

Supplementary Online Content

Gonzales NA, Jensen M, Tein JY, Wong JJ, Dumka LE, Mauricio AM. Effect of middle school interventions on alcohol misuse and abuse in Mexican American high school adolescents: five-year follow-up of a randomized clinical trial. *JAMA Psychiatry*. Published online March 21, 2018. doi:10.1001/jamapsychiatry.2018.0058

eAppendix. Follow-up Study Protocol

This supplementary material has been provided by the authors to give readers additional information about their work.

eAppendix. Follow-up Study Protocol

Statistical Analysis Plan for Testing Intervention Effects on Alcohol Outcomes

Intent-to-treat analysis will be employed to examine intervention effects on alcohol outcomes at the five-year follow-up. Baseline equivalence of the intervention groups will be tested using t-statistics for continuous measures and χ^2 tests for categorical variables. Intervention effects for continuous measures (e.g., frequency of past year alcohol use, binge drinking, and drunkenness) will be tested with analysis of covariance (ANCOVA). For dichotomous measures (e.g., lifetime alcohol use disorder), logistic regression will be used. Baseline measures of family structure, gender, and language group will be included as potential covariates. Covariates that are not related to any outcome will be excluded from the final model. Of primary interest are the effects of group membership and the interaction between group and baseline substance use. In models where the interaction is not significant, the model will be reassessed without the interaction term. In instance where the interaction is significant, follow-up analyses will be conducted to probe how the intervention effect varied between youths who had never used any substance (T1 abstainers) and the youths who had used at least one substance at T1 (T1 initiators). All hypothesis will be conducted using 2-tailed test with $\alpha = .05$. Primary ANCOVA and logistic regression analyses will be conducted in Mplus using full information maximum likelihood (FIML) to handle missing data and maximum likelihood estimation with robust standard errors will be used for the binary and non-normal outcomes.

Description of the Intervention and Control Conditions

This online supplemental material describes the overarching theory of the intervention, the intervention components, and the intervention strategies employed in Bridges. This supplement also provides information about the implementation of the intervention in participating schools, strategies used to maximize fidelity and quality of implementation, a description of the workshop control condition, and program satisfaction ratings for both the intervention and workshop conditions.

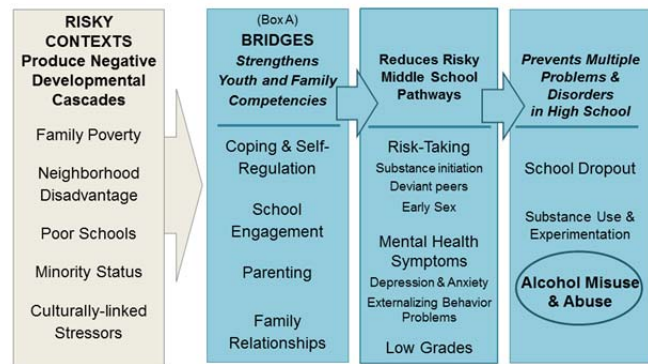
Theory and Empirical Evidence Informing Bridges

Bridges was broadly informed by ecodevelopmental systems, risk and protective factor, and developmental cascade theoretical frameworks. Ecodevelopmental theories^{1,2} explain how processes within and across multiple contextual levels (e.g., families, neighborhoods, schools) operate together to influence children’s development in high-risk contexts, such as low-income communities, and the pathways through which they lead to disparities in risk-taking, mental health, educational attainment and long-term life outcomes for youths in these communities. This framework also recognizes the pervasive role of culture and cultural factors, such as immigration, acculturation, and discrimination, in shaping the developmental contexts and adaptation of Latino youths in the U.S.² For example, Latino youths in poor communities have greater exposure to poverty-related disruptions in parenting and family functioning, uncontrollable stressors that challenge their coping abilities, and exposure to peer social norms that encourage drinking.³⁻⁶ They also must envision future possibilities in a context of unstable employment and low wage jobs, negative stereotypes, and limited pathways to higher education (particularly for those that are undocumented).⁷ Resulting patterns of risk-taking behavior and school disengagement have been shown, in turn, to predict multiple problem outcomes across adolescence, including increased risk for early initiation of drugs and alcohol and later transition to abuse and dependence.⁸⁻¹²

Derived from epidemiology¹³, the risk and protective factor framework identifies the specific risk conditions and competencies that increase or decrease that probability that children and adolescents will manifest such problems, with a particular interest in identifying “modifiable” processes that can be altered through intervention.⁹ Ecodevelopmental and risk and protective factor frameworks have been combined into cascading pathway models that explain how these processes produce broad or cascading effects across domains of functioning at later developmental stages.^{11,14} Intervention that strengthen youth and family competencies in middle school can thus disrupt or alter risky developmental trajectories to impact multiple outcomes later in life, such as later risk for alcohol abuse, and may be more impactful in the long term than interventions that narrowly target youth drinking or drug use.¹⁵⁻¹⁷

Drawing on these theoretical perspectives, the Bridges intervention targeted the four “modifiable” processes shown in Figure 1, Box A: (1) youth coping and self-regulation, (2) youth school engagement, (3) effective parenting practices, and (4) family relationships. Our prior analyses showed that Bridges significantly modified these competencies in middle school and, in so doing, reduced substance use initiation, problems in school, and mental health symptoms in early- to mid-adolescence (7th and 8th grade), as well as later rates of substance use experimentation (number of drugs ever tried) and school dropout in high school (12th grade assessment). These findings have been reported previously.^{4,18} In the current study, we specifically hypothesized that long-term intervention effects would also be shown on levels of alcohol misuse and risk for alcohol use disorders at the 12th grade assessment, consistent with our ecodevelopmental theory of cascading effects over time.

Figure 1: Bridges Ecodevelopmental Model of Promotion and Prevention



Bridges Intervention Components

Bridges /Puentes employed three integrated components that have been previously described:¹⁹ (1) an adolescent coping intervention, (2) a parenting intervention, and (3) a family strengthening intervention. Components were delivered in the family's preferred language (English or Spanish) through 9 weekly evening group sessions at the adolescents' schools and 2 home visits (pre-intervention and mid-program). Each session included separate simultaneous 1.25 hour groups for adolescents and parents followed by a .75-hour conjoint family session. All components were designed and adapted to optimize cultural competence.²⁰

Adolescent sessions. This component was designed to increase adolescents' coping and self-regulation (skills and efficacy), and adolescents' school engagement. In addition, it aimed to increase positive family relations by emphasizing strong family connections and respect as sources of resilience. Each session used participant-centered, active learning strategies²¹ to teach a range of social-cognitive coping skills to manage family, school, peer, and culturally-linked stressors, including situations involving risk-taking and pressures to drink. Skills were taught using methods to increase efficacy through skills practice, opportunities to address problems with implementation, and group leader feedback to promote growth mindset.^{22, 23} Specific coping skills included active coping strategies adapted from other efficacious coping, social competence and cognitive problem-solving skills training programs,²⁴⁻²⁶ as well as emotion awareness, emotion focused coping, and cognitive reframing techniques shown to be effective in reducing depressive symptoms.^{27, 28} To increase academic engagement, adolescents explored desired future selves to counteract group-based stereotypes²⁹ and practiced self-regulatory strategies to pursue academic goals success.³⁰ Weekly group meetings also provided an avenue for increased attachment to school and peer support for achievement.

Parent sessions. This component was designed to increase: 1) parents' use of effective parenting practices, 2) positive family bonds and relationships, and 3) parents' promotion of school engagement. The intervention employed active listening and a four-stage skills training strategy (skill *Description*, *Modeling*, *in-session and home Practice*, and *Feedback*) similar to other interventions that have been effective in preventing adolescent social, emotional and behavioral problems:^{31, 32} Three parenting domains were specifically targeted: supportive parenting (listening skills to strengthen parental responsiveness and support, and positive reinforcement to promote youth effort and positive development), appropriate discipline (clear rules and consistent consequences to provide structure and to minimize harsh parenting), and adequate monitoring (to provide ongoing supervision of academic progress and to limit adolescents' unsupervised interactions with deviant peers).³³ Family relationships and cohesion were strengthened through the supportive parenting skills mentioned above, strengthening the co-parenting alliance in two-parent households, and emphasizing the importance of interparental cooperation and support. The intervention also sought to decrease parent-adolescent conflict through consistent discipline and self-calming strategies to avoid escalating coercive interactions. To enhance academic engagement, the intervention aimed to increase parents' understanding of teachers' expectations about student engagement, improve parent-teacher communication through modeling and role-play of skills, and increase parental behaviors associated with greater school success (e.g., monitoring academic performance, encouraging academic goals and persistence). All skills were presented in a group format in which parents could support one another and benefit from discussions with other parents encountering similar circumstances. Skill enhancement strategies included opportunities to address problems with implementation, handouts to remind parents to use the skills, and group leaders' attributing change to parent efforts.³⁴

Family sessions. Modeled on the format of the *Family Strengthening Program*,³⁵ this component was designed to increase family cohesion, and provide opportunities for families to practice skills taught in the adolescent and parent components. Increasing family cohesion was addressed through activities designed to maximize parents' and adolescents' mutual enjoyment and understanding of one another. Each session also provided structured opportunities to strengthen skills learned in the adolescent and parent sessions and to depict these skills as ways of maintaining family connection and respect, consistent with core Latino family values.³⁶ For example, parents practiced effective listening skills, expressed hopes and expectations for their children, and communicated pride in their children's strengths and accomplishments. Activities also aimed to enhance family pride and bicultural understanding and included constructing a family tree together, sharing family stories, and reflecting on familial and cultural strengths with other participants.

Implementation Fidelity and Quality

Several strategies were employed to maximize intervention fidelity and quality of implementation.³⁷ These strategies were intensive and spanned across research design, training of group leaders, and delivery, receipt and enactment of the intervention. Group leaders (GLs) were trained to lead either the parent or teen program in two-person teams that were mixed gender as much as possible and linguistically matched to English or Spanish dominant families; 69% of GLs were of Latino origin and 65% were bilingual. GLs received a comprehensive program manual and 45 hours of pre-service training that focused on the intervention model (theory and specific intervention strategies), active learning methods, strategies to maximize participant attendance and engagement, cultural competence, and risk management. When intervention sessions began, GLs received weekly 3-hour trainings and 2 hour supervision sessions from a Ph.D. level clinician who had viewed videotapes of the previous week's sessions. GLs were tested on session content prior to each session and received a median score of 90% across all three cohorts. All program sessions were videotaped and coded for adherence by independent raters. Results indicated that 91% of adolescent and 88% of parent program components were delivered. Inter-rater agreement for adolescent and parent fidelity coding was 92% and 87%, respectively.

Bridges Control Condition

Parents and adolescents jointly attended a single 1.5 hour evening workshop that was conducted at the school on a different night and by different GLs than the intervention. GLs leading the workshop condition received 10 hours of pre-service training. Similar to the Bridges intervention condition, the workshop included both separate and combined parent and youth activities. Participants also received handouts on school resources, discussed barriers to school success, and developed their own family plan to support middle school success. However, in contrast to the 9-week intervention, the Bridges workshop did not teach specific youth or parenting skills.

It is important to note that families were told the Bridges 9-Week Program (intervention condition) and the Bridges Workshop (control condition) differed in format and length, but they each had similar goals to promote school success and keep teens on "the good path" (*el buen camino*). Although families understood the goals of the study and randomization requirements, both conditions offered a meaningful experience and at no point during recruitment, program delivery, or follow-up were workshop families led to believe they received an irrelevant program. The validity of this control condition was further supported by high program satisfaction ratings for the control workshop (mean=4.44, SD=.52; 1=awful, 5=wonderful) that did not differ from satisfaction ratings for the 9-week program (mean=4.51, SD=.55).

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