A Longitudinal Study of Familial Influences on Marijuana Use by Mexican American Middle School Students

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The purposes of this longitudinal parent-child investigation were to: (a) investigate the influence of familial factors (marital status of the husband and wife, family transience, adult cigarette smokers in the home, and parent-child communication style) on the use of marijuana among Mexican American middle school youth, and (b) use a growth curve model to estimate and examine the effect of time on the pattern and change rate of marijuana use among Mexican American school-age youth over a three year period. Methodologically, this was accomplished by applying a random-effects model in which student characteristics were construed as fixed effects at the micro-level and familial factors were treated as random effects at the macro-level in their relation to students' use of marijuana over a three year period. Results indicated that marijuana use increased across time among the students. Also, the quality of parent-child communication differentiated marijuana users from non-users. Gender of students, adults smoking cigarettes in the home, family transience, and divorce were all significantly related to substance use in the population studied.

Over the past several decades studies of adolescent substance use have focused on the prevalence, distribution, and use of illicit and licit substances among American children and youth (Johntson, O'Malley, & Bachman, 1996; U. S. Department of Health and Human Services, 1992). For instance, in 1997-1998 school year, 31% of 10th graders reported the use of marijuana while 9.7% of 8th graders also used it at least one time (The 1998 Monitoring the Future). Overall, 21% of 8th graders and 31% of 10th graders have used at least one illicit drug during that same period. Researchers have investigated a wide variety of individual psychological attributes, behaviors, demographic characteristics, genetic factors, and environmental influences on adolescents that they have classified as either risk or protective factors for involvement in the use of alcohol and other substances (Bry, McKeon & Pandina, 1982; Hawkins & Catalano, 1989; Jesser & Jesser, 1977; Kandel, 1978, Kandel & Foust, 1975; Newcomb & Bentler, 1988; Newcomb, Maddahian, & Bentler, 1986; Vega, Zimmerman, Warheit, Apospori, & Gil, 1992).

For example, in the area of demographic characteristics the vast majority of national and state surveys find that males engage in illicit substance use at an earlier age and more frequently when compared to their female counterparts (Gilbert & Cervantes, 1986; Murray, Perry, O'Connell, & Schmid, 1987; Newcomb, Maddahian, Skager, & Bentler, 1987; United States Department of Health and Human Services, 1992). Studies have also found that divorce within the family acts as a risk factor for substance use for female, as well as male children (Cadoret, Troughton, O'Gorman, Heywood, 1986). In other studies, school related problems, psychological problems, and the inter- and intrapersonal stress that accompanies residential transience, or frequency of family mobility have emerged as risk factors for youth who engage in alcohol and other substance use (Humke & Schaefer, 1995; Puskar & Martsolf, 1994).

Much of the research in this area specifically examines parental and familial influences on adolescents' substance use by soliciting youngsters perceptions of their parents' beliefs and/or behaviors on issues related to substance use, specific parental style in which they were reared, and other family variables. For instance, studies have found that youngsters who were heavy users of substances felt more rejected by their parents, experienced less emotional warmth from their parents, and rated their parents' rearing behavior as more overprotective than non-user control subjects (Emmelkamp & Heeres, 1988). Other researchers have found parental and familial variables that influence the substance using behaviors of adolescents to include cigarette smoking and other substance use among one or both parents (Brook, Whiteman, Gordon, & Brook, 1985; Kandel, 1990; McDermott, 1984), disciplinary problems in the home, an overly restrictive discipline style and maternal rejection (Vicary & Lerner, 1986).

In a retrospective case study approach Low and Sibley (1991) asked 17 adults identified as problem drinkers details about their past home life and parent interactions and relationships as adolescents. Results indicated that extreme modes of control, such as highly strict rules and discipline enforcement or households with no clear rules at all, were significant influences to their problem drinking. Cooper and Olson (1977) surveyed adolescents and found low perceived parental support was associated with substance use. A number of other studies (Coombs, Paulson, & Richardson, 1991; Elliot, Huizinga, & Ageton, 1982; Halebsky, 1987; Hawkins, Lishner, & Catalano, 1985; Jurich, Polson, Jurich, & Bates, 1985; Jurich & Polson, 1984; Prendergast, 1974; Vicary & Lerner, 1986; Wills, Vaccaro, & McNamara, 1992) found positive relationships, including the multifaceted aspects of positive parent-child interactions and general parental communicative style (verbal and non-verbal) with children works as a protective, or resilience factor against youthful involvement in substance use.

Unfortunately, fewer studies have actually involved parents as direct sources of obtaining information on parental and familial influences as they relate to adolescent substance use (Brook, Whiteman, Cohen, Shapiro, & Balka, 1995; Shedler & Block, 1990). Studies using this approach have found that high levels of parental support, as well as positive adolescent-parent communication, are key elements in the prevention of alcohol and drug use and other deviant behaviors. Parental nurturance emerges from all of these studies as a key factor in preventing problem drinking and problem behaviors among adolescents (Barnes & Farrell, 1992; Barnes, 1984; Barnes, Farrell, & Banerjee, 1994). Kandel (1973) interviewed parents and youngsters and found that peer and parent influences on the use of substances is synergistic. The highest rates of marijuana use were observed among adolescents whose parents and friends used marijuana or other substances, leading to the notion that parental and peer modeling play a role in substance use.

Shedler and Block (1990) interviewed parents and their children and determined, among other things, that compared to mothers of substance experimenters, the mothers of frequent users could be described as hostile, not spontaneous with their children, not responsive or sensitive to their children's needs, critical of their children and rejecting of their ideas and suggestions, not supportive and encouraging of their children, cold, unresponsive, and unprotective. They appear to give their children little encouragement, while, conjointly, they were pressuring and overly interested in their children's "performance". All of these modes of interaction and communication were conducive to the adolescent substance use.

Prendergast and Thum (1973) and Prendergast (1977) found that alcohol use (in the first study) and marijuana use (in the second study) in adolescents was significantly correlated with the child's perceived style of communication with their father, particularly psychological tension. Wills, Vaccaro and McNamara (1992) and Barnes (1982) both found family support, including poor communication with parents was associated with adolescent use of licit and illicit substances. Gantman (1978) compared family interaction patterns within a number of families and found well-adjusted families (as opposed to families with emotionally disturbed and drug-abusing adolescents) displayed clearer communication among family members. This was also true in a study conducted by Lowe and Sibley (1991) in which it was found that "connected" patterns of family interactions which were characterized as a pattern of interaction suggesting good communication among family members had lower levels of adolescent substance use.

A limited number of studies have investigated the influence of family factors on the initiation and continued use of substances within the context of an intraethnic, all Latino population. Watts and Wright (1991) found that lack of family support, parental supervision, and/or parental drug use is significantly related to substance use among Latino youth. In another study (Gfroerer & De La Rosa, 1993) Latino youth and one parent were interviewed about family variables and their relationship to youngsters' substance use. The researchers found that substance use by mothers (particularly cigarette smoking) was highly correlated with substance use by their children.

Smith, Joe, and Simpson (1991) investigated parental influences on illicit substance use by Mexican American youth by interviewing both youth and their mothers on vital information pertaining to characteristics of parents of users, together with indicators of home environment and psychological status, in relation to their child's behavioral and emotional adjustment. Children of married mothers used fewer

illicit substances in the first year after completing a Drug Prevention Program as opposed to children from divorced families, who evidenced continued substance use difficulties.

A research focus on parental communication style and other issues pertaining to family seems appropriate given the literature on Latinos in general and Mexican Americans in particular (Vasquez, 1998). Mexican American family members (including extended family) by tradition provide warmth and security for one another throughout their life (Griswold & del Castillo, 1984). This "familism" is one of the most important characteristic of "la familia" of Mexican Americans (Sena-Rivera, 1979; Ramirez & Arce, 1981) and has been described as a strong feeling of identification, dependence, loyalty, reciprocity, and solidarity among members of the family (Marin & Marin, 1991). This characteristic has been found to a greater extent among U.S. born Mexican Americans than among other ethnic and racial groups in the U.S. (See Ramirez & Arce, 1981 for a review). Strong familial support and positive communication (between children and parents, and extended family members) has been identified as a protective factor in stress resistant or resilient children (Garmezy, 1985; Kumpfer & Alvarado, 1995; Masten & Garmezy, 1985; Ramirez, 1980).

The purposes of this longitudinal parent-child investigation were to: (a) investigate the influence of familial factors (marital status of the husband and wife, family transience, adult cigarette smokers in the home, and parent-child communication style) on the use of marijuana among Mexican American youth, and (b) use a growth curve model to estimate and examine the effect of time on the pattern and change rate of marijuana use among Mexican American school-age youth over a three year period. Methodologically, this was accomplished by applying a random-effects model in which students' characteristics were construed as fixed effects at micro-level and familial factors were treated as random effects at macro-level in their relation to students' substance use over a period of three years.

Method

Subjects and Data Construction

Data used for this investigation was extracted from a longitudinal study in South Central Texas. Students in middle school, grade 6, 7, and 8 were surveyed regarding their use of substances, as well as on a set of psychological and social measures during three consecutive years. During the second year of the study, 720 students were randomly selected to have their parents participate in an interview protocol. These families were contacted by trained university students using telephone numbers provided by the school district. Three hundred and ninety-three families were successfully contacted and subsequently participated in the family interviews. Forty-one interviews were completed improperly (unmatchable cases and incomplete surveys) and were not usable for data analysis. The remainder of the families did not participated in the study due to difficulty contacting the parents (disconnected phone service, incorrect phone numbers, incorrect addresses or difficulty arranging an interview due to both parents working). Only a small portion of the families contacted refused to participate in the study. Therefore, the overall successful rate of parental interviews was 49%. A moderate completion rate was expected given the transient nature of residents of the community.

Inclusion of subjects in this study was based on the two criteria. First, a student's family must have been interviewed at year two of the study, and secondly, each student must have participated in at least two of the three yearly in-school surveys. Procedure and justification for dealing with incomplete cases will be discussed later in this article.

Procedure

Parental consent for students' participation in the school-based longitudinal survey study was established by both mailing a consent card with return postage to each student's family address and sending home a consent card. Student's parents or guardians were told about the nature of survey and were requested to indicate their willingness to have their child participate in the study. Prior to the survey administration, students were informed that their participation was voluntary and they could terminate their participation at any point during the survey. The overall consent rate of parents was 95%. The survey was administered to the students in school within intact classes by trained university students. Each question and choice on the survey was read aloud in English to control for readability of the survey.

The student survey dealt with questions pertaining to ethnicity, gender, and a Substance Use Inventory in which information was sought from each student as to their use of marijuana over the past year. The students were paid $1.00 after the survey for their participation.

The family interview was conducted by trained bilingual (English-Spanish) university students over a period of three months. Following a standardized protocol, interview staff first made at least three attempts to contact a family via telephone (86% of the interviews were conducted by way of telephone and 14% of the interviews were conducted in the home of the parents in face-to-face interviews; 74% of the interviews were conducted in English, 20% were conducted in Spanish, and 6% were conducted in both English and Spanish). During the last month of the interview, all families not contacted by telephone were visited by a pair of interviewers using addresses provided in school records. After the families agreed to participate in the study, the interview staff administered a closed-ended questionnaire in the language that the parents felt most comfortable with at their home. Interviews were conducted with the female head of the household (the mother in the majority of cases) without the presence of the student or any adult in the room.

Measures

Variables used in the present study were collected through both student and parent interviews. They are described below:

Self-reported use of marijuana. Student were asked to indicate how many times he or she had smoked marijuana in the last year. The response scale consisted of none, 1-2 times, 3 or more times. Marijuana use was coded as "no" if a student reported no use in last year and as "yes" if he or she reported at least 1-2 times of use2 .

Student's gender. Students reported their gender. Responses were coded as "F" for female and "M" for male.

Parental marital status. Parental marital status was coded as either "married" or "not married" (divorced or separated). This information was collected during the family interview.

Family residential transience. Parents reported the number of times the family moved residences in last three years was gathered during family interviews. Family transience was coded as "stable" if they had not moved and as "unstable" if it had moved residences at least once in the last three years.

Parent-child communication. Parents reported information for The Open Communication subscale of the "Parental Support Scale" detailing the level (quality and quantity) of information exchange between parents and child (Barnes & Olson, 1982). Adult respondents were asked about the communication process in the family. Respondent's score were divided into two groups (free communication and problems in communication) using a median split.

Data Analysis

Logistic regression was first applied to examine the cross-sectional relationships between marijuana use by students and its covariates at each time point. This would help to uncover the complicated relationships among the covariate variables. Conditional odd ratios (ORs) and 95% confidence intervals (CIs) were calculated for the covariate variables.

A multivariate hierarchical linear model (HLM) was used to study the growth curve of marijuana use in this longitudinal data set. HLM estimates individual parameters that describe how particular individuals change over time. Individual changes are estimated based on data from a previous timepoint which lead to more common overall population trends. HLM is more advantageous compared to the traditional regression approach (see Bryke & Ruadenbush, 1987; Hedeker & Gibbons, 1996; Goldstein, 1995 for a more detailed description of HLM).

First, error terms can be flexibly specified and treated as fixed, randomly varying, and non-randomly varying at each level of the estimation equations in HLM. Second, HLM avoids weaknesses in the repeated measure design in traditional longitudinal studies that only focus the final data point alone and ignore changes in covariates between initial and final timepoints.

Third, HLM does not require subjects to be measured at the same number of timepoints and therefore allows subjects with incomplete data across timepoints to be included in the analysis. The analysis is

based on the available repeated observations on which subjects have data. Therefore, the analysis is more powerful and avoids selection biases because it includes all available subjects. Furthermore, HLM permits the use of different types of covariates to model the change in dependent variable due to both stable/invariant characteristics (e.g., their gender and their parents' level of acculturation), and unstable/time-varying characteristics (e.g., self-esteem and association with deviant peers). Finally, in contrast to the traditional approaches to longitudinal studies, HLM can estimate average change (across time) in a population as well as individual change for each subject. It provides a more realistic description of behavior change by considering different trends of each individual.

The growth curve of marijuana use was modeled by estimating linear and acceleration rates of substance use at level 1 as well as estimating randomly-varying effects of familial factors at level 2. Conceptually, the level 1 model represented the traditional regression models in which linear and quadratic trends of changes in dependent variable across three time points were assessed with the exception that the error term was refined as a combination of independent errors and random effects associated with the cluster (i.e. individual) effect. At level 2, the model was constructed to identify specific contributions of contextual variables (i.e. familial factors) and random effects due to cluster effect on level 1 parameter estimates. Since this was a two-level model, the error term at level 2 model was treated as a fixed term.

Specification of parameter estimates for the present study are as the following:

Level 1 Model

$$Y_{it} = \pi_{0i} + \pi_{1i}\,\alpha_{it} + \pi_{2i}\,\alpha_{2it} + \varepsilon_{it} \quad \varepsilon_{it} \sim N(0, \sigma^2)\ ,$$

whereY_{it} is the marijuana use index for student i at year t, t = 1, ..., 3; i = 1, ..., 295; α_{it} = year of survey - 1 so that $\alpha_{it} = 0$ at year 1 of the survey; α_{2it} = year of survey * year of survey so that α_{2it} represents the quadratic term to measure the acceleration rate π_{0i} is therefore the expected level of marijuana use at year 1 of the survey for student i; π_{1i} is therefore the expected rate of change of marijuana use per year of the survey for student I; π_{2i} is therefore the expected acceleration of change rate of marijuana use per year of the survey for student i; ε_{it} is a random error

Level 2 Model

$$p_{0i} = b_{00} + X_{0k} + m_{0i}$$
$$p_{1i} = b_{10} + m_{1i}$$
$$p_{2i} = b_{20} + m_{1i}\ ,$$

where b_{00} is the population mean of marijuana use index at year 1 of the survey; X_{0k} is the random-varying covariate, k= 1,..., 5 (parental marital status, parental-child communication, student's gender, family transience, gender and marital status interaction); b_{0k} is the fixed effect of random-varying covariate X_{0k}; b_{10} is the population mean rate of change of marijuana use index; b_{20} is the population acceleration rate of change of marijuana use index; m_{0j}, m_{1j}, m_{2j}, are random effects associated with student i and assumed N(0, τ2).

Results

Multivariate Logistic Analysis of Familial Variables

Table 1 and Table 2 show the univariate statistics and results of logistic regression on marijuana use at each time point. For year 1, males, poor parent-child communication, a cigarette smoking adult in the home, and females in a divorced household seemed to be related to more reported use of marijuana by the adolescents, while at year 2 students who were male, had poor parent-child communication, had a cigarette smoking adult in the home, and were female living in a divorced home reported more marijuana

Table 1. Descriptive statistics of dependent and level-2 measures

		Used Marijuana in Year 1	Used Marijuana in Year 2	Used Marijuana in Year 3
Parental Marriage Status	Married	47 (27.0%)	82 (39.0%)	71 (43.6%)
	Not Married	13 (36.1%)	25 (48.1%)	16 (51.6%)
Gender	Male	40 (36.7%)	65 (50.4%)	52 (56.5%)
	Female	20 (19.8%)	42 (31.6%)	35 (34.3%)
Parental-child Communication	Open	27 (29.0%)	40 (34.8%)	37 (44.0%)
	Closed	33 (28.2%)	67 (45.6%)	50 (45.5%)
Smokers living in smoking	None	32 (23.5%)	66 (37.9%)	54 (41.9%)
	Yes	28 (37.8%)	41 (46.6%)	33 (50.8%)
Moved in the last three years	No	49 (28.0%)	89 (41.8%)	70 (43.8%)
	Yes	11 (31.4%)	18 (36.7%)	17 (50.0%)

Table 2. Logistic regression on marijuana use at each time point.

	Marijuana Use at Year 1.			Marijuana Use at Year 2.			Marijuana Use at Year 3.		
Variable	B	SE	OR	B	SE	OR	B	SE	OR
MAR1_95(1)	.0370	.5271	1.0377	-.0983	.4398	.9064	.1894	.5788	1.2086
GENDER(1)	-1.1015	.3718	.3324 [b]	-1.0034	.2961	.3666 [a]	-1.0393	.3328	.3537 [d]
COMMU2(1)	-.0964	.3227	.9081	.4598	.2662	1.5838 [a]	.0435	.3044	1.0445
SMOKER(1)	.6850	.3254	1.9838 [b]	.4013	.2760	1.4938	.4310	.3222	1.5388
MOVING(1)	.2233	.4278	1.2502	-.2499	.3447	.7788	.4026	.4067	1.4957
INT_1	1.1206	.8021	3.0666	1.0057	.6409	2.7338	.3069	.8117	1.3592
Constant	-.7908	.3213		-.3150	.2657		.0290	.3001	

Note: [a] < .10; [b] < .05; [c] < .01; [d] < .001

use. For year 3, males, a cigarette smoking adult in the home, and transience in terms of the family residence changing more than one time in the last three years tended to be associated with students who reported more marijuana use. However, results of multivariate logistic regression revealed that more marijuana use was only significantly related to males and a cigarette smoking adult in the home at year 1; significantly to males and marginally significant to poor parent-child communication at year 2; and significantly to males.

Logistic regression based on level 2 variables provided strong support for the notion that familial variables can act as risk or protective factors for marijuana use in adolescents. These findings lend support to efforts to explore the effects of familial variables on the change rate of marijuana use in this population.

Growth Curve Model

A series of nested growth curve models were estimated to examine the change rate of marijuana use over the three years and the effects of familial factors on change rates of marijuana use (see Table 3). Overall, there was a consistent random effect associated with the mean rate of marijuana use at each time point suggesting that the pattern of use or non-use of marijuana was different among all students across three years.

Model 1 revealed a significant individual effect across three time points. The fully unconditional model suggested significantly different individual patterns of marijuana use change (intraclass correlation = .19). This effect prompted further modeling of the individual effect with the average rate of

Table 3. Random-Effects Regression on Marijuana Use

	Model 1		Model 2		Model 3		Model 4		Model 5	
Fixed Effects	MLE	SE	MLE	SE	MLE	SE	MLE	SE	MLE	SE
Constant, G_{00}	-0.482***	0.106	-0.859***	0.154	-0.942***	0.171	-1.344**	0.415	-0.825	0.525
Parental marital status, G_{01}							0.446	0.284	0.019	0.389
Student gender, G_{02}							-0.849***	0.223	-1.945**	0.707
Child-parent communication, G_{03}							0.224	0.224	0.210	0.225
Smoking adult at home, G_{04}							0.489*	0.232	0.502*	0.233
Moving residence, G_{05}							0.099	0.291	0.045	0.294
Gender x Marital status, G_{06}									0.919	0.564
Year (mean change rate), G_{10}			0.380***	0.106	0.760*	0.351	0.419***	0.109	0.420***	0.110
Year squared (acceleration rate), G_{20}	1.280***	1.132					-0.189	0.166		
Random effect										
Constant, U_0			1.450***	1.204	1.461***	1.209	1.398***	1.182	1.405***	1.186

Note: * $p < .05$; ** $p < .01$; *** $p < .001$

change of marijuana use in Model 2. It was found there was a significant, positive time effect on change of marijuana use (i.e., marijuana use increased across time among the students). Model 3 tested quadratic time effect on the change rate of marijuana use. However, its effect was not significant. Model 4 included level 2 covariates and consisted of poor parent-child communication, transience of the family, divorce of parents, a cigarette smoking adult in the home, and student's gender. Being male and having a cigarette smoking adult in the home significantly predicted use of marijuana at year 1. Student's gender and parental marriage status interaction terms also marginally related to marijuana use at year 1.

Discussion

Findings of the present investigation were based on a longitudinal study of Mexican American students and their parents over a three-year period. It provided important developmental understanding of marijuana use in this adolescent group. Overall there was a positive linear trend of increasing marijuana use across the three time points over the years. This is a trend seen with national studies in which the prevalence of substance use increases proportionately to the age/grade level of pre-adolescent and adolescent subjects (see for example, Johntson, O'Malley, & Bachman, 1996). However, different patterns of use or non-use of marijuana among all students across the three years was an important finding which may imply the emerging negative quadratic trend of marijuana use although it was not significant in Model 4. This may be related to the experimental use of marijuana during adolescence.

Both cross-sectional logistic regression and growth curve models consistently found students' gender an important predictor of marijuana use even after controlling for familial factors. In the present study males reported more marijuana use than females. The majority of national and state surveys of adolescent substance use find that males engage in illicit substance use at an earlier age and more often compared to their female counterparts (Gilbert & Cervantes, 1986; Murray, Perry, O'Connell, & Schmid, 1987; Newcomb, Maddahian, Skager, & Bentler, 1987; United States Department of Health and Human

Services, 1992). Based on this and other literature (Newcomb & Bentler, 1989; Stein et al, 1987), among males there are a myriad of risk factors that are associated with substance use including peer pressure, social deviance, emotional problems, and issues with self esteem, all of which tend to play a role particularly for males' relatively high substance use when compared to females. However, smoking among females is increasing at least in part because advertisers have targeted them as a highly lucrative market. Many of the studies cited note that females are catching up to, and in some cases becoming more frequent users of cigarettes when compared to males.

In one study conducted by Gfrorer and De La Rosa (1993), Latino female adolescents were found to engage in more illicit substance use than male adolescents. The researchers found that these females were more likely to report using illicit substances, including marijuana, as compared to males. This use of marijuana by Latino females is supported by the findings of the National Institute on Drug Abuse (U. S. Department of Health and Human Services, 1990; 1991) in which a trend over the last several years shows slightly higher rates of lifetime marijuana use among Latino females age 11-17 than among Latino males of the same age.

Having a cigarette smoking adult in the home was also shown to be a reliable predictor of the prevalence of marijuana use across the three years in the present study. This is consonant with the findings of the study by Gfroerer and De La Rosa (1993) in which 223 parent-child pairs were interviewed pertaining to family variables and children's' use of substances. An important finding of this study is that frequency of marijuana use by Latino youth was strongly related to the use of cigarettes by their mother. As Gfroerer and De La Rosa (1993) report, their data are supportive of the importance of children's modeling of parents' drug use behavior found in studies conducted with white and non-Latino families and their children (Brook, Whiteman, Gordon, Nomura, & Brook, 1968; Brooks, Whiteman, Nomura, Gordon, & Corton, 1988; Gfroerer, 1987). This study seems to support other research in that the impact of a cigarette smoking adult in the home has a tremendous influence on Latino children's behavior.

Transience, or relatively high rates of family residential mobility was found to be associated with higher rates of marijuana use by the Mexican American adolescents in the present study. Transience of the family in terms of the number of moves from one residence to another has been associated with a range of school related, psychological, and substance use issues (Humke & Schaefer, 1995). Studies found that family transience leads to depression, anxiety, and impacts overall life satisfaction for adolescents (Puskar & Ladely, 1992). Researchers theorize that family mobility impacts interpersonal relationships, overall adjustment, social and educational situations, and academic achievement to such an extent that transience must now be considered a constellation risk factor for substance use within this population. Perhaps multiple residential moves is associated with instability, uncertainty and a higher level of overall anxiety for Mexican American adolescents whether or not the move is precipitated by pleasant or not so pleasant circumstances. What we do know is that this is an issue that needs further study in this population in relation to substance use.

The impact of separation and divorce on adolescent development is influenced by a variety of factors, including when the divorce occurs, the nature and length of the family conflicts that lead up to and follow the divorce, the quality of the child's relationship with both the absent parent and the parent who have primary physical custody, and the economic circumstances of the family after the divorce. It is difficult to predict with great accuracy who will be severely affected by divorce. As a rule, boys appear to be more negatively influenced by divorce than are girls (Emery, Hetherington, & DiLalla, 1984). Girls who are affected often exhibit behaviors associated with anxiety and withdrawal.

Several studies have found that adolescents from intact homes (i.e., two natural parents reside in the home) are less likely to use marijuana and tend to use less frequently than adolescents from non-intact homes (e.g., single parent or stepparent homes; Hoffman, 1994; Wallace & Bachman, 1991; Wells & Rankin, 1991; Needle, Su, & Doherty, 1990; Flewelling & Bauman, 1990; Selnow, 1987; Smith & Paternoster, 1987) where parent monitoring and bi-gender role models exist. For example, Mednick, Baker, and Carothers (1990) found that parental divorce during adolescents leads to a significant increase in the probability of delinquency and adult criminality, as well as substance use. In the present study females were more negatively impacted than males by divorce in the home as evidenced by their use of marijuana. Perhaps the lack of a consistent male role model in the home, compounded with the intricacies

and dynamics of interactions between daughters and their divorced mothers within the Mexican American culture increases the daughters' risk of substance use. Susceptibility to peer influence, vulnerability to poor personal decisions, and a strong desire to be accepted, or just "fit-in" with a substance using group may play significant roles in this finding.

Finally, problems in communication between parents and their children were found to have a significant impact on the use of marijuana for the subjects in this study. Parents whose communication style could be described as open in terms of the quality and quantity of verbal and non-verbal exchange (Barnes & Olson, 1982) had children who reported significantly less use of marijuana over the course of this study. Communication is generally viewed as one of the most crucial facets of interpersonal relationships. Further evidence of the belief that good communication skills are crucial to satisfaction with family relationships is offered by a large number of researchers (See Barnes & Olson, 1982 for a review). Barnes, Farrell, and Banerjee (1994, p. 197) concluded ". . . the quality of parenting [specifically in terms of communication] is critically important for adolescent outcome regardless of race or other sociodemographic characteristics" Positive adolescent-parent communication is a key element in the prevention of alcohol abuse and other deviant behaviors.

The impact of parental interactions via communication style becomes even more influential (as a risk or protective factor for substance use) in the context of "la familia" and the children within the Mexican American cultural traditions (Vasquez, 1998). Mexican American children in the present study who experience their parents' communication style as open, positive and supportive seem to mediate this relationship as a buffer or cushion against other environmental and familial risk factors for substance use.

Conclusion

Given the importance of familial factors in the Mexican American culture, it seems plausible to assume that substance use research efforts directed toward Mexican American adolescents would benefit from incorporating family and parents in the investigation. In the area of prevention (Kaufman, 1986; Kaufman & Borders, 1988; Faufman & Kaufmann, Stanton & Todd, 1982) researchers have strongly recommended family focused prevention interventions for drug abuse based on the effectiveness of controlled studies. A few programs have been developed for Latino families and researched (see Szapocznik, et al, 1989; Cervantes, 1993 for details). Barrett, Simpson, and Lehman (1988) found that a reduction in drug and alcohol use was related to family support among Mexican American youth in their first 3 months in drug intervention programs. However, there continues to be a dearth of substance use research in the area of family factors and Mexican American youth.

Whatever prevention and/or intervention orientation is espoused in the schools and community as a working model for Mexican American youth, the following components might well be considered for integration in programs as effective practices:

Focus on the family. Prevention/intervention efforts should focus on the importance of parent-child communication styles. An abundance of literature suggests that many Latino students are distinguished by a sense of loyalty to the family. Children from Latino homes are brought up with the notion that to bear the family name is a very important responsibility, and that their behavior reflects on the honor of the family. This cultural value stands in stark contrast to the "rugged individualism" that characterizes mainstream American values (Vasquez, 1998).

Parents and extended family members might benefit from intensive and extensive intervention efforts based within local schools but community led, focusing on modeling, and discussing more effective styles of communication compared to less effective styles of communication. An example of a culturally relevant, systems oriented approach to intervention efforts among Latino families is the Family Effectiveness Training for Latino Families (FET) (Szapocznik et al, 1986). In addition, parents must be made to understand the impact of their behavior upon their childrens' behavior (i.e., cigarette smoking), and the impact of divorce and transience upon individual children.

Focus on the student. Prevention/intervention efforts have traditionally focused exclusively on the student and tended to be adult centered. Contemporary models might consider the impact of social influences on adolescent alcohol and drug use. For example, Project SMART, a peer-led social influence prevention program, has been shown to be effective in delaying the onset of tobacco, alcohol, and

marijuana use in a cohort of adolescents (Perry, 1996). Intensive and extensive substance use intervention training for school children, over multiple years is called for due to the growth curve effect discussed previously in this article.

In addition, Guthrie, Caldwell, and Hunter (1997) believe that health-promotion interventions in the next millennium must consider how gender socialization mediates the interaction of social class, ethnicity, and environment with self-efficacy, which in turn influences behavioral outcomes related to physical and mental health. Gender socialization is the process by which children learn how to think and act as boys or girls in a variety of situations. This process may be facilitated by environmental factors that provide reinforcement of specific gendered behaviors. An extension of this idea may mean the need for some gender segregation in our prevention/intervention efforts given the fact that females tend to respond differentially in the area of marijuana use compared to males when divorce of the parents occurs.

Focus on the teacher. Prevention/intervention efforts have not sufficiently sensitized and educated mainstream teachers to the intricacies of the Mexican American culture. For example, Vasquez (1998, p. 2) illustrates this point with the following, "Our attempts to reinforce youth must be based on values the student holds, and these often differ depending on the ethnic and social class background of the student. It is for this reason that teachers who comment that they 'treat all students the same' are not showing their democratic disposition, but rather that they are not yet prepared to teach in the pluralistic classrooms of American schools. Already more that one in every four students is an ethnic minority." All teachers, but particularly those that will implement intervention programs need to be specifically educated in the area of Distinctive Traits for Latino Students (see the Prevention Researcher, 1998).

Until comprehensive and multilevel prevention intervention efforts are constructed that address at least some of the concepts detailed in this article, movement toward a more substance-free, younger Latino generation may be further in the future than we would hope. Our effects need to be redoubled in the coming years in order to prevent the loss of an important ethnic generation for our nation.

References

Bry, B., McKeon, P., & Pandina, R. (1982). Extent of drug use as a function of number of risk factors. *Journal of Abnormal Psychology*, *91*, 273 - 279.

Elliott, D., Huizinga, D., & Ageton, S. (1982). *Explaining delinquency and drug use* (Report No. 21). Boulder, CO: Behavioral Research Institute.

Hawkins, J. D., & Catalano, R. F. (1989). *Risk and protective factors for alcohol and other drug problems: Implications for substance abuse prevention*. Unpublished manuscript.

Hawkins, J., Lishner, D., & Catalano, R., Jr. (1985). Childhood predictors and the prevention of adolescent substance abuse. In C. Jones & R. Battjes (Eds.), *Etiology of drug abuse* (NIDA Drug Research Monograph No. 56, pp. 13 - 44). Rockville, MD: National Institute on Drug Abuse.

Jessor, R., & Jessor, S. L. (1977). *Problem behavior and psychosocial development: A longitudinal study of youth*. San Diego, CA: Academic Press.

Jurich, A., Polson, C., Jurich, J., & Bates, R. (1985). Family factors in the lives of drug users and drug abusers. *Adolescence*, *20*, 143 -159.

Kandel, D. B. (1978). Convergence in prospective logitudinal survey of drug use in normal populations. In D. B. Kandel (Ed.), *Longitudinal research on drug use: Empirical findings and methodological issues* (pp. 132 - 169). New York: Halstead.

Newcomb, M. D., & Bentler, P. M. (1988). The impact of family context, deviant attitudes, and emotional distress on adolescent drug use. *Journal of Research in Personality*, *22*, 154-176.

Newcomb, M. D., & Bentler, P. M. (1989). Substance use and abuse among children and teenagers. *American Psychologist*, *44*, 242 - 248.

Newcomb, M. D., Maddahian, E., & Bentler, P. M. (1986). Risk factors for drug use among adolescents: Concurrent and longitudinal analyses. *American Journal of Public Health*, *76*, 525 - 531.

Newcomb, M. D., Maddahian, E., Skager, R., & Bentler, P. M. (1987). Substance abuse and psychosocial risk factors among teenagers: Associations with sex, age, ethnicity, and type of school. *American Journal of Drug and Alcohol Abuse*, *13*, 413 - 433.

Perry, C. L. (1996). Models for effective prevention. *The Prevention Researcher*, *3*, 1- 5.

Shedler, J., & Block, J. (1990). Adolescent drug use and psychological health. *American Psychologist*, *45*, 612 - 630.

Stein, J. A., Newcomb, M. D., & Bentler, P. M. (1987). An eight-year study of multiple influences on drug and drug use consequences. *Journal of Personality and Social Psychology*, *53*, 1094 - 1105.

Szapocznik, J., Santisteban, D., Rio, A., Perez-Vidal, A., Santisteban, D., & Kurtines, W. M. (1989). Family effectiveness training: An intervention to prevent drug abuse and problem behaviors in Hispanic adolescents. *Hispanic Journal of Behavioral Sciences*, *11*, 4 - 27.

U. S. Department of Health and Human Services (1992).

Vasquez, J. A. (1998). Distinctive traits of Hispanic students. *The Prevention Researcher*, *5*, 1 - 4.

Vega, W. A., Zimmerman, R. S., Warheit, G. J., Apospori-Zografos, E., & Gil, A. G. (1992). Risk factors for early adolescent drug use in four ethnic and racial groups. *American Journal of Public Health*, *83*: 185 - 189.

Vicary, J. R., & Lerner, J. V. (1986). Parental attributes and adolescent drug use. *Journal of Adolescence*, *9*, 115 -122.

Endnote

Two additional analysis was conducted by coding marijuana use as none for those reporting no use or 1-2 times of use and as marijuana use for those reporting 3 or more times of use in last year. The purpose of this exercise was to explore the impact of "experimental marijuana use". Results of analysis were however similar to those reported in this paper.

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