Published in final edited form as:

Prev Sci. 2014 December ; 15(6): 929–939. doi:10.1007/s11121-013-0454-y.

School Engagement Mediates Long Term Prevention Effects for Mexican American Adolescents

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Abstract

This five year follow-up of a randomized clinical trial evaluated the efficacy of a family-focused intervention delivered in middle school to increase school engagement following transition to high school (2 years posttest), and also evaluated mediated effects through school engagement on multiple problem outcomes in late adolescence (5 years posttest). The study sample included 516 Mexican American adolescents who participated in a randomized trial of the Bridges to High School Program (*Bridges/ Puentes*). Path models representing the direct and indirect effects of the program on four outcome variables were evaluated using school engagement measured in the 9th grade as a mediator. The program significantly increased school engagement, with school engagement mediating intervention effects on internalizing symptoms, adolescent substance use, and school dropout in late adolescence when most adolescents were in the 12th grade. Effects on substance use were stronger for youth at higher risk based on pretest report of substance use initiation. There were no direct or indirect intervention effects on externalizing symptoms. Findings support that school engagement is an important prevention target for Mexican American adolescents.

Keywords

school engagement; mental health; substance use; school dropout; prevention

An impressive body of evidence has shown that family and youth focused interventions work to prevent a range of emotional, behavioral, and social problems, and they have a cost-beneficial economic impact when delivered in education, criminal justice, social and health services systems (NRC/IOM, 2011). Evidence also indicates that many interventions have cascading effects by which adaptive behaviors in one domain spill over to influence functioning in other domains (Catalano & Hawkins, 1996), supporting that common pathways can lead to multiple endpoints (e.g., Cicchetti & Rogosch, 1996). Identifying common pathways is critical to support prevention programs in community settings that

have differing priorities. For example, if interventions that prevent mental health and substance abuse problems also impact key academic outcomes, they offer more compelling justification for schools to adopt and sustain them.

Investment and bonding to school, hereafter termed “school engagement,” is an intervention target that may provide a key pathway to the prevention of multiple youth problems such as alcohol and drug use, emotional and behavioral problems, and school dropout (Hawkins, Catalano, Kosterman, Abbot, & Hill, 1999). The current study tests this hypothesis using long-term follow-up data from a randomized controlled trial of the *Bridges to High School Program (Bridges)*, a combined parent- and youth-focused intervention that aimed to increase school engagement and decrease mental health symptoms and risky behaviors following middle school transition. Outcome analyses with a sample of 516 Mexican American students showed intervention effects on school engagement at post-test (7th grade) for adolescents in families that participated in the Spanish version of the program (predominantly immigrant, low acculturated), but not for those that participated in English (Gonzales et al., 2012). Study goals were twofold: (1) to test effects on school engagement in 9th grade, following transition to high school, and (2) to examine whether 9th grade school engagement mediated intervention effects on academic, emotional, and behavioral outcomes at 5 years posttest when most students were in 12th grade.

Mexican American Youth and the Bridges/ Puentes Program

Mexican American youth are the largest ethnic subgroup in the United States and their representation in the public school system is rapidly growing (U.S. Census Bureau, 2011). Across several indicators, Mexican American students are disproportionately at-risk for school failure. For example, since 1980, Mexican Americans have had the lowest rates of high school completion, compared to Whites, Blacks, Asian and Pacific-Islander groups, and other Latino youth (U.S. Department of Education, 2012). Studies also report Mexican American adolescents are at higher risk for internalizing problems compared to other ethnic groups, including other Latino subgroups (e.g., Merikangas et al., 2010; Roberts, Roberts, & Chen, 1997). They also initiate substance use at earlier ages, have higher rates of hard core drug use, and develop substance use disorders at higher rates compared to Anglo and African American peers (CDCP, 2005). A school-based intervention that can reduce these disparities and simultaneously promote school completion would offer important public health benefits for this growing U.S. subgroup.

Bridges to High School/ Puentes a la Secundaria (Bridges/ Puentes) is a family-focused intervention to prevent mental health and substance use disorders and school dropout amongst Mexican American adolescents attending schools in low-income, urban communities (Gonzales et al., 2012). Content and structural elements of *Bridges/Puentes* were based on: (a) programmatic research on risk and protective processes within targeted communities; (b) qualitative interviews and focus groups with Mexican-origin families and key informant interviews with school personnel and service providers; and (c) extensive pilot testing with these stakeholders (Gonzales, Dumka, Mauricio, & Germán, 2007; Gonzales, Dumka, Deardorff, Jacobs-Carter, & McCray, 2004). The resulting intervention targeted parenting practices, child coping skills, and family cohesion that are common to

other integrated family and youth interventions (e.g., Spoth, Redmond & Shin, 2001); however these components were adapted to address unique risk and protective processes for our targeted population. School engagement, particularly, is a challenge for Mexican American youth in low-income communities who find it difficult to envision positive future possibilities (possible selves) in a context of low wage jobs, unemployment, and reduced expectations (Oyserman & Markus, 2006). Research shows these contextual constraints combine with other features of low income communities, particularly the availability of drug and deviant peers, to diminish interest and involvement in education and encourage choices (e.g., gang and drug involvement, school dropout) that have life changing consequences (e.g., Hawkins et al., 1992). Mexican American youth also encounter negative stereotypes and cultural conflicts in their schools and families, and their parents often have a poor understanding of U.S. schools (Crosnoe, 2006). Immigrant parents are especially ill-prepared to monitor and intervene when their children have academic difficulties (Suarez-Orozco & Suarez-Orozco, 1995). *Bridges/Puentes* provided youth and families with knowledge and skills to address these challenges. In addition, the program integrated traditional family values (*familismo*) through program content and structure (e.g., recruiting both caregivers), and to motivate school engagement. Delivery occurred in middle school because this is a transition period in which negative social influences escalate, particularly the lure of antisocial peers and risk-taking (Brown, Bakken, Ameringer, & Mahon, 2008), and when school engagement declines precipitously for poor, minority students (Seidman et al., 1994).

School Engagement and the Social Development Model

Our focus on school engagement was informed by the Social Development Model (SDM) and related research, including longitudinal studies and prevention trials conducted by the Seattle Social Development Research Group (Hawkins et al., 1999). According to the SDM, prosocial bonds play a key role in inhibiting problem behavior (Catalano & Hawkins, 1996) because they motivate youth to act in accordance with the norms and values of a social group or institution. Bonding to school, including greater investment in the value of education, promotes school persistence and also discourages behaviors inconsistent with school success. Longitudinal studies link school engagement to a broad range of outcomes in late adolescence, including lower levels of depression, delinquency, violence, alcohol and drug use, teen pregnancy, and school dropout (Maguin & Loeber, 1996; Masten et al., 2005; Resnick et al., 1997). However, in a review of this research, Maddox and Prinz (2003) noted that links with externalizing outcomes have been inconsistent across studies and suggested that school engagement may create opportunities for peer social interactions that exacerbate antisocial trajectories for high risk youth. Tests of the SDM also have been limited primarily to European American adolescents, with very few extensions to minority youth (for exception, see Choi, Harachi, Gillmore, & Catalano, 2005).

Findings from randomized prevention trials also support the SDM, though not yet with Latino populations specifically. The *Raising Healthy Children Program* is a multifaceted intervention that involved classroom and family components extending across the elementary years. Outcome analyses with a diverse low-income sample showed significant program effects on school bonding (attachment and commitment) in elementary school that

predicted subsequent reductions in multiple problem outcomes at the end of high school (Hawkins, Guo, Hill, Battin-Pearson, & Abbott, 2001). Long-term follow-up also revealed shifting effects on school bonding that are relevant to the current study. Effects became non-significant in middle school when school bonding declined for all youths, then re-emerged in high school to subsequently predict lower levels of alcohol use, violence, risky sexual activity, and pregnancy by age 21 (Hawkins et al., 1999). The authors surmised that intervention students developed a strong connectedness to school that prevented the continuing decline in high school experienced by the control group.

Because *Bridges/Puentes* demonstrated effects on middle school engagement, this follow-up provided a unique opportunity to test whether these effects were sustained for youth in Spanish-dominant families or emergent for youth in English-dominant families following high school transition, and to test long-term benefits of school engagement for the first time in a randomized trial with Mexican American youth. We identified only three published family interventions trials with Latino youth that have targeted academic outcomes. Two trials targeted middle school students but did not show effects on academic engagement, despite improvements in parenting and reductions in problem behaviors and substance use (*Familias Unidas*, Pantin, Coatsworth, Feaster, Newman, Briones, Prado, et al., 2003; *Nuestras Familias*, Martinez & Eddy, 2005). The third (*Families and Schools Together*, McDonald et al., 2006) targeted younger children (average 7 years) and found improvements on teacher-reported academic performance but did not examine effects beyond elementary school. Thus, this study provides a rare test of whether middle school engagement prevents subsequent high school dropout for Mexican Americans.

Study Goals and Hypotheses

The current study examined *Bridges/Puentes* effects on school engagement in 9th grade (2 years posttest), and mediating effects of school engagement on multiple problem outcomes 5 years posttest, when most students were in their final year of high school. Outcomes included externalizing and internalizing symptoms, substance use, and school dropout. Internalizing symptoms are not typically examined within a SDM framework but have been associated with school engagement in prior longitudinal studies (Cole, Martin, & Powers, 1997; Masten et al., 2005). The study also examined whether effects on externalizing and substance use were moderated by baseline levels on these outcomes, given speculation that school bonding might exacerbate antisocial trajectories and risk-taking (Maddox & Prinz, 2003).

We hypothesized that intervention effects on school engagement would be significant in high school (9th grade) for both the Spanish and English groups. This prediction is based on the stronger effects reported by Hawkins et al (1999) in high school vs. middle school, and because our prior outcome analyses showed posttest improvement on multiple family and youth competencies hypothesized to support school engagement over time. We hypothesized that school engagement would mediate intervention effects on substance use, externalizing and internalizing symptoms, and high school dropout. We did not offer directional hypotheses for tests of moderation by baseline externalizing and substance use due to competing hypotheses. One hypothesis posits that school engagement may not be as

beneficial for high risk youth (those with higher baseline levels of externalizing and substance use) because school bonds provide more opportunities for deviant peer processes and risk-taking (Prinz & Maddox, 2003). On the other hand, a common finding is that higher risk youth often benefit the most from universal interventions (NRC/IOM, 2012). Our analyses tested these as alternative hypotheses.

Method

Participants

The sample included 516 Mexican American adolescents recruited in the 7th grade from four urban schools in a Southwestern metropolitan area. All four schools had Title 1 designation, with 75% to 85% of students eligible for free or reduced lunches. Of eligible families, 62% enrolled and completed pretest interviews (Carpentier et al., 2007). Most participants were born in the U.S. (82.3%); those born in Mexico moved to the U.S. at a median age of 5 years old. The sample included 254 adolescent males (49.2%) and 262 females (50.8%) with an average age of 12.3 years ($SD = .54$). The majority were in two-parent families (83.5%, $n = 431$).

Procedures

Recruitment and randomization—Three cohorts of students were recruited in the first semester of each school year. Seventh graders with 'Hispanic' designation were randomly selected from school rosters with data indicating 'primary language spoken in the home' used to select English and Spanish recruitment samples (CONSORT available online). A phone call described the intervention and determined eligibility according to the following criteria: the adolescent was of Mexican descent, at least one caregiver of Mexican descent was interested in participating, and the family was willing to be randomly assigned to the 9-week intervention or a brief workshop (control group). Families that agreed to participate designated the predominant (preferred) language used in their family and this determined placement in either the English or Spanish subsample. The Spanish subsample had lower incomes, more immigrants (96% vs. 30% of parents), and were less acculturated than the English sample (Gonzales et al., 2012).

Data collection and retention—Data collection for the current analyses occurred prior to the intervention (T1), 2 years posttest (T2), and 5 years posttest (T3). Adolescent data were collected through in-home, computer-assisted interviews. Each participant received \$30 for each assessment. School districts provided data on grades and enrollment status used in determining school dropout status. Of 516 randomized youth, 420 were retained at T3 (81.39%); 276 of 338 (81.65%) were lost to attrition in the intervention group and 144 of 178 (80.90%) were lost in the control group. Of those lost to attrition, 3 were deceased (3.12%), 54 were unable to locate (56.25%), 10 could not be scheduled after repeated attempts (10.42%), and 29 declined further participation (30.21%; most declined at earlier assessments). Retained youth had higher grades, lower rates of substance use, and were more likely to be in the Spanish subsample ($p < .001$).

Intervention condition—*Bridges/Puentes* integrated the following components into 9 weekly evening group sessions (2 hours total) and 2 home visits: (a) a parenting intervention; (b) an adolescent coping intervention; and (c) a family strengthening intervention. Videos for all intervention sessions were coded for adherence by independent raters that determined the extent to which the program curriculum, both content and processes, were delivered as specified in the program manual. Average inter-rater agreement was 90%. Results showed 91% of adolescent and 88% of parent program components were delivered with fidelity.

The adolescent groups aimed to increase the salience of future possible selves (e.g., Oyserman & Fryberg, 2006); teach self-regulation strategies (e.g., Duckworth, Grant, Loew, Oettingen, & Gollwitzer, 2010); strengthen coping resources (e.g., Lochman & Wells, 2002); and identify activities, family members, and peers to facilitate adolescent goals. The parent groups taught parenting strategies similar to other evidence-based interventions (e.g., Spoth et al., 2001) but also aimed specifically to increase school engagement through supportive parent-child communication and parents' positive reinforcement and monitoring of schoolwork. Parents also received information about school expectations and practices, and ways to improve parent-teacher communication. The family sessions provided opportunities to strengthen family cohesion, practice new skills together, and develop shared values about the importance of education. Of families randomized to *Bridges*, 63% attended at least 5 and 31% attended all 9 sessions; these statistic include those 17% that did not attend any sessions.

Control condition—Parents and adolescents jointly attended a single 1.5 hour evening workshop. Participants received handouts on school resources, discussed barriers to school success, and developed their own family plan to support middle school success. In contrast to the intervention, this workshop did not teach specific skills to promote school success.

Measures

Validated translated versions of the measures were used when available. Measures not previously validated in Spanish were translated and back translated by fluent Spanish and English speakers. All scales were investigated for factorial invariance in relation to language of the interview (English or Spanish), and each met requirements for strong invariance. Scale means, standard deviations, alpha coefficients, and intercorrelations are presented in Table 1.

School engagement—Adolescents reported on a 9-item School Engagement Scale (available online) that drew items from The School is Important Now Scale (Lord, Eccles, & McCarthy, 1994), the Academic Liking Scale (Roeser et al., 1994), and the Importance of Education Scale (Smith et al., 1997). Prior analyses supported a single factor scale, good psychometric properties, and expected relations with other indicators of academic resilience. Adolescents responded to items (e.g., “It is very important to finish high school” and “I like school a lot”) on a scale from 1 (not at all true) to 5 (very true).

Internalizing and externalizing symptoms—Internalizing and externalizing symptoms were assessed by adolescent report on the Youth Self Report (YSR) at T1 and T2 and Adult Self Report (ASR) at T3. These scales (Achenbach, 1991; Achenbach & Rescorla, 2001) have been validated extensively with diverse populations. Adolescents responded on a scale from 0 (not true) to 2 (very true or often true) to items that were summed to indicate higher levels of internalizing (“I feel worthless or inferior”) and externalizing symptoms (“I get in many fights”).

High school dropout—Dropout status was assigned to students that had not earned a high school degree or equivalent (one student earned a GED) and were not attending high school at the time of their 12th grade assessment. This determination was based on multiple sources, including youth report, parent report, and school archival records obtained for 59% of the sample after graduation. Students responded to the following item, “Are you currently attending school, like a high school, college, vocational or technical school, etc.?” (responses included 0 “No, I stopped attending, did not graduate” and 1 “Yes/No, I graduated or obtained a GED”), with a follow-up question to identify the type and name of the school if enrolled. On the basis of these questions, 16.5% were not attending high school and had not received a high school degree. This variable was consistent with mother report on the same items, with discrepancies for only 8 cases (2% of sample), as well as school archival data with discrepancies for only 3 cases for which data were available (0.7% of the sample). Discrepancies were resolved on a case by case basis.

Substance use—Adolescents reported their use of tobacco, alcohol, marijuana, and other illegal substances based on six questions that were taken from the 2001 Youth Risk Behavior Survey (Centers for Disease Control and Prevention, 2005). Each item was coded to form dichotomous categories of lifetime use (0 = no use, and 1 = use). The total number of substances ever used was derived for each adolescent.

Grade point average (GPA)—Archival school data, collected from 95% of students at T1, included separate letter grades from 0 (F) to 4 (A+) for the four classes required of all middle school students (Language Arts, Math, Social Studies, Science). Grades were averaged to yield an overall GPA for each student to be used as a control variable. School data were obtained for 59% of the sample at T3 but were not reported on a common metric across schools and some schools did not assign grades, thus precluding use of 12th grade GPA as an outcome.

Gender and Language group—A binary variable was created for gender (0 “male” and 1 “female”) and to indicate the language each family selected to receive either the control workshop or intervention condition (0 “Spanish-speaking” and 1 “English-speaking”). Language group correlated with adolescent ($r = .46$) and parent ($r = .79$) nativity (U.S. vs. Mexico).

Data Analysis

All analyses were conducted in Mplus software version 6.1 (Muthén & Muthén, 2010), using full information maximum likelihood (FIML) to handle missing data. In addition,

intent-to-treat analyses, which analyzes participants based on initial randomized assignment regardless of whether treatment was actually received or not, were employed in these models as a conservative test of intervention effects. Path model fit was evaluated using the chi-square test of exact fit, and also a set of approximate fit indices. The root-mean-square error of approximation (RMSEA) was used, along with the 90% confidence interval for the RMSEA. We also used the comparative fit index (CFI) and the standardized root-mean-square residual (SRMR). For models that are rejected using the chi-square test, we applied Hu and Bentler's (1999) criteria: a good approximate fit would be indicated by $RMSEA < .06$, $CFI > .95$, and $SRMR < .08$.

Path models were constructed separately for each of the five outcome variables at T3: externalizing, internalizing, substance use, and dropout. In all cases, the models included both direct intervention effects on the T3 outcome, and indirect effects through T2 school engagement. All models included T1 measures of school engagement and GPA, along with gender and language. With the exception of the model for school dropout, all models also included T1 and T2 measures of the outcome variable. Indirect effects of the intervention through the T2 measure of the outcome were evaluated in these models. These indirect effects could not be evaluated in the dropout model because only T3 measures of dropout were available. The dropout model also differed from the other four models in that dropout is a binary measure, and so the paths to T3 dropout used a logistic rather than linear regression.

For the externalizing and substance use models, the T1 measures of these outcomes were considered for their potential roles as moderators of the intervention effects. To evaluate moderation, interaction terms were created from the intervention status indicator and the T1 outcome measure (T1 externalizing or substance use) after centering (Aiken and West, 1991). Both direct and indirect (through T2 school engagement or T2 measures of the outcome) were evaluated. Preliminary analyses also evaluated gender, language, and T1 school engagement as potential moderators of the intervention effects, but no effects were found and no interaction terms involving these measures were included in any of the five models.

If the path coefficients from the intervention to T2 school engagement and from T2 school engagement to the T3 outcome were found to be at least marginally significant ($p < .10$), indirect effects were tested by constructing a 95% confidence interval for the indirect effect using PRODCLIN (MacKinnon, 2008). The indirect effect is declared to be statistically significant if the confidence interval excludes zero. The same procedure was used to evaluate the indirect intervention effects through the T2 measure of the outcome.

If a significant interaction was found between the intervention and the T1 measure of the outcome, follow-up analyses were conducted to probe how the intervention effect varied as a function of the T1 outcome. Interaction effects could either be direct effects on the T3 outcome, or indirect effects through T2 school engagement or through the T2 outcome measure. Interaction effects were probed by testing for intervention effects using re-centering procedures focused on the 15th and 85th percentiles of the T1 outcome distribution (Aiken and West, 1991).

Results

Figures 1–4 display path models for the four outcome variables, along with the unstandardized path coefficients. Residual variables for the T2 and T3 variables are not displayed, nor are correlations among T1 measures shown. Residuals for T2 measures were permitted to covary when more than one T2 variable appeared in the model. Table 2 gives path coefficient estimates involved in direct and indirect intervention effects in each model.

Figure 1 shows the path model for the substance use outcome. This model was found to provide a good approximate fit to the data ($\chi^2(4) = 14.496$, $p = .006$, $RMSEA = .071$ (90% CI (.034, .112)), $CFI = .972$, $SRMR = .024$). While direct effects for the intervention or the interaction between the intervention and T1 substance use were only marginally significant, significant indirect effects for the intervention were found and probed. The discrete nature of the use item meant that the 15th and 85th percentiles in the T1 use distribution were approximated by “zero substances used” and “1 or more substances used” respectively. The indirect effect of the intervention was found to be significant at the mean of the T1 substance use distribution ($ab = -.034$, CI $(-.081, -.002)$). High-risk youth (youth who had used 1 or more substances at T1) experienced a significant indirect intervention effect ($ab = -.053$, CI $(-.115, -.009)$) through T2 school engagement, as well as through T2 substance use ($ab = -.176$, CI $(-.318, -.047)$). These indirect effects were not significant for youth who had not used at least 1 substance at T1.

Figure 2 shows the path model results for the externalizing T3 outcome. This model fit the data well ($\chi^2(4) = 8.646$, $p = .071$, $RMSEA = .047$ (90% CI (0, .091)), $CFI = .989$, $SRMR = .025$), but no significant direct or indirect effects for the intervention were found. Figure 3 presents the path model results for the internalizing T3 outcome. This model also provided a good fit to the data ($\chi^2(4) = 4.124$, $p = .389$, $RMSEA = .008$ (90% CI (0, .067)), $CFI = 1.000$, $SRMR = .015$). A significant indirect effect of the intervention on T3 internalizing through school engagement was found ($ab = -.166$ CI $(-.423, -.001)$). Finally, Figure 4 shows the path model results for the dropout T3 outcome. There are no absolute fit statistics produced by Mplus for this model due to the binary nature of this outcome, but the single omitted path was tested and found to have a path coefficient estimate that was not statistically significant. A significant indirect effect for the intervention on T3 dropout through school engagement was found ($ab = -.062$, CI $(-.517, -.001)$).

Discussion

This study examined whether a family-focused intervention delivered in middle school could increase school engagement in early high school and thereby reduce multiple high risk outcomes across the high school years. In testing these mediational pathways, the study offered the first longitudinal, experimental test of the Social Development Model with a sample of Mexican American adolescents. Findings supported the generalizability of the SDM with this population, with the intervention leading to higher levels of school engagement in high school that accounted, in turn, for lower rates of substance use, internalizing symptoms, and school dropout compared to adolescents in the control group.

Intervention effects on school engagement were found two years after the intervention, controlling for baseline levels of school engagement and GPA. Whereas levels of school engagement were declining overall for the sample, the intervention reduced these declines across the high school years, consistent with effects reported by the *Raising Healthy Children Program*. Prior analyses of *Bridges/ Puentes* outcomes immediately following the intervention in 7th grade only showed intervention effects on school engagement for adolescents in low acculturated, predominantly immigrant families. In contrast, the current study found benefits for both language groups. The stronger effects overall for the full sample in 9th grade suggest that strategies to promote school bonding may operate gradually, as suggested by Catalano and Hawkins (1996), and that analysis of long-term effects are critical to evaluate program effects and underlying mechanisms. Findings here with a less intensive middle school intervention may seem surprising given the multiple forces that undermine adolescents' investment in education during this period, particularly for youth attending schools in low-income communities (Seidman et al., 1994). However, these findings support a central assumption of the *Bridges/ Puentes* program, also supported by developmental theory (Masten et al., 2005), that this transition provides an opportune time for youth and families to enhance competencies and alter developmental trajectories.

Effects on substance use were found through reduced substance use experimentation and increased school engagement in 9th grade; both pathways had unique effects on 12th grade substance use. Although these effects were moderated by baseline substance use, findings did not support the hypothesis that school engagement amplifies substance use for those at higher risk. Adolescents at high risk due to 7th grade substance initiation were *more* likely to show intervention effects on substance use and school engagement in 9th grade, and these changes accounted for reduced rates of substance use in 12th grade. These findings are consistent with a pattern often reported in universal prevention trials in which those at highest risk experience the greatest benefit (NRC/ IOM, 2013). However, this pattern was not supported in analyses examining effects on externalizing behaviors. Irrespective of baseline levels, the intervention did not reduce externalizing in the 9th or 12th grades relative to the control condition, neither directly nor indirectly through school engagement. Growth trajectories showed externalizing behaviors were declining across high school for both the intervention and control group (Wong, 2013), a pattern that is consistent with normative developmental trends from mid to late adolescence (Moffitt, 1993). A middle school intervention may be better timed to reduce risky behaviors like substance use that are on an upward trajectory during this period, with externalizing behaviors better addressed through interventions targeting much younger ages (Reid, Webster-Stratton, & Beauchaine, 2001). It also is possible that our externalizing measure was not optimal for detecting change on delinquent behaviors that are increasing from mid to late adolescence.

The current findings extended the SDM by showing that school engagement also had indirect effects to decrease internalizing symptoms. Although prior longitudinal studies have shown that objective and perceived academic failures are related to change in internalizing symptoms and, conversely, that achievement gains predict changes in depressive symptoms (Cole et al., 1997; Masten et al., 2005), this study provided novel data showing that

intervention-induced change in school engagement prevents increases in internalizing symptoms across the high school years.

Our focus on Mexican Americans is the study's most noteworthy contribution, particularly that the intervention had indirect effects to prevent high school dropout for this population. Given the continuing expansion of the Mexican American population and the substantial negative effects of school dropout on their economic, emotional, and physical health, it is critical to identify and target processes that reduce disparities in school attainment for this population. Our findings suggest that a brief and timely family intervention may provide a strategy to keep Mexican American youth on track to receiving a high school diploma. However, it is important to note that a family and youth program should not be the frontline approach in efforts to engage high risk youth in the educational process. Continued focus on school reform must take priority, particularly efforts to improve the quality of education in schools that serve low-income students. Although our findings showed that school engagement could be strengthened through a theory-based family intervention and thereby reduce high school dropout, 7th grade GPA remained a powerful predictor of 12th grade dropout status for our sample.

Limitations, Strengths, and Implications

These results should be viewed in light of several limitations. A more powerful test of cascading effects across domains of functioning would have been possible with more comprehensive assessments, including broader domains of high risk outcomes as well as competencies; multiple measures within domains; and use of multiple reporters and data sources. For example, exclusive use of school archival data would have been preferable to determine school dropout, and high school grades would have offered a more complete understanding of the long term impact of school engagement had they been available for a greater proportion of the sample. Although our retention rates were excellent, the 18.6% lost at wave 5 were more likely to be English speaking and they had lower grades and higher rates of substance use at baseline. Thus, it is possible that study findings are biased due to this attrition. However, these were the only variables on which non-retained participants differed and we included all three of these baseline variables as controls. To the extent that attrition is explained by these variables, the FIML method we used to handle missing data will correctly adjust for the impact of attrition on the other measured variables and will produce correct parameter estimates once those three measured variables are included as controls. Finally, it is not possible to determine from these analyses which components of the intervention were responsible for program effects on school engagement. Future analyses should focus on identifying these components to inform theory and to aid in future dissemination.

Despite these limitations, this study had considerable strengths. Recruitment and retention rates were reasonably high, particularly given high mobility rates for the target population, and the sample was diverse with respect to generation status and acculturation. Assessment of targeted mediators allowed us to test the underlying SDM theory across a reasonable span of time, and tests of moderation evaluated differential effects for subgroups based on gender, language, and baseline risk. All told, this study provides encouraging evidence that a family-

focused intervention delivered at a key developmental juncture can have far-reaching effects to reduce multiple problem outcomes for Mexican American youth, a population that is fast growing and at heightened risk for disparities in mental health, substance use outcomes, and school dropout.

Acknowledgments

This study was supported by the National Institute of Mental Health grant R01 MH64707 and grant T32 MH018387.

APPENDIX A: CONSROT DIAGRAM

Figure 1.

Flow chart of intervention recruitment, enrollment, randomization, and retention.

APPENDIX C: School Engagement Items

1. School is not so important for people like me. (Reverse Coded)
2. I have to do well in school if I want to be a success in life. (Reversed Coded)
3. I like to do well in school.
4. I really don't care much for school. (Reversed Coded)
5. It is very important to finish high school.
6. School is a waste of time. (Reversed Coded)
7. I look forward to going to school every day.
8. I like school a lot.
9. Getting a good education will help me in the future.

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Figure 1.

Moderated mediation model examining indirect effects on substance use probed at one or more substances used

Note. Unstandardized regression coefficient reported. Covariances between exogenous variables not depicted. Estimates based on T1 substance use centered at 1 substance used.

Figure 2.

Mediation model examining indirect effects on internalizing.

Note. Unstandardized regression coefficient reported. Covariances between exogenous variables not depicted.

Figure 3.

Moderated mediation model examining indirect effects on externalizing symptoms.

Note. Unstandardized regression coefficient reported. Covariances between exogenous variables not depicted

Figure 4.

Mediation model examining indirect effects on dropout.

Note. Unstandardized regression coefficient reported.

Table 1

Intercorrelations and Descriptive Statistics of Study Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Language group	--														
2. Gender	-.02	--													
3. GPA T1	-.09*	.29**	---												
4. School engagement T1	.02	.15**	.18**	--											
5. School engagement T2	-.13**	.14**	.23**	.26**	--										
6. Internalizing T1	.09*	.14**	-.17**	-.13**	-.09*	--									
7. Internalizing T2	.15**	.22**	-.08	-.08	-.17**	.51**	--								
8. Internalizing T3	.17**	.12**	-.10*	-.12**	-.21**	.34**	.61**	--							
9. Externalizing T1	.06	-.08	-.25**	-.30**	-.25**	.54**	.28**	.25**	--						
10. Externalizing T2	.13	-.02	-.20**	-.18**	-.42**	.29**	.58**	.54**	.46**	---					
11. Externalizing T3	.18**	-.07	-.15**	-.12**	-.23**	.22**	.42**	.74**	.38**	.60**	--				
12. Substance use T1	.19**	-.12**	-.26**	-.18**	-.20**	.18**	.08	.13**	.47**	.31**	.26**	--			
13. Substance use T2	.10*	-.04	-.21**	-.14**	-.25**	.10*	.18**	.15**	.30**	.48**	.24**	.46**	--		
14. Substance use T3	.21**	-.12**	-.29**	-.12**	-.26**	.09*	.13**	.26**	.33**	.42**	.39**	.40**	.54**	--	
15. Dropout T3	<-.01	-.05	-.35**	-.07	-.16**	.10*	.07	.12**	.22**	.19**	.12**	.25**	.28**	.28**	--
Mean	--	--	2.43	4.60	4.55	13.84	10.30	12.17	8.72	9.78	10.76	0.52	0.92	1.80	--
SD	--	--	0.99	0.56	0.58	8.72	8.05	9.26	6.86	7.55	9.13	0.96	1.09	0.51	--
N	516	516	493	516	418	516	418	420	516	418	420	515	417	420	425
Alpha	--	--	--	0.70	0.80	0.88	0.88	0.91	0.87	0.88	0.91	--	--	--	--

Note. Correlation coefficients, means, and standard deviations are adjusted for missing data using the FIML procedure in Mplus 6 (Muthén & Muthén, 2010), N=516, alpha coefficients based on data present (see Ns).

Gender was coded 0 = male, 1 = female.

**
p<.01,

*
p<.05.

Table 2

Significant Intervention Effects on T3 Outcomes

T3 Outcome	T2 Mediator	a	b	c'	Ab
Internalizing	School Engagement	0.09*	-1.90*	-0.24	-0.17*
	Internalizing	0.42	0.65*	-0.24	0.27
Externalizing	School Engagement	0.08†	0.73	-0.25	0.06
	Externalizing	-0.34	0.66*	-0.25	-0.22
Substance use ^a	School Engagement	0.14*	-0.38*	-0.13	-0.05*
	Substance Use	-0.30*	0.59*	-0.13	-0.18*
Dropout	School Engagement	0.09*	-0.67*	-0.16	-0.06*
GPA	School Engagement	0.09*	-0.13	-0.02	-0.01
	GPA	0.07	0.26*	-0.02	0.02