) Covariates			.53	.53**			.23	.23**			.51	.51**
Age	-.67	-.58			-.42	-.16			-.53	-.20		
Site	.06	-.06			.15	.06			-.13	-.09		
Pretest score	.59	.23			.32	.00			.67	.44		
Attendance	-.01	.04			.19	.12			-.23	.06		
(2) Acculturation	.29	.36	.60	.07**	.48	.38	.40	.17**	.50	.41	.57	.06*
(3) Family functioning	-.16	-.16	.63	.03**	-.40	-.28	.50	.10**	-.06	-.23	.60	.03*
(4) Quantity of PTI	-.10	-.01	.63	.00	-.49	-.30	.60	.10**	.20	.19	.64	.04*
(5) P-S engagement	-.10	-.18	.66	.03**	-.39	-.28	.66	.06*	.07	-.10	.65	.01

PTI = PTI scores for frequency of parent–teacher contact; P–S engagement = PTI scores for frequency of engagement in various school-related activities.

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

children's school activities at Time 1 demonstrated significantly more gains in spelling achievement from Time 1 to Time 2.

For children 8 years and older, acculturation [$F(1,43) = 6.04, p < .05$], family functioning [$F(1,42) = 4.16, p < .05$], and quantity of parent–teacher contacts [$F(1,41) = 4.50, p < .05$] were significantly related to change in spelling achievement. These findings indicate that more acculturated children, children from families with more parent–teacher contact, and children from lower functioning families demonstrated significantly greater gains in spelling achievement.

3.6.3. Moderators of change in math achievement

Regression findings for math achievement are shown in Table 5. For the entire sample, parent engagement with children's school activities [$F(1,85) = 22.38, p < .01$] was significantly related to change in math achievement; children whose parents reported less engagement with their children's school activities at Time 1 showed greater gains in math achievement across the school year.

For children younger than 8 years, parents' school engagement was significantly related to change in math achievement [$F(1,36) = 4.41, p < .05$], indicating that parents who were less engaged in school activities had children with the greatest gains. For children 8 years and older, family functioning [$F(1,42) = 5.55, p < .05$] and parent engagement with school activities [$F(1,40) = 8.83, p < .01$] were significantly related to change in math achievement; children from lower functioning families and those whose parents had less school engagement demonstrated the greatest gain in math achievement.

4. Discussion

At the time of the pretest, children in G-10 were one standard deviation below norms for reading and spelling, and two thirds of a standard deviation below the norm for mathematics performance. The fact that children were farther behind in reading and spelling than they were in mathematics may be

Table 5
Predictors of change in math achievement scores over period of G-10 program

Step and variable	Age group											
	Entire sample				Younger children				Older children			
	<i>R</i>	β	<i>R</i> ²	ΔR^2	<i>R</i>	β	<i>R</i> ²	ΔR^2	<i>R</i>	β	<i>R</i> ²	ΔR^2
(1) Covariates			.35	.35**			.32	.32**			.48	.48**
Age	-.53	-.54			-.54	-.39			-.54	-.49		
Site	.11	.00			.02	.03			.13	-.01		
Pretest	.30	.15			.14	.02			.56	.26		
Attendance	.09	-.01			.26	.11			-.09	-.09		
(2) Acculturation	.03	.20	.36	.01	.23	.14	.34	.02	.05	.19	.49	.00
(3) Family functioning	-.17	-.16	.38	.02	-.08	-.10	.34	.00	-.30	-.21	.55	.06*
(4) Quantitative PTI	-.02	.10	.38	.00	-.04	.12	.34	.00	.10	.00	.55	.00
(5) P–S engagement	-.31	-.41	.51	.13**	-.31	-.31	.41	.07*	-.35	-.44	.63	.08**

PTI = PTI scores for frequency of parent–teacher contact; P–S engagement = PTI scores for frequency of engagement in various school-related activities.

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

attributable to migrant Latino children having less experience with the English language. One important implication, given research suggesting that Latino-Americans are at special risk for academic failure (Fratoe, 1981; Hampton et al., 1995; National Center for Educational Statistics, 2001; Walker, 1987) and analyses demonstrating that children in the G-10 program were at elevated risk for failure in reading, spelling, and math achievement, is that community services may wish to focus increased attention on reducing the level of academic risk in migrant Latino populations.

After 9 months of the G-10 program, children had significantly increased their achievement scores by approximately one-half standard deviation in each academic subject. Increases in reading achievement were comparable for both age groups. However, older children's gains in spelling and in math achievement were large with age, site, and pretest accounting for a large proportion of variance in the posttest scores. Therefore, academic achievement appears to be relatively stable in older children and less so in the younger children. Findings of greater stability in academic achievement scores for older children are consistent with previous research, suggesting that once children fall behind in academics, they may have a difficult time catching up (Bowman et al., 2000).

Very little variance in children's achievement was accounted for by attendance rates. This was somewhat surprising given that there was the expectation that children who received a greater dosage of the G-10 program would make greater gains in achievement. There also appears to have been enough variability in attendance rates for this to have occurred. It is unclear why attendance appears to have had little effect on achievement. However, similar analyses of the social development of G-10 children did show that those children who have more G-10 attendance demonstrated greater gains in social competence as well as decreases in behavior problems (Riggs & Greenberg, submitted for publication).

The evaluation design of the current study lacked a control group with which to compare effects of the G-10 program. As a result, inferences regarding the efficacy of the G-10 program would be inappropriate. However, this was not the main thrust of the current investigation. The current study investigated the relationship between child- and family-level factors and the academic development of children who did attend the G-10 after-school program. Analyses examined how age, child acculturation,

family functioning, and parents' involvement with their children's school and school activities were related to change in children's academic functioning.

The relationship between the ecological variables and children's academic development depended upon the academic subject under investigation as well as the age of the children. Acculturation had its greatest links with reading and spelling achievement. As hypothesized, more acculturated children in both age groups demonstrated greater gains in spelling achievement, and more acculturated younger children demonstrated greater gains in reading achievement. One possible reason for these findings is that more acculturated children had greater English proficiency, and as a result, may have been better able to grasp, and benefit from, academic instruction presented to them in English. Conversely, children who were less acculturated may have been less proficient in English and had greater difficulty making strides in subjects dependent upon English mastery. This hypothesis is supported by null findings in the relation between acculturation and math achievement at both age groups. Here, a lack of a significant relation between acculturation and math may be due, in part, to math being less reliant upon mastery of English.

Although English language use is one important aspect of acculturation, it may not only be English proficiency that is driving these relations. Because children's academic abilities (i.e., reading and spelling) were controlled for by entering pretest achievement scores in the first step of the regression model, the variation explained by acculturation in these models is likely *in addition to* that which can be explained by English proficiency. Furthermore, fully one third of the items on this measure of acculturation assess the predominant cultural background of children's social groups. Thus, a second possible reason for the link between acculturation and gains in academic success is that more acculturated children may have friends who are more familiar with, or hold more favorable attitudes, toward achievement in an American educational system, a possibility that can be investigated in subsequent studies.

In addition, educators may be able to make use of this information provided by the present study by grouping less acculturated children with more acculturated children throughout the school day. Such group work may be mutually beneficial for children who are both more and less acculturated. Less acculturated children may benefit from those more familiar with dominant attitudes toward achievement, whereas more acculturated children may benefit from instructing those less familiar with American academic standards.

The relation between the level of family function and academic achievement depended upon the age of the participants. In younger children, lower levels of family functioning were related to significant gains in reading and spelling achievement. In older children, lower levels of family functioning were linked to significant gains in spelling and math scores. These results are contrary to the proposed hypothesis that higher levels of family function would be related to increases in academic achievement. However, these results suggest that the G-10 program may have been beneficial for those who were in the most need, specifically children from relatively poorer functioning families.

The fact that children from relatively poorer functioning families made the greatest academic gains suggests that the G-10 program may have protected them from the influence of this potential risk factor on the development of academic problems. This has implications, not only specifically for after-school programs, but also for prevention programs in general. Here, findings support the contention that prevention programs can enable children at risk to better handle developmental challenges, enhance support provided by developmental contexts, and/or offset exposure to risk factors (Coie et al., 1993; Tolan & Gorman-Smith, 2002).

The quantity of parent–teacher involvement appeared not to influence children’s academic development when considering the entire sample of children. However, as hypothesized, younger children whose parents were less likely to have contact with their teachers made significantly greater strides in their reading and spelling than did children whose parents had higher rates of parent–teacher contact. This may also be due to the G-10 program’s ability to offset any negative consequences that may occur as a result of parent’s unwillingness or inability to participate in their children’s academic activities.

Lower pretest levels of parent engagement with children’s school activities were related to increases in all three domains of academic achievement. However, this was only consistently true when considering the subsample of children younger than age 8. For older children, this relation was only found for math achievement. These findings are contrary to the hypotheses, but again may suggest that the G-10 program was most beneficial for children at highest risk: children from families with poorer family functioning and lower levels of parent engagement with their children’s schooling.

The overarching pattern of family-level findings is that after-school programs may have significant compensatory influences on the academic development of children from relatively poor functioning families. Current analyses suggest that the G-10 program may have buffered children from the potential ill effects of low-functioning families and low levels of parent engagement in their children’s schooling by providing an alternative context during which children could develop their academic competencies. These findings are congruent with research demonstrating that after-school programs may buffer other populations of children at risk for developmental difficulties, such as those from low SES and/or urban families (Caughy, DiPietro, & Strobino, 1994; Halpern, 1992; Posner & Vandell, 1994) and those with low cognitive abilities (National Institute of Child Health and Development Early Child Care Research Network, 2002).

Due to G-10’s potential to buffer children from these family-level deficits, it may behoove after-school providers to give preference for admission to children in families that are exhibiting signs of poor functioning and lower engagement in children’s school activities. This may be employed to exact the greatest possible impact on the lives of the children served. This is not to say that children from functional families be denied participation in after-school services. However, enrollment in after-school programs is often limited, and if children who are most in need of those services are also those who can make the greatest strides in academic development, then priority of enrollment for these children may be warranted.

Yet another implication of the current investigation is that the timing of after-school services may be important to some aspects of children’s development. The current analysis suggests that the G-10 program may have its greatest buffering effect on children’s reading achievement in the early years. Therefore, after-school providers may want to focus academic curricula on children’s reading achievement early in grade school. Such a strategy may prove critical in that it appears that establishing a solid foundation of reading skills early in life appears to be very important for children’s future academic development (Bowman et al., 2000; Morris et al., 1990).

Due to the voluntary nature and selection processes of most after-school programs, children are rarely randomly assigned to after-school and non-after-school conditions. As a result, it is often difficult to determine whether positive impacts can be attributed to the program itself, or to other factors such as biases that result from selection. In the current study, children were referred to G-10 based on academic and/or social difficulties. Therefore, the current study could not address this selection bias, and generalization of current findings to after-school programs that do not serve this particular population of children and families would be inappropriate.

Evaluations of after-school programs also often lack a control group of children with whom to compare outcomes (Grossman et al., 2002). This weakness limits researchers' ability to rule out factors not attributable to the after-school program, such as maturation, as causes for developmental change. The evaluation design of current study also lacked a control group that would enable us to establish whether the results were due to the program. In addition, although the WRAT is a standardized measure, it was not standardized to the specific population being investigated. Thus, factors not attributed to the G-10 after-school program, such as typical development of migrant Latino children, cannot be completely ruled out.

5. Conclusion

The current study examined how specific child- and family-level factors are related to children's outcomes following their participation in the G-10 after-school program. Results suggest that children increased their academic skills by nearly one full standard deviation. Evidence supported the notion that, in general, more acculturated children and children from families demonstrating relatively greater levels of risk (i.e., those from poorly functioning families and those with parents reporting less engagement with their children's school activities) made the greatest strides in their academic development.

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