



Methodological Challenges in Designing Efficacious Drug Abuse and HIV Preventive Interventions for Hispanic Adolescent Subgroups

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ABSTRACT *This article focuses on designing and evaluating drug abuse and HIV prevention interventions for subgroups of Hispanic adolescents. It describes the need for preventive interventions designed or adapted specifically for Hispanic adolescents and offers a rationale for subgrouping Hispanic adolescents based on risk and protective factor profiles rather than demographic indices. This subgrouping method is based on intrapersonal and ecodevelopmental domains of risk and protection. Finally, the article presents methods for designing, adapting, and evaluating “flexible” interventions for use with Hispanic adolescent subgroups.*

KEYWORDS *Drug abuse, Hispanic adolescents, HIV, Preventive interventions.*

INTRODUCTION

Hispanics represent the largest minority group in the United States, accounting for approximately 13% of the total US population.¹ Hispanics are also a young population, with 34% under the age of 18. In addition to their large and growing numbers, Hispanic youth are disproportionately affected by drug use and HIV/AIDS. Population-based studies show that Hispanic youth report higher drug use across all categories (with the exception of amphetamines) than do youth from most other ethnic groups.² With regard to HIV/AIDS, the most recent report by the Centers for Disease Control and Prevention³ indicates that Hispanic adolescents between the ages of 13 and 19 years are five times more likely to contract HIV than are similarly aged non-Hispanic Whites. These alarming rates of HIV contraction among Hispanic adolescents are largely attributed to the higher rates of unprotected sex in this population, relative to African Americans and non-Hispanic Whites.⁴ Given these alarming health risk behavior rates among Hispanic adolescents, preventing these health-compromising behaviors is an important public health priority.

Although Hispanic youth as a group appear to be at increased risk for drug use, unsafe sexual behavior, and their consequences, all Hispanics may not be at equivalent risk. The extant literature has identified two primary sources of this variation: nativity and country of origin.⁵ For example, data from the Monitoring the Future

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Survey suggest that Cuban youth have significantly higher rates of past-year illicit drug use than do Mexican American or Puerto Rican youth.⁶ Population-based data also suggest that Hispanic adolescents who were born in the United States report higher rates of drug use than do foreign-born Hispanics.⁷ Similar differences have been reported on unsafe sexual behavior and HIV contraction rates. For example, the National Vital Statistics Surveillance Data Report (not specific to adolescents) shows that among Hispanics, Puerto Ricans born in the United States have the highest HIV-related death rates, followed in descending order by foreign-born Puerto Ricans, Cubans, Mexicans, and “Other” Hispanics.⁸

Despite the disparities in health and health-risk behaviors between Hispanics and non-Hispanic Whites, there is a dearth of scientific knowledge on drug use and HIV prevention for Hispanic adolescents.^{9,10} To date, there are no published, empirically validated preventive interventions with efficacy data on reduced drug use and/or unsafe sexual behavior reported *solely* for Hispanics. Some published studies evaluating drug abuse and HIV preventive interventions have used multiethnic samples that included relatively small numbers of Hispanics. For example, in a recent study, Griffin and colleagues¹¹ suggested that universal drug abuse preventive interventions may be useful in preventing and reducing adolescent smoking, drinking, and illicit drug use. However, the study sample was largely African American. Because the analyses were conducted only for the sample as a whole, it was not possible to determine the extent to which the intervention effects observed for the entire sample generalized to the Hispanic subsample. Similar patterns have emerged in the literature on HIV preventive interventions. An extensive literature search conducted by the authors revealed that HIV preventive interventions for adolescents have either (a) used non-Hispanic samples or (b) used multiethnic samples and have not reported efficacy analyses separately for Hispanics.^{12–15} Given the growing number of Hispanic adolescents in the United States, it is necessary to evaluate the efficacy of preventive interventions specifically for this population.

Some progress in this direction is being made. A handful of preventive interventions are currently being tested with Hispanic adolescent samples. A common dilemma in the prevention literature¹⁶ is whether the most effective strategy is to (a) develop culturally sensitive interventions for Hispanics or (b) test with Hispanics those interventions that have been found to be effective with non-Hispanic or multiethnic samples. For example, Parent/Preadolescent Training for HIV prevention (PATH),¹⁷ a preventive intervention to reduce unsafe sexual behavior, was validated with a multiethnic adolescent population and does not contain components specific to Hispanic culture. This intervention, as well as others that do not contain Hispanic-cultural specific components, may be efficacious in reducing substance use and unsafe sexual behavior in Hispanic adolescents. However, Castro, Barrera, and Martinez¹⁸ suggest that prevention programs should be designed in ways that are syntonic with the cultural, ethnic, linguistic, and socioeconomic realities of the individuals and families they are intended to serve. It is possible, then, that existing interventions would be most efficacious with Hispanics if they targeted specific cultural variables that may pose risks for drug use and unsafe sexual behavior in Hispanic adolescents. Such risk factors include acculturation of adolescents to American culture, acculturation discrepancies between parents and adolescents, and lack of parent–adolescent communication about drugs and sex.

Research has suggested at least two important reasons for developing culturally sensitive preventive interventions for non-White populations. First, culturally sensitive interventions are more likely to engage and retain non-White participants.^{19,20}

Second, different sets of risk and protective factors are associated with drug use and unsafe sexual behavior for different ethnic groups.²¹ Consequently, developing culturally targeted interventions may facilitate improved engagement, retention, and success rates than would be possible using culturally generic programs.^{19,20}

There are two ways in which a culturally sensitive preventive intervention may be developed. First, an existing intervention previously developed for non-Hispanics may be modified to include Hispanic-specific components. For example, Villarruel and colleagues²² have adapted an intervention developed, tested, and found to be effective with non-Hispanics¹² for use with Hispanic youth. The adapted intervention, which targets social cognitive mechanisms underlying unsafe sexual behavior (e.g., perceived control of, attitudes toward, and intentions to engage in unsafe sexual behavior), also targets specific Hispanic cultural values (familism and culturally prescribed gender roles). Efficacy data for this adapted intervention are not yet available. Other researchers have developed and are testing drug abuse and HIV preventive interventions developed specifically for Hispanic adolescents. For example, Pantin and colleagues²³ are currently testing a drug abuse and HIV preventive intervention that targets the unique cultural and ecodevelopmental risk factors²⁴ predisposing Hispanic adolescents to drug use and unsafe sexual behaviors.

FIXED VERSUS FLEXIBLE INTERVENTIONS

A limitation in almost all preventive interventions is that they are “fixed” interventions. Fixed interventions are “one size fits all” interventions that provide equivalent dosage and content to all participants.²⁵ Fixed interventions are designed based on the risk and protective factors that generally characterize a group of individuals (e.g., middle school youth, Hispanic adolescents). For example, interventions for Hispanic adolescents may focus on parent–adolescent acculturation discrepancies and on parent–adolescent communication about drugs and sex. However, because fixed preventive interventions deliver all components to each participant, only a limited number of components can feasibly be included in the intervention. Intervention components that are resource intensive (e.g., in personnel and money) often cannot be included.²⁵ Moreover, additional dosages of specific intervention modules that may be beneficial to some participants may not be included, because they may have iatrogenic effects for other participants. In particular, providing inappropriate dosages of specific intervention components may produce attrition in individuals or families who do not require such intensive dosages in these areas. For example, suppose that a given intervention contains several intensive sessions focusing on parental involvement in the adolescent’s life. Parents who are already highly involved in their adolescents’ lives may be irritated or bored by what they perceive to be unnecessarily excessive coverage of this topic. Such parents may then be less likely to attend subsequent intervention sessions,²⁰ and therefore they may not receive subsequent intervention modules that might be helpful to them.

Research has begun to show that fixed interventions may have differential effects for participants with different risk and protection profiles.²⁶ A fixed intervention may be highly efficacious for one group of participants, moderately efficacious for a second group, and not efficacious (or even iatrogenic) for a third group. Thus, fixed interventions may not be optimal for preventing drug use and HIV among all Hispanic adolescents. It may be desirable, and perhaps necessary, to adapt intervention models so that the set, sequence, and dosage vary according to

the risk and protection profile that characterizes a particular subgroup of Hispanic adolescents. The resulting intervention would then be characterized as “flexible”. If one accepts that designing “flexible” interventions is an important goal, then an important question emerges: what combination and dosage of intervention components work for which subgroup? This represents a major methodological challenge in designing efficacious “flexible” drug abuse and HIV preventive interventions for Hispanic adolescents.

SUBGROUPING HISPANIC ADOLESCENTS USING DEMOGRAPHIC INDICATORS

Prior to investigating the extent to which existing interventions work for each Hispanic adolescent subgroup, it is critical to identify subgroups of Hispanic adolescents and to appropriately classify individuals into these subgroups. There are multiple ways in which Hispanic adolescents can be subgrouped. The most common method of subgrouping Hispanics has relied on demographic characteristics. For example, some population-based studies subgroup Hispanics by country of origin to explore the prevalence of drug use and HIV contraction.^{6,8} Other studies have used nativity (i.e., US-born versus foreign-born) to explore differences in risk among Hispanic adolescents.²⁷

However, there may be other theoretically or empirically based classification systems for subgrouping Hispanic adolescents. Put another way, subgrouping Hispanics by national origin or nativity carries the assumption that national origins or birthplaces themselves are somehow responsible for the observed rates of drug use and unsafe sexual behavior. It is likely that risk and protective factors associated with drug use and unsafe sexual behaviors account for the observed national-origin and nativity differences. For example, Gil, Vega, and Biafora²⁷ presented findings suggesting that differences in substance use between US-born and foreign-born Hispanics may have been due, in part, to differences in acculturation and family functioning. Below is a brief review of the risk and protective factors literature, focusing on those risk and protective factors that may be most salient in explaining differences in drug use and unsafe sexual behavior among Hispanic youth.

RISK AND PROTECTIVE FACTORS

Research has identified a number of risk and protective factors that predispose adolescents in general, and Hispanic adolescents in particular, to drug use and unsafe sexual behavior.²⁸ These risk and protective factors can be grouped in two domains: intrapersonal (e.g., social cognitive attitudes, beliefs, and intentions regarding drug use and sexual behavior) and ecodevelopmental (e.g., family functioning, parent-adolescent communication about drugs and sex, parental monitoring of peers, and orientation toward American culture).

Intrapersonal Variables

Cognitive-affective theory²⁹ holds that the decision to use drugs is determined by the adolescent’s intentions to use drugs, her/his beliefs regarding drugs, and her/his attitudes toward using drugs. A number of studies have linked specific attitudes, beliefs, and intentions with drug use.³⁰⁻³³ Similar findings have supported the relationship of attitudes, beliefs, and intentions regarding sex to unsafe sexual behaviors.^{34,35}

Ecodevelopmental Variables

Ecodevelopmental models²⁴ focus on the multiple social contexts influencing development, the direct transactions among those contexts, the changing nature of the contexts, and the way that these contexts and transactions affect risk and protection for the development of drug use and unsafe sexual behaviors in adolescents.^{24,36} Ecodevelopmental variables that are especially salient for Hispanic immigrant adolescents and their families include parent–adolescent communication about sex, parental isolation, parental monitoring of peers, and adolescent orientation toward American culture, among others.³⁷ A substantive body of literature has demonstrated that adolescents whose parents communicate with them about sex are less likely to engage in unsafe sexual behavior.³⁸ Parental monitoring of peer relationships has also been shown to be critical in protecting adolescents from peer influences to engage in drug use^{39,40} and unsafe sexual behaviors.⁴¹ Acculturation is another important ecodevelopmental risk factor for substance use and unsafe sexual behavior in Hispanic immigrant adolescents. Hispanic adolescents who are highly Americanized are more likely to report drug use^{42,43} and engagement in unsafe sexual behavior.^{44,45}

As described above, intrapersonal and ecodevelopmental risk and protective factors may represent mechanisms through which nativity and country of origin affect levels of drug use or unsafe sexual behavior in Hispanic adolescents. The design of “flexible” interventions that are efficacious in preventing drug use and unsafe sexual behavior for Hispanic adolescent subgroups might therefore best be facilitated by classifying or subgrouping Hispanic adolescents based on their risk and protection profile.

HISPANIC SUBGROUP CLASSIFICATIONS BASED ON RISK AND PROTECTION PROFILES

An alternative method of classifying Hispanics might be based on adolescents’ risk and protection profiles. The two general domains of risk and protection (i.e., intrapersonal and ecodevelopmental) presented above have, for the most part, been treated separately in the extant research literature. However, some studies suggest that intrapersonal and ecodevelopmental processes may combine to influence adolescent drug use and unsafe sexual behavior.⁴⁶ Although intrapersonal and ecodevelopmental influences on adolescent drug use and unsafe sexual behavior may be related, it is quite plausible that a given adolescent could be exposed to high levels of ecodevelopmental risk but low levels of intrapersonal risk, or vice versa. For example, an adolescent may attend a poor, inner-city school with a high proportion of drug using peers, but the adolescent may hold antidrug attitudes and beliefs. Conversely, it is possible that an adolescent may view drugs positively while living in a cohesive and well-functioning family and associating with pro-social peers. Accordingly, intrapersonal and ecodevelopmental risks might be crossed to create four different risk/protection profiles characterizing Hispanic adolescents: (1) those with high intrapersonal and high ecodevelopmental risk; (2) those with low intrapersonal risk but high ecodevelopmental risk; (3) those with high intrapersonal risk but low ecodevelopmental risk; and (4) those with low intrapersonal and low ecodevelopmental risk. Below is a brief overview of each of these four subgroups.

High Intrapersonal and High Ecodevelopmental Risk

Adolescents with high ecodevelopmental and high intrapersonal risks may be most likely to use drugs and progress to abuse,^{47,48} as well as to engage in high-risk sexual

behavior,⁴⁹ because they are influenced by contextual processes that promote drug use and HIV-risk behaviors, and because they view these behaviors positively and express intentions to engage in them. An example would be an adolescent who resides in a conflictual family environment, associates with deviant friends, and believes that using drugs and engaging in unprotected sex is “cool.”

Low Intrapersonal Risk but High Ecodevelopmental Risk

Adolescents with high ecodevelopmental risk but low intrapersonal risk may be characterized as resilient.⁵⁰ Resilient adolescents are those who evidence positive developmental outcomes (e.g., do not engage in drug use or unsafe sexual behavior) despite the presence of multiple ecodevelopmental risk factors.⁵¹ For example, although parental alcoholism strongly predicts adolescent and adult substance abuse,⁵² some adolescents from alcoholic or substance abusing families may be quite adamant that they will not engage in substance use.

High Intrapersonal Risk but Low Ecodevelopmental Risk

Adolescents with high intrapersonal risk but low ecodevelopmental risk may be likely to become “experimenters.”⁵³ Experimenters are adolescents who use “marijuana once or twice, a few times, or once a month and who try no more than one drug other than marijuana”^{54(p165)} or who engage in infrequent unsafe sexual behavior (i.e., report using condoms almost all of the time). These adolescents often do not progress to substance abuse and do not have multiple instances where they engage in unsafe sexual behavior,⁵⁴ because their “experimental” substance use or sexual behavior is not reinforced by ecodevelopmental risks that promote drug use or unsafe sex.

Low Intrapersonal and Low Ecodevelopmental Risk

Adolescents with low risk in both the intrapersonal and ecodevelopmental domains may be less likely to use drugs or engage in unsafe sexual behavior than may those with high risk in either or both domains.⁴⁷

One important advantage of the intrapersonal–ecodevelopmental risk typology is that it lends itself readily to intervention. Both intrapersonal and ecodevelopmental risks can be modified through intervention programs. For example, intentions to use substances or engage in unsafe sex might be modified by focusing on decision-making skills and personal competence.⁵⁵ Ecodevelopmental variables can also be modified through intervention. For example, Szapocznik and colleagues⁵⁶ have shown that it is possible to reduce parent–adolescent discrepancies in orientation toward American culture (i.e., a risk factor for drug use and unsafe sexual behavior in Hispanic adolescents) through an ecodevelopmental intervention. Demographic variables that are traditionally used to subgroup Hispanics are not amenable to such intervention.

It is possible that individuals with specific risk and protection profiles may require only certain types of intervention ingredients. Following the principle of flexible interventions and the four-fold risk-protection classification scheme introduced in this article, it may be beneficial to deliver a combination of intrapersonal and ecodevelopmental intervention modules only to participants with high risk in both the ecodevelopmental and intrapersonal domains. Hispanic adolescents high in ecodevelopmental risk but not in intrapersonal risk would likely require only ecodevelopmental intervention components.³⁷ Conversely, Hispanic adolescents high in intrapersonal risk, but not in ecodevelopmental risk, would likely benefit most from

intervention components targeting only attitudes, beliefs, and intentions.¹⁷ Ongoing work (NIDA Grant 19101; G. Prado, Principal Investigator) is examining (a) the empirical viability of the four-fold classification scheme, and (b) the extent to which the efficacy of ecodevelopmental and intrapersonal drug abuse and HIV prevention intervention modules vary as a function of risk and protection profile. Such research will help to gauge empirically the extent to which “flexible” interventions might help to reduce risk and increase prevention in Hispanic adolescents.

The classification system advanced here is one of a number of such systems that might be utilized. Other theoretically or empirically based classification systems might be advanced as well. For example, it might be possible to subgroup Hispanic adolescents according to level of risk within different ecodevelopmental and intrapersonal domains (e.g., acculturation, family relationships, and deviant peer associations).

DESIGN OF FLEXIBLE INTERVENTIONS

The development of a flexible intervention involves a four-step process: (1) determining the number and nature of subgroups in the population; (2) conducting a randomized clinical trial of the fixed version of an intervention and evaluating efficacy across subgroups; (3) developing a screening measure with appropriate cut-offs to identify subgroup membership; and (4) designing flexible versions of the intervention for each subgroup and comparing the efficacy of the fixed versus flexible versions of the intervention for each subgroup. In the first step, subgroups should be identified prior to intervention assignment (e.g., by screening adolescents for ecodevelopmental and intrapersonal risk). This may be accomplished through conducting cluster analyses on existing or baseline data. At least two types of cluster analytic methods are available for this purpose. The first method, hierarchical cluster analysis,⁵⁷ can be used to identify homogenous groups of cases based on the participants' baseline risk and protection profile. A limitation of this method of cluster analysis is that there are no standard criteria for choosing the most parsimonious solution from among the options.⁵⁸ The second method, which is more confirmatory, allows for specification of the subgroups in advance. This methodology^{59,60} involves latent variables and allows for confirmation (or disconfirmation) of the cluster solution that is hypothesized a priori.

The second step involves conducting a randomized clinical trial to ascertain the extent to which the efficacy of the fixed intervention varies by subgroup. This involves conducting standard time \times condition analyses of intervention efficacy, along with supplemental time \times condition \times subgroup analyses examining the moderating effects of subgroup membership on intervention efficacy. To maximize statistical power and to ensure that an intent-to-treat design is used, advanced statistical procedures such as hierarchical linear modeling⁶¹ or latent growth modeling,⁶² which are equipped to handle cases with missing data, should be used in lieu of analysis of variance methods. Provided that the intervention was efficacious overall or for at least some subgroups, it is necessary to identify intervention components that were most and least efficacious for each subgroup.²⁵

For subgroups in which the intervention was not efficacious trajectories of change on outcome and mediating variables should be examined. The relationships of participant characteristics and potential mediating mechanisms to the intervention's target outcome variables should also be examined. If certain outcome or mediating variables did not change sufficiently in some subgroups, then greater intervention

emphasis on these mechanisms may be necessary. Alternatively, if the relationships between the hypothesized mediating mechanisms (i.e., what is manipulated in the intervention) and the target outcome variables (i.e., the target process that the intervention is designed to affect) are weak in some groups, then it is possible that a different set of mechanisms may be operating and may, therefore, need to be targeted within some subgroups. For example, an intrapersonally based intervention may not be efficacious with subgroups with low intrapersonal risk and high ecodevelopmental risk; such individuals may not require intervention in intrapersonal areas but may require intensive intervention in ecodevelopmental areas.

The third step in developing a flexible intervention is development of a screening measure with appropriate cut-offs to discriminate among the empirically identified subgroups. Such a measure might be developed based on the ecodevelopmental and intrapersonal indices that differ most between pairs of clusters. For example, assuming that our hypothesized four-fold cluster solution were to be empirically supported, certain measures of intrapersonal risk might best differentiate those individuals identified as “high” versus “low,” and likewise for ecodevelopmental risk.

A limitation to evaluating intervention efficacy within each subgroup is the moderate to large number of participants that may be needed to ensure adequate sample size in each subgroup. Because randomized clinical trials tend to be characterized by missing data and somewhat modest sample sizes,⁶³ it may be necessary to conduct exploratory analyses in data sets from randomized clinical trials and then confirm or replicate the results in larger multisite or effectiveness studies. For subgroups that are underrepresented or for whom statistical power is likely to be inadequate, it may be necessary to increase the sample size. Alternatively, purposeful sampling may be employed using a screening measure designed to identify subgroup membership (i.e., high vs. low ecodevelopmental and intrapersonal risk).

Following the treatment development guidelines recommended by Rounsaville and colleagues,⁶⁴ the fourth step is to pilot test and manualize the flexible intervention. The manual should specify how subgroup membership will be determined, which intervention components are to be delivered in equal doses for all participants, which are to be delivered in varying doses to different subgroups, and which are to be delivered to some subgroups but not to others. A randomized clinical trial comparing the fixed and flexible versions of the intervention can be designed to ascertain the extent to which the flexible intervention produces better outcomes for each subgroup.

CONCLUSION

This article has suggested that Hispanic adolescents should be subgrouped based on risk and protective factors that are amenable to intervention. Such subgrouping would then support the development and refinement of flexible interventions that can be tailored to the risk and protection profile of each subgroup. Research that follows the process outlined here may help to improve the health of Hispanic adolescents and families, and therefore to reduce health disparities in this vulnerable population.

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