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Association between Socio-Ecological Risk Factor Clustering and Mental, Emotional, and Behavioral Problems in Hispanic Adolescents

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Abstract

Compared to non-Hispanic whites, Hispanic adolescents in the U.S. report higher rates of several mental, emotional, and behavioral (MEB) problems such as substance use, sexual risk behaviors, and internalizing and externalizing problems. There is evidence of common pathways in the development of MEB problems with certain subgroups of Hispanic adolescents being at greater risk. In the present article, we report analysis of baseline data for 959 Hispanic adolescents who participated in one of two randomized controlled trials evaluating a family-based preventive intervention. Utilizing latent class analysis, we identified subgroups of Hispanic adolescents based on socio-ecological risk and protective factors (e.g., parent-adolescent communication, parental involvement in school). Three distinct socio-ecological risk subgroups (high, medium, and low risk) were identified and exhibited significant differences from each other across a majority of socio-ecological risk and protective factors. Adolescents in higher socio-ecological risk subgroups reported greater MEB problems across all outcomes. Individual comparisons revealed significant differences between the low socio-ecological risk group and both the medium and high socio-ecological risk group in lifetime alcohol use, smoking, and sex, as well as internalizing and externalizing problems. Implications for intervention include focusing on specific risk subgroups and targeting shared risk and protective factors rather than specific MEB outcomes.

Keywords

Hispanic; adolescents; latent class analysis; risk factors; health behaviors

Introduction

Mental, emotional, and behavioral (MEB) problems, such as substance use (illicit drugs, cigarettes, and alcohol), sexual risk behaviors, and internalizing and externalizing problems, are critical public health issues faced by adolescents (O'Connell, Boat, & Warner, 2009). Recent evidence suggests that Hispanic adolescents are more likely to report higher rates of certain MEB problems compared to non-Hispanic whites. For example, Hispanic eighth and tenth grade adolescents are more likely than their non-Hispanic white and non-Hispanic

black counterparts to have ever tried alcohol, cigarettes, or marijuana in their lifetime (CDC, 2011). Hispanic adolescents also have the highest rates of unprotected sexual behavior compared to non-Hispanic whites and non-Hispanic blacks, and 7.1% of Hispanic adolescents have had sex before the age of thirteen compared to 3.9% of non-Hispanic white adolescents (CDC, 2011). Comprising 20% of new infections, Hispanic youth are also disproportionately affected by HIV when compared to non-Hispanic white youths, who accounted for 12% of new infections (CDC, 2016). When examining psychological outcomes that comprise MEB problems, Hispanic adolescents report the highest prevalence of “feeling sad or hopeless”, “seriously considered attempting suicide”, “attempted suicide one or more times”, or “made a plan about how they would attempt suicide,” relative to non-Hispanic white and non-Hispanic black counterparts (CDC, 2011).

Reducing these health disparities may be achieved by targeting common risk and protective factors associated with the development of multiple MEB problems, such as substance use, sexual risk behaviors, and internalizing/externalizing problems. In fact, many preventable causes of death appear to share common pathways with similar risk and protective factors impacting multiple outcomes (Jessor, 1992).

Social ecological models (Bronfenbrenner, 1979) of public health and extensions of those models, such as ecodevelopmental theory (Prado et al., 2010; Szapocznik & Coatsworth, 1999), propose the existence of multiple factors from various social contexts that influence adolescent development. Risk and protective factors or processes at various levels of influence (e.g., family, school, and peers) have been found to be directly or indirectly associated with multiple MEB problems (Malcolm et al., 2013; Prado et al., 2010). For example, extant literature has indicated that poor family functioning is related to greater substance use (Ryan, Jorm, & Lubman, 2010; Wagner et al., 2010), sexual risk behaviors (DiClemente et al., 2008), and internalizing problems (Formoso, Gonzales, & Aiken, 2000; Henderson, Dakof, Schwartz, & Liddle, 2006). Similarly other socio-ecological factors such as school functioning, peer relations, and acculturation have also been found to be associated with many of these same outcomes (Bond et al., 2007; Prinstein, Boergers, & Spirito, 2001; Schwartz et al., 2013). Although previous studies have examined the influence of specific socio-ecological risk and protective factors separately on MEB problems, limited research has examined the impact of the clustering of these factors on a variety of MEB problems.

In this study, we aimed to first identify subgroups of Hispanic adolescents based on socio-ecological risk and protective factors utilizing latent class analysis, a clustering technique used to identify homogenous subgroups of participants on a set of variables. We then examined differences in socio-ecological risk and protective factors between these subgroups to provide substantive meaning to these groups. Finally, we determined whether, and to what extent, substance use, sexual risk behaviors, and internalizing and externalizing problems vary as a function of subgroup. We hypothesized that distinct subgroups of adolescents would emerge based on socio-ecological risk and protective factors and that those subgroups with higher socio-ecological risk would be associated with greater MEB problems. Implications for these results include enhancing our ability to tailor interventions to specifically target various subgroups and to impact these shared risk and protective factors to prevent multiple MEB problems.

Method

Participants

This study uses pooled baseline data from two randomized controlled trials evaluating Familias Unidas, a family-based intervention previously found to be efficacious in preventing and reducing sexual risk behaviors and substance use among Hispanic adolescents (Prado et al., 2012). The first randomized controlled trial was an efficacy study with an indicated sample of 213 Hispanic adolescents and their primary caregivers and the second randomized controlled trial was an effectiveness study with a universal sample of 746 Hispanic adolescents and their primary caregivers. By combining these two samples a continuum of youth risk levels are included in these analyses, given that the trials were a large universal sample and a selected sample of youth evidencing behavior problems.

The total combined sample for the present analysis consisted of 959 Hispanic adolescents (45% female, $n = 434$) with an average age of 13.84 years ($SD = 0.69$). A slight majority (55%, $n = 530$) of the participants were born in the United States. Adolescents were predominately from low-income families with 70% ($n = 673$) of participating families reporting an annual household income of less than \$30,000.

Procedure

All study methods and procedures were approved by the University of Miami's Institutional Review Board and the Miami-Dade County Public School System's Research Review Committee. To be eligible for either study, adolescents were required to identify as Latino/Hispanic, attend eighth grade at baseline, live with an adult primary caregiver who was willing to participate, live within the catchment areas of the participating middle schools, and plan to live in South Florida for the duration of the study.

Additionally, to be eligible for the efficacy study adolescents had to have been identified by their school counselors as having at least "mild problems" on at least one of the following Revised Behavior Problem Checklist (Quay & Peterson, 1993) subscales: conduct disorder, socialized aggression, and attention problems. Participants were recruited from three middle schools in the Miami-Dade County Public School system. Once identified by their school counselors, parents completed the three subscales of the Behavior Problem checklist and, to be included in the study, adolescents had to be scored by their parents as being at least one standard deviation above the mean on one of the three subscales (Pantin et al., 2009). Data was collected for this study from 2004–2007.

The effectiveness study adolescents were recruited from 18 middle schools in the Miami-Dade County Public School System. In this study, school system mental health personnel were trained by researchers to deliver the intervention with data collected from 2010–2014.

Measures

Measures were based on responses to self-reported surveys administered to adolescents using audio computer-assisted self-administered interviewing (ACASI) (Turner et al., 1998). These surveys presented text on-screen while a pre-recorded voice reads the text to the

participant. Participants were asked to select whether they wanted to complete the assessment battery in English or Spanish.

Socio-ecological risk and protective factors—Socio-ecological risk and protective factors used in the analyses included Hispanic cultural practices, U.S. cultural practices, parental monitoring of peers, positive parenting, parental involvement, parent-adolescent communication, parent's involvement in school, and peer substance use. All measures in these analyses were adolescent reported.

Hispanic cultural practices (Cronbach's $\alpha = .92$, 11 items, five-point Likert scale) and U.S. cultural practices ($\alpha = .92$, 11 items, five-point Likert scale) were assessed using the Bicultural Involvement Questionnaire-Revised (Birman, 1998), which measures the level of Hispanic and U.S. cultural indicators such as comfort with language, food, and traditions. Sample items include "How comfortable do you feel speaking English at home?" and "How much do you enjoy Hispanic-oriented places?"

Parental monitoring of peers ($\alpha = .81$, 5 items, five-point Likert) was measured using items from the Parent Relationship with Peer Group Scale (Pantin, 1996) which assesses the extent to which parents supervise adolescents' friends, activities, and whereabouts. A sample question was, "How well do your parents know your best friends?" Positive parenting ($\alpha = .82$, 9 items, four-point Likert) and parental involvement ($\alpha = .84$, 13 items on a three-point Likert scale and 2 items on a four-point Likert) were assessed using the corresponding subscales from the Parenting Practices Scale (Gorman-Smith, Tolan, Zelli, & Huesmann, 1996). Sample items included: "When you have done something that your parents like or approve of, how often does your mother not say anything about it, or ignore it?" and "How often you do and your mom do things together?". Parent-adolescent communication ($\alpha = .90$, 20 items on a five-point Likert scale) was assessed using the Parent-Adolescent Communication Scale (Barnes & Olson, 1985). A sample item is "I can discuss my beliefs with my mother/father without feeling restrained or embarrassed."

Parent's involvement in school is based on the answer to the question: "How often did your mom talk with you about how things are going in school?" Responses options were measured on a three-point Likert scale. Peer substance use was assessed by combining questions regarding how many of the adolescent's friends drank alcohol, smoked cigarettes, or used drugs. If the adolescent reported that one or more of their friends engaged in any of these activities, peer substance use was coded as 1 and otherwise it was coded as 0.

Mental, Emotional, and Behavioral (MEB) Problems—Outcome measures included adolescent self-reports of substance use, sexual risk behaviors, and internalizing/externalizing problems. Adolescent substance use was assessed using a survey comparable to the items from the national epidemiological study, Monitoring the Future (Johnston, O'Malley, Bachman, & Schulenberg, 2013). Lifetime alcohol use was assessed by the survey question, "Have you ever had any beer, wine, wine coolers, or liquor to drink - more than just a few sips?". Lifetime smoking was assessed using the survey question, "Have you ever smoked cigarettes?" Lifetime drug use was assessed by the survey question which asked, "Have you ever used drugs?" Sexual risk behaviors included reporting lifetime sexual

behavior as well as sex in the past 90 days (Jemmott III, Jemmott, & Fong, 1998). Lifetime sexual behavior was determined by the survey question: "Have you ever had vaginal, anal, or oral sex?" Sexual behavior in the past 90 days was based on the survey question: "In the past 3 months, have you had vaginal, anal, or oral sex?" Substance use indicators (alcohol, smoking, and drug use) and sexual risk behaviors were dichotomized.

Internalizing and externalizing problems were measured using the Youth Self-Report (Achenbach & Edelbrock, 1991). This measure contains 112 questions, each with a three point Likert scale, including "Not True", "Somewhat or Sometimes True", and "Very True or Often True". This measure includes a subscale for internalizing problems (e.g., anxious/depressed, withdrawn, and somatic complaints; 30 items, $\alpha = .91$) and a subscale for externalizing problems (e.g., delinquent behavior and aggressive behavior; 32 items, $\alpha = .90$).

Data Analyses

In this study, we aimed to: 1) identify subgroups of Hispanic adolescents based on socio-ecological risk and protective factors (e.g., positive parenting, parental involvement in school), and 2) determine whether MEB problems (substance use, sexual risk behavior, and internalizing/externalizing problems) differed by subgroup. To accomplish this, we first identified subgroups of adolescents based on socio-ecological risk and protective factors using latent class analysis. Latent class analysis, sometimes referred to as latent profile analysis if continuous indicators are included, is a clustering technique used to identify homogenous subgroups of participants (Collins & Lanza, 2010).

We used five criteria to determine the best solution for the number of classes (Nylund, Asparouhov, & Muthén, 2007). The first criterion used was the Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), and the sample-size adjusted BIC, where a better model fit is indicated by a smaller value. The second criterion used was the p-value of the Vuong-Lo-Mendell-Rubin Likelihood Ratio test which compares a model with K classes to a model with K-1 classes. The third criterion was the entropy value, where greater clarity in classification is indicated by a value closer to 1. The fourth criterion used was the number of participants in each class (no class with less 10% of participants). The fifth criterion was the clinical meaningfulness of the classes. The latent class analysis was conducted in Mplus version 7.11 (Muthén & Muthén, 2012).

Second, to evaluate the differences between the subgroups in those socio-ecological factors used to create the classes, we used an analysis of variance (ANOVA) for continuous variables and Wald chi-square test for parent's involvement in school and peer substance use. Separate models were conducted for each of the socio-ecological factors and those which were statistically significantly different across the classes were further explored through pairwise comparisons with a Bonferroni correction. This analysis was used to establish an interpretation of the socio-ecological risk of adolescents in each subgroup.

Third, a 3-step method was utilized to evaluate the relationship between socio-ecological risk classes and MEB problems (Asparouhov & Muthén, 2013; Vermunt, 2010). In this 3-step method, first latent classes are estimated using the socio-ecological risk and protective

factors, then a variable is created containing the most likely class from the posterior distribution, and finally this most likely class variable is regressed on each of the MEB outcomes (Asparouhov & Muthén, 2013). These 3-steps are implemented seamlessly in Mplus. For outcomes that differed significantly across classes, individual comparisons using a Bonferroni correction were estimated to determine which subgroups of adolescents differed in the outcome.

Results

Identification and Interpretation of Classes

Table 1 reports the fit indices by the number of latent classes (i.e., 2, 3, 4, and 5 class solutions). While the AIC, BIC, adjusted BIC, and likelihood difference test indicated a five class solution, both the four and five class solution contained a class with less than 10% of the total sample. Therefore, we decided to use a three class solution based on the number of subjects within each class as well as the meaningfulness of each class. With the three class solution, class assignment appeared to be highly reliable with the average class probabilities of .94, .89, and .93 and the entropy was also high at .81.

Means and standard deviations or frequencies and percentages of the socio-ecological factors by class are reported in Table 3.2. These were utilized to help evaluate the meaningfulness and aid in the interpretation of each class. ANOVA results indicated significant differences in all of these socio-ecological risk factors by class at the $p < .001$ significance level except for U.S. cultural practices, $F(2, 956)=0.131$, $p = .88$. Individual comparisons of the remaining factors indicated that each class was significantly different from every other class at the $p < .05$ level on all socio-ecological factors except between the High and Medium Socio-Ecological Risk classes on the variables of Hispanic cultural practices classes ($p = .94$) and peer substance use ($p = .61$).

As seen in Table 2, the smallest class, High Socio-Ecological Risk ($n = 147$) included 15% of the sample and were adolescents that had a significantly lower average than the other classes on most protective factors. Specifically, compared to the other two classes, on average, they reported less parental monitoring of peers, positive parenting, parental involvement, parent-adolescent communication, and parent's involvement in school. Compared to the Low Socio-Ecological Risk class, on average, those in the High Socio-Ecological Risk class reported less Hispanic cultural practices and greater peer substance use.

The Medium Socio-Ecological Risk class ($n = 363$) accounted for 40% of the sample. Compared to the Low Socio-Ecological Risk class, these adolescents had significantly lower average values of Hispanic cultural practices, parental monitoring of peers, positive parenting, parental involvement, parent-adolescent communication, and parent's involvement in school, as well as higher reported peer substance use.

The Low Socio-Ecological Risk class ($n = 426$) included 44% of the sample and had the highest levels of all the protective factors and lowest peer substance use. Compared to both the High and Medium Socio-Ecological Risk classes, youth in the Low Socio-Ecological

Risk class reported the highest average values of Hispanic cultural practices, parental monitoring of peers, positive parenting, parental involvement, parent-adolescent communication, and parent's involvement in school.

MEB Problems by Class

To examine the relationships between class membership and outcomes, we compared the outcomes across classes. We did this given the satisfactory entropy ($>.8$) and classification accuracy values for the class solution (Clark, 2010; Muthén, 2013). As shown in Table 3.3, there were significant associations between class membership and all of the substance use, sexual risk behaviors, and internalizing/externalizing problems.

Substance Use by Class

Statistically significant associations were found between class membership and all substance use outcomes at the $p < .01$ level. Individual comparisons revealed that the High Socio-Ecological Risk class reported greater substance use than the Low Socio-Ecological Risk class across all substance use outcomes. The High Socio-Ecological Risk class reported greater lifetime alcohol (34%), cigarette (26%), and drug (27%) use compared to the Low Socio-Ecological Class which reported lifetime alcohol, cigarette, and drug use rates of 8%, 5%, and 4%. The Medium Socio-Ecological class also reported greater lifetime alcohol use (23%) and lifetime smoking (18%) compared to the Low Socio-Ecological Risk class.

Sexual Risk Behaviors by Class

Significant differences across classes were found for sex lifetime at the $p < .01$ level. Individual comparisons indicated that the Low Socio-Ecological Risk (7%) class reported less sex lifetime compared to both the Medium (15%) and High Socio-Ecological Risk (18%) classes. While an overall significant association was found between class membership and sex in the past 90 days at the $p < .05$ level, the individual comparisons were not significant.

Internalizing and Externalizing Problems by Class

Significant differences in internalizing and externalizing problems were found across class membership at the $p < .01$ level. Individual comparisons indicated that the Low Socio-Ecological Risk ($M = 8.5$, $SD = 7.6$) class reported less internalizing problems compared to both the Medium ($M = 12.0$, $SD = 9.3$) and High Socio-Ecological Risk ($M = 14.4$, $SD = 10.2$) classes. The High Socio-Ecological Risk ($M = 16.5$, $SD = 11.3$) class reported the greatest externalizing problems, the Medium Socio-Ecological Risk ($M = 12.5$, $SD = 8.5$) class reported less externalizing problems, and the Low Socio-Ecological Risk ($M = 7.3$, $SD = 6.9$) class reported the lowest externalizing problems.

Discussion

The aim of this study was to identify subgroups Hispanic adolescents based on socio-ecological risk and protective factors and to determine whether and to what extent substance use, sexual risk behaviors, and internalizing and externalizing problems would differ by these subgroups. To the best of our knowledge, this is the first study to use a person-centered

approach in evaluating the impact of socio-ecological risk factors across multiple levels of influence on a broad set of outcomes in Hispanic adolescents, including substance use, sexual risk behavior and internalizing/externalizing problems. Results indicate that there were subgroups of Hispanic adolescents which significantly differed in terms of socio-ecological risk and that MEB problems varied by these groups. Adolescents in higher socio-ecological risk groups reported significantly greater substance use, sexual risk behaviors, and internalizing and externalizing problems. This indicates that these behaviors cluster together in this population and correspond to socio-ecological risk factors. The findings were consistent across all outcomes, lending support to the common pathways concept (Jessor, 1992).

Among the socio-ecological factors included in our analysis, U.S. cultural practices was the only indicator found to not differ significantly among the risk groups. Although the measure we used focused on American and Hispanic cultural practices (e.g., preferences regarding language or media) and does not include measures of cultural values (e.g. individualism and collectivism) or cultural identification (e.g., ethnic and national identity), (Alegria, 2009; Schwartz et al., 2014) our findings support the notion that U.S. cultural practices may not contribute significantly in characterizing risk as long as Hispanic cultural practices are retained (Farrelly, Cordova, Huang, Estrada, & Prado, 2013; Sullivan et al., 2007). In many studies, acculturation is measured as a unidimensional construct ranging from high heritage-cultural orientation to high U.S.-cultural orientation. However, a bidimensional approach appears to be preferable, as U.S. and Hispanic cultural orientations contribute separately to psychosocial and health outcomes. Integrated adolescents (high levels of both U.S. and Hispanic cultural practices) have been found to report the highest levels across positive family functioning indicators, whereas assimilated adolescents (high U.S. orientation but low heritage orientation) were most likely to report aggressive behavior (Schwartz et al., 2015; Sullivan et al., 2007). This may suggest that Hispanic culture retention is the more important aspect of acculturation in the context of family relationships and adolescent risk behavior.

Adopting a person-centered approach allowed us to identify homogenous groups of adolescents based on risk and protective characteristics across multiple levels of influence. With risk and protective factors across family, peer, school, and neighborhood often impacting each other to affect outcomes, (Prado et al., 2010) using these factors together allowed us to assess overall risk for individuals. These findings add to our understanding of shared risk and protective factors suggesting that several MEB problems may be related to common developmental pathways. This person-centered approach also highlighted groups of Hispanic adolescents that were at higher or lower socio-ecological risk and demonstrated that those with higher risk were more likely to have poorer MEB outcomes.

Overall, our findings suggest common pathways with individuals who share similar risk and protective factors being more likely to engage in a variety of outcomes. Our results highlight the benefit of adopting a person-centered approach to holistically evaluate socio-ecological risks rather than linking specific risk factors with outcomes. Examining risk factors from multiple socio-ecological risk and protective areas such as family, school, peer, and acculturation together would allow the identification of adolescents who are higher socio-

ecological risk and are more likely to engage in a variety of MEB problems. A latent class approach could be utilized to help screen for and identify adolescents in high risk subgroups across a variety of risk and protective factors. These classes could be used to help identify adolescents who are at the highest risk for developing MEB problems and who will require more intensive selective or indicated interventions that can strengthen protective factors and promote behavioral health (Maton & Schellenbach, 2005). Implications for interventions include identifying adolescents by common risk factors to improve efficacy by directing it at an indicated sample. Furthermore, focusing on targeting these shared risk and protective factors rather than specific disease outcomes could yield benefits spanning multiple health areas with a single intervention.

Limitations

Results from this study should be considered in light of several limitations. First, the use of cross-sectional data indicates that causality between socio-ecological risk and health outcomes cannot be inferred. Further research using longitudinal data would aid in our understanding of how socio-ecological risk impacts these outcomes over time. Second, the Hispanic adolescents used in this analysis were drawn from only in Miami and are not representative of the U.S. Hispanic population, though it is noteworthy that the sample includes Hispanics from a wide range of countries and backgrounds. Miami has strong and well-established social, cultural and political structures in place, which may differentially impact the acculturation process relative to Hispanics living in other parts of the United States. Third, the socio-ecological factors and MEB outcomes were all measured through self-reports and adolescents may have under or over reported some or all of these variables.

References

- Achenbach, T., Edelbrock, C. Manual for the child behaviour checklist. Burlington, VT: University of Vermont Department of Psychiatry; 1991.
- Alegria M. The challenge of acculturation measures: What are we missing? A commentary on Thomson & Hoffman-Goetz. *Social Science & Medicine*. 2009; 69(7):996–998. [PubMed: 19664868]
- Asparouhov T, Muthén B. Auxiliary variables in mixture modeling: 3-step approaches using Mplus. *Mplus Web Notes*. 2013; 15:1–24.
- Barnes HL, Olson DH. Parent-adolescent communication and the circumplex model. *Child Development*. 1985; 56(2):438–447.
- Birman D. Biculturalism and perceived competence of Latino immigrant adolescents. *American Journal of Community Psychology*. 1998; 26(3):335–354. [PubMed: 9726112]
- Bond L, Butler H, Thomas L, Carlin J, Glover S, Bowes G, Patton G. Social and school connectedness in early secondary school as predictors of late teenage substance use, mental health, and academic outcomes. *Journal of Adolescent Health*. 2007; 40(4):357.e9–357.e18.
- Bronfenbrenner, U. *The ecology of human development: Experiments by design and nature*. Cambridge, MA: Harvard University Press; 1979.
- Centers for Disease Control and Prevention. Youth risk behavior surveillance – United States 2011. *Morbidity and Mortality Weekly Report*. 2011; 61(4):1–162.
- Centers for Disease Control and Prevention. Diagnoses of HIV infection among adolescents and young adults in the United States and six dependent areas, 2010–2014. *HIV Surveillance Supplemental Report*. 2016; 21(3):1–58.
- Clark, SL. *Mixture modeling with behavioral data*. Los Angeles, CA: University of California; 2010.

- Collins, LM., Lanza, ST. Latent class and latent transition analysis: With applications in the social, behavioral, and health sciences. Hoboken, NJ: John Wiley & Sons; 2010.
- DiClemente RJ, Crittenden CP, Rose E, Sales JM, Wingood GM, Crosby RA, Salazar LF. Psychosocial predictors of HIV-associated sexual behaviors and the efficacy of prevention interventions in adolescents at-risk for HIV infection: what works and what doesn't work. *Psychosomatic Medicine*. 2008; 70(5):598–605. [PubMed: 18541908]
- Farrelly C, Cordova D, Huang S, Estrada Y, Prado G. The role of acculturation and family functioning in predicting HIV risk behaviors among Hispanic delinquent youth. *Journal of Immigrant and Minority Health*. 2013; 15(3):476–483. [PubMed: 22532299]
- Formoso D, Gonzales NA, Aiken LS. Family conflict and children's internalizing and externalizing behavior: Protective factors. *American Journal of Community Psychology*. 2000; 28(2):175–199. [PubMed: 10836090]
- Gorman-Smith D, Tolan PH, Zelli A, Huesmann LR. The relation of family functioning to violence among inner-city minority youths. *Journal of Family Psychology*. 1996; 10(2):115–129.
- Henderson CE, Dakof GA, Schwartz SJ, Liddle HA. Family functioning, self-concept, and severity of adolescent externalizing problems. *Journal of Child and Family Studies*. 2006; 15(6):721–731.
- Jemmott JB III, Jemmott LS, Fong GT. Abstinence and safer sex HIV risk-reduction interventions for African American adolescents: A randomized controlled trial. *JAMA*. 1998; 279(19):1529–1536. [PubMed: 9605896]
- Jessor R. Risk behavior in adolescence: A psychosocial framework for understanding and action. *Developmental Review*. 1992; 12(4):374–390.
- Johnston, L., O'Malley, P., Bachman, J., Schulenberg, J. Monitoring the future national results on drug use: 2012 overview, key findings on adolescent drug use. Ann Arbor, MI: Institute for Social Research, The University of Michigan; 2013.
- Malcolm S, Huang S, Cordova D, Freitas D, Arzon M, Jimenez GL, ... Prado G. Predicting condom use attitudes, norms, and control beliefs in Hispanic problem behavior youth: The effects of family functioning and parent-adolescent communication about sex on condom use. *Health Education & Behavior*. 2013; 40(4):384–391. [PubMed: 22561377]
- Maton KI, Schellenbach CJ. Investing in children, youth, families, and communities: Strengths based research and policy. *Catholic Education: A Journal of Inquiry and Practice*. 2005; 9(2):256–259.
- Muthén, L. [Mplus discussion]. Apr 5. 2013
- Muthén, LK., Muthén, BO. Mplus User's Guide. 7. Los Angeles, CA: Muthén & Muthén; 2012.
- Nylund KL, Asparouhov T, Muthén BO. Deciding on the number of classes in latent class analysis and growth mixture modeling: A monte carlo simulation study. *Structural Equation Modeling*. 2007; 14(4):535–569.
- O'Connell, ME., Boat, T., Warner, KE. Preventing mental, emotional, and behavioral disorders among young people:: Progress and possibilities. Washington, DC: National Academies Press; 2009.
- Pantin, H. Scale of parent relationship with peers. University of Miami; Miami, FL: 1996. Unpublished Manuscript
- Pantin H, Prado G, Lopez B, Huang S, Tapia MI, Schwartz SJ, ... Branchini J. A randomized controlled trial of Familias Unidas for Hispanic adolescents with behavior problems. *Psychosomatic Medicine*. 2009; 71(9):987–995. [PubMed: 19834053]
- Prado G, Huang S, Maldonado-Molina M, Bandiera F, Schwartz SJ, de la Vega P, ... Pantin H. An empirical test of ecodevelopmental theory in predicting HIV risk behaviors among Hispanic youth. *Health Education & Behavior*. 2010; 37(1):97–114. [PubMed: 20130302]
- Prado G, Pantin H, Huang S, Cordova D, Tapia MI, Velazquez MR, ... Villamar J. Effects of a family intervention in reducing HIV risk behaviors among high-risk Hispanic adolescents: A randomized controlled trial. *Archives of Pediatrics & Adolescent Medicine*. 2012; 166(2):127–133. [PubMed: 21969363]
- Prinstein MJ, Boergers J, Spirito A. Adolescents' and their friends' health-risk behavior: Factors that alter or add to peer influence. *Journal of Pediatric Psychology*. 2001; 26(5):287–298. [PubMed: 11390571]
- Quay, H., Peterson, D. The revised behavior problem checklist manual. Odessa, FL: Psychological Assessment Resources; 1993.

- Ryan SM, Jorm AF, Lubman DI. Parenting factors associated with reduced adolescent alcohol use: A systematic review of longitudinal studies. *Australian and New Zealand Journal of Psychiatry*. 2010; 44(9):774–783. [PubMed: 20815663]
- Schwartz SJ, Des Rosiers S, Huang S, Zamboanga BL, Unger JB, Knight GP, ... Szapocznik J. Developmental trajectories of acculturation in Hispanic adolescents: Associations with family functioning and adolescent risk behavior. *Child Development*. 2013; 84(4):1355–1372. [PubMed: 23848416]
- Schwartz SJ, Unger JB, Des Rosiers SE, Lorenzo-Blanco EI, Zamboanga BL, Huang S, ... Pattarroyo M. Domains of acculturation and their effects on substance use and sexual behavior in recent Hispanic immigrant adolescents. *Prevention Science*. 2014; 15(3):385–396. [PubMed: 23828449]
- Schwartz SJ, Unger JB, Zamboanga BL, Córdova D, Mason CA, Huang S, ... Soto DW. Developmental trajectories of acculturation: Links with family functioning and mental health in recent-immigrant Hispanic adolescents. *Child Development*. 2015; 86(3):726–748. [PubMed: 25644262]
- Sullivan S, Schwartz SJ, Prado G, Huang S, Pantin H, Szapocznik J. A bidimensional model of acculturation for examining differences in family functioning and behavior problems in Hispanic immigrant adolescents. *The Journal of Early Adolescence*. 2007; 27(4):405–430.
- Szapocznik, J., Coatsworth, JD. An ecodevelopmental framework for organizing the influences on drug abuse: A developmental model of risk and protection. In: Glantz, MD., Hartel, CR., editors. *Drug abuse: Origins and Interventions*. Washington, DC: American Psychological Association; 1999.
- Turner CF, Ku L, Rogers SM, Lindberg LD, Pleck JH, Sonenstein FL. Adolescent sexual behavior, drug use, and violence: Increased reporting with computer survey technology. *Science*. 1998; 280(5365):867–873. [PubMed: 9572724]
- Vermunt JK. Latent class modeling with covariates: Two improved three-step approaches. *Political Analysis*. 2010; 18(4):450–469.
- Wagner KD, Ritt-Olson A, Chou CP, Pokhrel P, Duan L, Baezconde-Garbanati L, ... Unger JB. Associations between family structure, family functioning, and substance use among Hispanic/Latino adolescents. *Psychology of Addictive Behaviors*. 2010; 24(1):98–108. [PubMed: 20307116]

Table 1

Fit Criteria by Number of Latent Classes

<u>Latent Classes</u>	<u>AIC</u>	<u>BIC</u>	<u>Adjusted BIC</u>	<u>Entropy</u>	<u>Likelihood Ratio Test p-value</u>	<u>Number of Subjects in Each Class</u>
1	41682	41755	41707	-	-	959
2	40365	40487	40407	.836	<.001	319, 640
3	39983	40153	40042	.808	<.001	147, 386, 426
4	39736	39955	39812	.821	<.001	77, 150, 363, 369
5	39638	39906	39731	.849	<.001	35, 67, 144, 356, 357

Table 2

Means and Standard Deviations of Socio-Ecological Factors by Class

	Overall Sample N=959	High Socio-Ecological Risk N=147 (15%)	Medium Socio-Ecological Risk N=386 (40%)	Low Socio-Ecological Risk N=426 (44%)
Hispanic Cultural Practices ^{*bc}	37.2 (10.7)	33.0 (10.8)	34.0 (10.0)	41.7 (9.5)
U.S. Cultural Practices	48 (7.6)	48.3 (7.1)	47.9 (7.3)	48.0 (8.1)
Parental Monitoring of Peers ^{*abc}	14 (4.9)	10.3 (4.1)	12.7 (4.2)	16.5 (4.4)
Parent's Involvement in School ^{*abc}	2.7 (0.6)	2.0 (0.7)	2.7 (0.5)	3.0 (0.2)
Positive Parenting ^{*abc}	18.9 (5.3)	11.2 (4.7)	17.8 (4.2)	22.4 (2.8)
Parental Involvement ^{*abc}	36.9 (6.8)	24.9 (3.7)	34.9 (3.5)	42.4 (2.8)
Parent-Adolescent Communication ^{*abc}	68.9 (14.7)	50.9 (12.4)	64.0 (9.8)	79.4 (10.2)
Peer Substance Use ^{*bc}	406 (46%)	76 (56%)	192 (53%)	138 (36%)

*
p<.001

^a indicates significant difference between the High Risk and Medium Risk class (p<.05)

^b indicates significant difference between the Medium Risk and Low Risk class (p<.05)

^c indicates significant difference between the High Risk and Low Risk class (p<.05)

Table 3**Mental, Emotional, Behavioral Problems by Class**

	Overall Sample N=959	High Socio-Ecological Risk N=147 (15%)	Medium Socio-Ecological Risk N=386 (40%)	Low Socio-Ecological Risk N=426 (45%)
Substance Use				
Alcohol Lifetime ^{**bc}	173 (18%)	50 (34%)	87 (23%)	36 (8%)
Smoking Lifetime ^{**bc}	130 (14%)	38 (26%)	70 (18%)	22 (5%)
Drug Use Lifetime ^{**c}	88 (9%)	40 (27%)	32 (8%)	17 (4%)
Sexual Risk Behaviors				
Sex Lifetime ^{**bc}	115 (12%)	27 (18%)	57 (15%)	31 (7%)
Sex in the Past 90 Days [*]	68 (7%)	14 (10%)	34 (9%)	20 (5%)
Internalizing/Externalizing				
Internalizing Problems ^{**bc}	10.8 (9.0)	14.4 (10.2)	12.0 (9.3)	8.5 (7.6)
Externalizing Problems ^{**abc}	10.8 (9.0)	16.5 (11.3)	12.5 (8.5)	7.3 (6.9)

^{*}
p<.05,

^{**}
p<.001

^a indicates significant difference between the High Risk and Medium Risk class (p<.05)

^b indicates significant difference between the Medium Risk and Low Risk class (p<.05)

^c indicates significant difference between the High Risk and Low Risk class (p<.05)