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Neighborhood Effects on Youth Substance Use in a Southwestern City

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Abstract

This study examines neighborhood influences on alcohol, cigarette and marijuana use among a predominantly Latino middle school sample. Drawing on theories of immigrant adaptation and segmented assimilation, we test whether neighborhood immigrant, ethnic, and socioeconomic composition, violent crime, residential instability, and family structure have differential effects on substance use among youth from different ethnic and acculturation backgrounds. Data are drawn from self-reports from 3,721 7th grade students attending 35 Phoenix, Arizona middle schools. Analysis was restricted to the two largest ethnic groups, Latino students of Mexican heritage and non-Hispanic Whites. After adjusting for individual-level characteristics and school- level random effects, only one neighborhood effect was found for the sample overall, an undesirable impact of neighborhood residential instability on recent cigarette use. Sub-group analyses by individual ethnicity and acculturation showed more patterned neighborhood effects. Living in neighborhoods with high proportions of recent immigrants was protective against alcohol, cigarette, and marijuana use for Latino students at different acculturation levels, while living in predominantly Mexican heritage neighborhoods (mostly non-immigrants) was a risk factor for alcohol and marijuana use for less acculturated Latinos. There were scattered effects of neighborhood poverty and crime, which predicted more cigarette and alcohol use, respectively, but only among more acculturated Latinos. Inconsistent effects confined to bilingual and more acculturated Latinos were found for the neighborhood's proportion of single mother families and its residential instability. No neighborhood effects emerged for non-Hispanic White students. Results suggested that disadvantaged neighborhoods increase substance use among some ethnic minority youth, but immigrant enclaves appear to provide countervailing protections.

Keywords

neighborhood effects; substance use; adolescents; Mexican Americans; acculturation

For nearly a century the neighborhood social context has been conceptualized and investigated empirically as an important influence on the behavior of individuals. Numerous studies have tested competing theories about neighborhood effects on substance abuse among adolescents (Duncan, Duncan and Strycker 2002; Crum, Lillie-Blanton & Anthony

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1996; Elliott, et. al., 1996). Some studies have delved into differential neighborhood impacts on African Americans and European Americans (e.g., Crowder and South, 2003; Finch, Kolody and Vega, 1999). However, research is relatively sparse on the impact of neighborhoods on Latinos specifically, and how neighborhood effects operate in cities where Latinos are the largest cultural minority group (e.g., Finch, et al., 2000; Sastry and Pebley, 2003; Zatz and Portillos 2000). Thus, there is little understanding about how factors specific to predominantly Latino neighborhoods—particularly the influence of Mexican culture, immigrant populations and acculturation—may influence adolescent substance use. In this study set in Phoenix, Arizona, with its large and rapidly growing population of both Mexican-Americans and recent immigrants from Mexico, we investigate the influence of these neighborhood factors on substance use among adolescents. We seek to discover whether Mexican culture, immigration and acculturation in urban neighborhoods affect substance use in different ways for Latinos compared to non-Latino whites; or for more-acculturated versus less-acculturated Latinos.

We focus on alcohol, cigarette and marijuana use because they are the primary substances used by youth. Underage drinking remains a problem of epidemic proportion (National Center on Addiction and Substance Abuse 2003). Earlier and heavier alcohol use is associated with greater likelihood of alcohol dependence and other drug use (Nephew, Williams, Stinson, Nguyen & Dufour, 1999). Substance use negatively affects the young brain, mental and social development, and academic progress (National Center on Addiction and Substance Abuse 2003). Better understanding of the factors influencing youth substance use at all levels—individual, family, peer, school and neighborhood—is increasingly recognized as essential to addressing this problem effectively (Hawkins, 2002; Hawkins, Van Horn & Arthur, 2004).

Neighborhood Influences on Adolescents

From the early days of the Chicago school pioneers of urban sociology, researchers have considered neighborhood characteristics to be important influences on individual behavior (Shaw and McKay 1942). Following Bronfenbrenner's (1989) argument that individuals are influenced by processes through which individual characteristics and environmental characteristics interact to produce developmental outcomes, theorists have conceptualized the effect of different social ecosystems on adolescent behaviors as a series of concentric circles (Oetting et al. 1998a; Padilla 2002; Szapocznik and Coatsworth 1999). Theorists generally agree that the degree of influence of each environment varies with age: family (inner ring) is the most important influence for the youngest children, then school (middle ring) becomes an important influence on older children. Finally, as individuals develop through adolescence and mature into adults, peers and the neighborhood (outer ring) grow in importance as sources of influence, while family and school shrink (Brooks-Gunn et al. 1997; Oetting et al. 1998a; Szapocznik and Coatsworth 1999).

Bursick and Grasmick used a parallel concept to study crime at the neighborhood level: private, parochial and public levels of social control (Bursick and Grasmick 1993; Hunter 1985). Parents and networks of family and friends are instruments of private social control, which is exerted over the behavior of children and adolescents. Parochial social control is exerted through local institutions such as schools and churches, reflecting the ability of the neighborhood to supervise the behavior of residents. In addition to its supervisory function, parochial social control is also demonstrated through a neighborhood's capacity to act collectively on behalf of the welfare of its children, or its “collective efficacy for children;” these processes of social organization are very important in reducing neighborhood crime (Sampson, Raudenbush & Earls, 1997; Sampson, et al., 1999; Zatz and Portillos 2000). Finally, public social control is exerted through the community's ability to secure public

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goods and services (such as police and fire protection, and funding for public schools, parks and libraries) provided by entities outside the neighborhood (Bursick and Grasmick 1993; Sampson et al. 1999; Zatz and Portillos 2000). Thus, most of the neighborhood's influence on adolescents is mediated through social organization processes, rather than direct.

Adolescent influences are also mediated through residents' perceptions of neighborhood conditions (Aneshensel and Sucoff 1996; Brooks-Gunn et al. 1997; Sampson et al. 1999). Neighborhoods that are perceived as chaotic, unpredictable and dangerous–or merely unwelcoming and alienating–can have adverse effects by increasing stress (Aneshensel and Sucoff 1996; Schier et al. 1999) and shaping patterns of anti-social behaviors and attitudes that are viewed as necessary to cope with a “tough” environment (Dembo, Allen, Farrow, Schmeidler & Burgos, 1985a). Previous research has shown that neighborhood conditions are especially salient in accounting for risky adolescent behaviors like delinquency and substance use (Sampson, Morenoff & Gannon-Rowley, 2002). Although other researchers have focused on the mediating processes through which neighborhood structural factors influence residents (e.g., Sampson et al. 1999; South, Baumer & Lutz, 2003), we focus here on the structural factors themselves, starting with a discussion of the ways that neighborhood conditions have been found to influence youth drug use.

Neighborhoods and Adolescent Drug Use

The type of neighborhood in which an adolescent lives has been found to influence substance use patterns among adolescents, sometimes in unexpected ways. “Disadvantaged” neighborhoods are those with problematic conditions such as concentrated poverty, single-parent families and high crime rates, making them risky places for adolescents to develop (see Aneshensel and Sucoff 1996; Brooks-Gunn et al. 1997; Crum et al. 1996; Elliott et al. 1996; Sampson et al. 1997, 1999; Wilson 1987). High crime neighborhoods are characterized by stressful conditions and are also associated with adolescent alcohol and drug use (Dembo, Schmeidler, Burgos & Taylor, 1985b; Schier et al. 1999). Crime rates are problematic in Phoenix, which ranks as the 33rd most dangerous metro area (Morgan Quitno 2003), where the rate of “index crimes” (murder, rape, robbery and aggravated assault) has been consistently higher than the U.S. average since 1975 (Hultsman 2002). Within the city of Phoenix, there is much unevenness in the violent crime rate: some neighborhoods are characterized by high homicide and gang-related violent crimes, while others are much safer. In Phoenix as elsewhere, disadvantaged neighborhoods tend to be places where informal social control is low (Sampson et al. 1999); as a result, drugs are easier to get, children are likely to observe people on the street who are drunk or “high,” and neighborhood attitudes are perceived by residents to be more pro-substance use (Kadushin et al. 1998). Adolescents from disadvantaged neighborhoods are more likely to be offered “hard” drugs like cocaine (Crum et. al. 1996), and are more likely to use marijuana at school (Esbensen and Huizinga 1990).

However, neighborhood affluence does not always protect against, and may actually increase the risk of substance use among youth (Ennett et al, 1997; Luthar & Cushing 1999; O'Malley, Bachman & Johnston, 1988). The reasons for these findings are unclear, as affluence-related risk factors for youth drug use are not as well studied as disadvantage-related factors.

Unstable neighborhoods—in which there are few owner-occupied residences, people move in and out frequently and few neighbors know one another—are also risky for adolescents. Sampson et al. (1999) reported an array of deleterious effects of neighborhood instability on youth outcomes even controlling for concentrated poverty, racial/ethnic composition, and individual level-factors. Neighborhood instability increases the risk of adolescent substance

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use because it inhibits parents' participation in parochial social control of other people's children; as a result, crime rates are higher in unstable neighborhoods (Sampson et al. 1997; Sandefur and Laumann 1998). However, life in more stable and socially cohesive neighborhoods may not be uniformly protective against all forms of substance use. Ennett et al. (1997) found that high social trust and neighborhood stability are associated with relatively more cigarette and alcohol use among 5th and 6th graders, and with greater acceptance of substance use.

Neighborhood instability is ubiquitous in Phoenix, and in some respects is more reflective of wealthier suburbs than older, established neighborhoods where the Latino population is concentrated. Although 60% of the occupied housing units in Phoenix are owned rather than rented, only 43% of Phoenix's population has lived in the same house for five years or more (U.S. Census 2000). Ironically, many of the city's most stable neighborhoods are long-established Mexican-American enclaves that are economically stagnant, and thus stability may accord residents few advantages.

Although these studies point convincingly to the ways in which neighborhood crime, disadvantage and instability are substance use risks for adolescents, they do not shed much light on how ethnic composition and the proportion of immigrants might exacerbate or reduce neighborhood risks. These are particularly relevant questions in Sunbelt cities like Phoenix, with its proportionally large and growing Latino and immigrant population.

Neighborhood Racial/Ethnic and Immigrant Composition, Acculturation and Drug Use

The potential link between neighborhood racial/ethnic composition and youth drug use has been theorized as occurring in two ways: directly, through private social control at the family level and ethnic cultural influence on neighborhood risks and protective factors; or indirectly, through its association with socioeconomic and political conditions in the neighborhood that limit or undermine the community's capacity for parochial and public social control (Bursick and Grasmick 1993).

Private Social Control: Mexican Culture and Acculturation

Like other recently developed Sunbelt cities, Phoenix is home to a large number of recent immigrants from Mexico. Although official figures represent an undercount, they indicate that 6% of Phoenix residents were born in Mexico, about a third of whom have been in the U.S. for five years or less (U.S. Census 2000). Phoenix's location just 179 miles from the Mexican border means that it has a large number of undocumented immigrants, estimated in 2000 to number more than 200,000 nationwide (Passel 2002). The large population of recent immigrants from Mexico could affect Phoenix neighborhoods in several ways.

First, immigrant neighborhoods may have closer knit networks of families and neighbors and thus have more effective or pervasive levels of social control over youth (Portes, 1997; Zhou, 1997). Such vigilant monitoring of youth and encouragement of desirable behavior might discourage or suppress youth substance use.

Second, immigrants may also bring with them and retain certain cultural practices that promote health and discourage risk behaviors such as substance use. Evidence of the positive influence of Mexican culture on health behaviors can be seen in the better health outcomes of recent immigrants, compared to their more assimilated counterparts (Landale et al., 1999; Landale, Oropesa, and Gorman, 2000; Morenoff, 2003). However, traditionally Mexican norms governing alcohol and drug use vary by gender, age and social class, and are not uniformly protective. Compared with the mainstream (Anglo) culture, traditional

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Mexican norms are more tolerant of drinking among men than among women and the elderly (Canino, 1994). Culture incompatibility is one possible reason why foreign-born individuals report relatively low rates of a range of risky or unhealthy behaviors, including use of alcohol, cigarette, and illicit drugs (Landale et al., 1999). In rural Mexico, heavy drinking is a ritual of male bonding for laborers enjoying casual work schedules (Lomnitz, 1977); while in urban areas, getting drunk is part of a display of male dominance for lower-class men. Both men and women in the middle- and upper-classes in Mexico tend to drink both more moderately and more often (Madsen and Madsen 1979). The influence of Mexican culture on substance use appears to persist after migration to the U.S., as evidenced in patterns of drinking behaviors similar to those in Mexico among Mexican-Americans in southern Texas (Van Wilkinson, 1989). Compared to other ethnic groups, Mexican-American men are more likely to be heavy and frequent drinkers, and less likely to "mature out" of this drinking style (Caetano, 1988; Finch, 2001; Gilbert and Cervantes, 1986). Traditional Mexican norms may frown on the use of other substances; Mexican-American adolescents who identify strongly with Mexican culture are less likely to be daily cigarette smokers than those who identify with mainstream "White" American culture (Casas et al., 1998). Although these studies suggest that Mexican cultural norms may be strong and persistent for Mexican-American youth, there is evidence that acculturation exerts an equally strong influence. After all, differences in alcohol use among all Latinos are larger by acculturation level than by national origin or heritage (Nielsen & Ford, 2001).

Third, the process of acculturation could also affect substance use. Acculturation involves both individual- and community-level changes that result from contact between two cultures (Berry et al., 1992). It is identified as an important risk factor for substance use and abuse (Epstein, Botvin, & Díaz, 2000, 2001; Gil & Wagner, 2000) both among Mexican immigrants and U.S.-born Mexican-Americans (Samaniego & Gonzales, 1999; Vega & Gil, 1999). Acculturation can increase risk in several ways. First, acculturation may introduce and reinforce behaviors of the mainstream culture, causing value conflicts with the culture of origin (Vega, Zimmerman, Warheit, Apospori, & Gil, 1997; Gilbert & Cervantes, 1986). For example, women in all Hispanic groups consume less alcohol and drink less frequently than women from other ethnic groups, but greater acculturation among these women is associated with more drinking, narrowing or even eliminating the gap between them and non-Hispanic White women (Canino, 1994; Cervantes, et al., 1990/1991). Second, it may induce stress as the individual attempts to resolve conflicting cultural differences, leading to social isolation and problematic or destructive behaviors that attempt to reduce stress, such as drug use (Barnes, 1979; Beauvais, 1998; Bonnheim & Korman, 1985; Gil and Wagner, 2000; Rogler, Cortes & Malgady, 1991). Third, acculturative stress occurs when those surrounded by an unfamiliar culture are forced to make rapid adjustments in self-concept and ways of operating in the world, without the supports enjoyed in the old culture (Vega and Gil 1998). Acculturation stress within family relationships, especially between immigrant parents and their children, has been linked to intergenerational conflict, adolescent rebellion against family rules, affiliation with deviant peers, and decreased parental monitoring, all of which increase the likelihood of adolescent substance use (Birman, 1998; Caetano, 1986; Collins, 1995; Szapocznik & Hernandez, 1988; Vega, Kolody, Hwang & Noble, 1993; Vega and Gil 1998). Fourth, the acquisition of and preference for English enables the children of immigrants to access a larger array of social networks and opportunities for risk behaviors (e.g., drug offers), while making private social control by less-acculturated parents and relatives more difficult (Chilcoat and Anthony, 1996; Duncan, Duncan, Biglan, and Ary, 1998; Escobar, 1998; Feiring & Lewis, 1993; Flannery, Williams & Vazsonyi, 1999). Although culture and acculturation directly affect individuals, they also affect them indirectly because concentrated populations of Mexican-American residents and recent immigrants from Mexico shape neighborhood conditions.

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Parochial and Public Social Control: Immigrant Enclaves, Segmented Assimilation and Oppositional Culture

High proportions of minority residents and recent immigrants might increase anti-drug influences at the school and community level, and thus enhance parochial social control. A Connecticut study found that alcohol, cigarette and inhalant use were lower in racially heterogeneous school districts than in predominantly white districts, while minority children attending school in less diverse districts tended to take on “white” patterns of drug use (Cook, Ungemack and Mark 2001). Areas where immigrants are concentrated tend to have many first generation immigrant children, a selective group that may exhibit higher levels of motivation and industry than their native-born counterparts.

Children who come to the United States as immigrants often exceed second- and third-generation children in educational attainment, wealth, and occupational mobility (Portes and Rumbaut, 2001). The influence of highly motivated immigrant populations may be protective, as demonstrated by findings that drug use is less prevalent among Latinas living in communities with fewer highly acculturated individuals (Finch, Boardman, Kolody & Vega, 2000). Studies at the school level show lower rates of drug use among less acculturated Mexican Americans students who are in schools with high proportions of peers like themselves (Kulis, Marsiglia, Nieri, Sicotte, & Hohmann-Marriott, 2004), as well as a school level “immigrant advantage” in outcomes as diverse as academic failure and obesity (Crosnoe and Lopez-Gonzales, 2005).

But Mexican ethnicity can also be associated with factors that create stress and add to substance use risk, such as racial or ethnic discrimination based on observable traits such as skin color or way of speaking. Mexican immigrants are distinctive in that they tend to have less formal education than other immigrant groups and have been received in the U.S. with more hostility, limiting their social mobility (Portes and Rumbaut 2001). However, Mexican immigrants and their children vary widely in English proficiency, documented or undocumented legal status, migration patterns, such as circular migration back and forth across the border, and time of migration, with some families tracing their ancestry to the time when Arizona was part of Mexico. Mexican-Americans comprise 28% of Phoenix's urban population (only 5% of Phoenix residents are African-American), but tend to be clustered in poor, crime-ridden neighborhoods due to economic necessity, chain migration (Portes 1995), and patterns of ethnic segregation (Massey 1990; U.S. Census 2000).

Many descendents of Mexican immigrants face continued poverty, placing them at risk for ‘minority stress.’ Minority stress affects those who are highly acculturated rather than recent immigrants because familiarity with the dominant culture enables them to better perceive the discrimination they face and their unequal access to opportunities, placing them at greater risk for drug use than immigrants (Hodge, Cardenas & Montoya, 2001; Vega and Gil 1998). Thus, parochial social control may not be strong enough to counter increased risks from minority stress in areas with large populations of highly acculturated racial/ethnic minorities.

The stress of perceived discrimination and inequality may be part of a “segmented assimilation” process for many Latino immigrants, which can contribute to what Portes and Rumbaut (2001) call “downward assimilation.” Portes and Rumbaut argue that the optimism and ambition of Mexican immigrants ultimately gives way to assimilation into “oppositional culture” among the more acculturated second-, third- or higher generations living in a neighborhood context of poverty, segregation and unequal opportunities (Ogbu 1995; Portes 1995; Rumbaut 1995). The stress of being treated as a minority group may lead to the development of a community-wide “oppositional culture” (Ogbu 1995), which views mainstream society as hostile, rejects its goals and values (such as education and sobriety),

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and endorses recognizably “minority” attitudes, behaviors and speech styles (Ogbu 1995). Such cultures can combine an anti-school, pro-drug-use stance with elements of traditional Mexican culture, as in the “Cholo” subculture documented among disadvantaged Chicano youth in East Los Angeles (Dietrich 1998; Vigil 1993). The powerful combination of neighborhood disadvantage, minority stress and oppositional peer culture can then undermine parochial social control, putting highly acculturated Latino adolescents at risk for harmful behaviors (Zatz and Portillos 2000).

Minority stress, oppositional culture, and lack of parochial social control are all fueled by problematic neighborhood conditions such as crime, disorder and lack of resources for youth. These conditions continue to characterize many predominantly Mexican-American neighborhoods in Phoenix, where parents perceive the police as unresponsive and local politicians as neglecting their communities economically (Zatz and Portillos 2000). The spatial development of the Phoenix area has been marked by rapid, uncontrolled economic and suburban growth benefiting mostly Anglos, and the economic stagnation and exclusion of minority neighborhoods in the central part of the city (Bolin, Grineski, and Collins 2005). The lack of political power in minority neighborhoods that results from economic marginalization allows racial/ethnic inequalities to continue, generating continued risk factors for minority adolescents.

One factor often associated with reduced parochial social control is the preponderance of single-mother families; however, this may not be as strong a factor in Phoenix as elsewhere. Less than 20% of Latino families with children in Phoenix are headed by single mothers (about the same percentage as non-Hispanic white families); this is a much lower proportion than in the much smaller groups of American Indian (39%) and African-American families (45%) in Phoenix (U.S. Census 2000). In addition to the relatively low prevalence of single mother families among Latinos in Phoenix, the influence of traditional culture, immigration and acculturation may narrow differences between single-parent and two-parent Latino families. Very traditional two-parent Latino families have a gendered division of labor that resembles single-mother families in some respects. In both types of families, traditional Mexican gender norms require women to care for and socialize children, while in two-parent families men are expected to work and have little to do with childrearing. In addition, low-income immigrant women often hold jobs outside the home, which reduces their ability to monitor children and fulfill their traditional motherhood role whether they are single parents or not (Ehrenreich & Hochschild 2002). On the other hand, social control by parents may be less crucial in Latino communities if mothers, whether single or married, are enmeshed in extended family circles that provide daily assistance and supervision of children. Acculturation processes add another layer of complexity to the matter. Latino men in more acculturated families may assume greater childrearing responsibilities, thus offsetting declines in social control due to mothers' need to work or even raising the level of social control provided in the home (Hondagneu-Sotelo 1994).

Research Questions

Data from a large sample of early adolescents in Phoenix were used in this study to examine the impact of neighborhood factors on the youths' level of recent use of alcohol, cigarettes and marijuana. Analyses explored the impact of neighborhood ethnic, immigrant, and socioeconomic composition, violent crime, residential instability, and family structure on these substance use outcomes, both for the sample as a whole, and for subgroups of youth who differed by ethnicity and acculturation. The study tested a general hypothesis that neighborhood effects on substance use for this sample would be moderated both by ethnicity and acculturation, that is, that neighborhood effects might differ for non-Hispanic White youth and Mexican heritage youth, with further differences among the latter group by their level of acculturation.

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Methods

Individual level data for the analysis come from the baseline survey of a drug prevention study of students from 35 middle schools in Phoenix, more than three-quarters of all such schools within city boundaries. The schools were located in ten districts representative of Phoenix public schools in terms of socioeconomic status and ethnic composition. All schools were Title 1 eligible and had growing Latino student enrollments. All the middle schools in these districts were recruited to participate in the study through contacts with superintendents and the individual school principals (see Harthun, Drapeau, Dustman, & Marsiglia, 2002).

Students of Mexican heritage constituted the majority in most of these schools. The proportion of Mexican or other Latino background students ranged from 21% to 99%, but over three-fourths of the schools had Latino majorities, with non-Hispanic White students typically the next largest group. The schools served primarily lower income, central-city neighborhoods, but they also included several schools located in wealthier, predominantly White areas. Comparisons with other schools in the city showed few differences but the study schools did differ from the profile for the state as a whole. In addition to having larger percentages of Latino students, the study schools tended to have lower achievement test scores but slightly higher attendance rates than the statewide averages (Harthun et al., 2002). Within these schools, every student in 7th grade at the onset of the study was selected as a participant.

Data were collected in fall of 1998, before a drug use prevention curriculum was introduced in schools as part of a randomized trial. University-trained survey proctors administered a 45-minute questionnaire, written in English on one side and in Spanish on the other, during school hours in a science, health, or homeroom class. Proctors informed students that the questionnaire was part of a university research project and that their responses would remain confidential. All students present the day of survey administration agreed to complete the questionnaire. Sample sizes for individual schools ranged from 56 to 725 student respondents. The original respondents represented approximately 87% of the students officially enrolled in the study schools during that semester. Nearly two-thirds (65%) of the initial sample of 4,630 student respondents claimed a Mexican heritage, and the next largest ethnic group was comprised of non-Hispanic Whites, about 16% of the total. In this study we have excluded from all analysis the small numbers of remaining respondents in order to have sufficient numbers of cases to examine ethnic sub-groups separately. Among the excluded were African Americans (8% of the original total), Latinos without a Mexican background (4%), American Indians (2%), and Asian/Pacific Islanders (1%). In addition to the fact that their small size precluded a separate subsample tests for neighborhood effects, non-Mexican Latinos were excluded from the analysis because their diverse national origins may reflect distinctive cultural influences.

The three outcomes examined are Likert scales that measure recent use of alcohol, cigarettes, and marijuana. Key independent variables are measured at the neighborhood level. Additional variables capture demographic information about the individual students, and these are used to control for individual level risk and protective factors for drug use (See Table 1).

Recent substance use

The dependent variables were student reports of alcohol, cigarette, and marijuana use in the last month. Students indicated the number of alcohol drinks consumed (from 1=“None” to 9=“Over 30”), the number of cigarettes smoked (from 1=“None” to 8=“Over two packs”), and the frequency of marijuana use (from 1=”Never” to 6= “16-30 days”) in the prior 30

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days. These survey questions were chosen for their developmental specificity for the age group under study (Flannery, Flannery, Vaszonyi, Torquati, & Fridich, 1994) and for their similarity to measures used in other large studies of early adolescent drug use (Kandel and Wu 1995; Newcomb and Bentler 1986). The original Likert scale responses had skewed distributions toward low amounts or frequency of use, with over 70% of the students indicating that they had not used alcohol, cigarettes or marijuana in the last 30 days. However, there were substantial numbers of students distributed across the full range of substance use amounts and frequency. To deal with the skewness while preserving distinctions between non-users, highly experimental substance users, and heavy users, we transformed the responses by calculating their natural log.

Neighborhood level variables

The neighborhood for each student was defined as the official enrollment boundaries or "catchment" area of the middle school s/he attended. These boundaries, carved through 10 separate school districts, yielded 35 school catchment areas using data obtained from the Arizona Department of Education. Although parents can request to send their children to schools outside the official school boundaries in which they live, both within and across school districts, such transfers are uncommon and nearly all children within each school live nearby. Using Geographic Information Systems software (ArcView), neighborhood level variables were constructed by spatially reconfiguring from Census tracts to the school catchment boundaries. School catchment areas were generally larger than inner-city census tracts. When a school catchment area spanned census tract boundaries, ArcView imputed the relevant data by apportioning data from each of the tracts. Thus, if 50% of a census tract fell into an area, ArcView would designate 50% of the population within that tract to that area. This procedure is extremely accurate when conducted for more dense, inner-city populations. Twenty-three of the 35 areas contain portions of three or fewer census tracts. Our census tract-based measures of neighborhood variables resemble most closely the approach of Aneshensel and Sucoff (1996), who also defined neighborhoods as clusters of from 2 to 15 tracts but used cluster analysis to group them together. Many other studies of neighborhood effects have used single census tracts to define a neighborhood's boundaries (e.g., Brooks-Gunn et al., 1997, Cattarello, 2000). This definition can be defended because the Census Bureau designs tracts to be "relatively homogeneous units with respect to population characteristics, economic status, and living conditions…"[1] Alternate definitions have been employed in neighborhood effects research such as those based on zip codes (South & Baumer 2000; Baumer & South 2001) or on individual perceptions of the neighborhood (Crum et al. 1996).

We constructed five neighborhood level variables from the 2000 U.S. Census Summary File 1 or Summary File 3. These included the percentage of all residents in the school catchment area who indicated that they were: (a) of Mexican ancestry; (b) immigrants to the U.S. within the last five years, (c) in families with incomes below the official U.S. poverty line; (d) living in a different residence five years ago; and (e) in families headed by a single mother. An additional variable—the violent crime rate—was constructed from local police department data on all violent crimes reported within 1/4 mile square crime grids. The aggregation of crime grids into school catchment areas yielded reported violent crime rates for 1999 per 1000 residents in each neighborhood. Crime data from 1999 (when data from Census 2000 were actually collected, and less than a year after the individual survey data were gathered) were aggregated into school catchment areas using ArcView, following procedures similar to those used to generate contextual neighborhood data from Census data. In multivariate tests, each of the neighborhood predictors was first standardized to facilitate

[1]Source: http://factfinder.census.gov/home/en/epss/glossary_c.html, downloaded May 28, 2004.

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comparisons of the size of various neighborhood effects relative to each other and across sub-groups of respondents.

Individual level control variables

In multivariate analyses, several predictors are entered at the individual level to control for well known factors in youth drug use: socioeconomic status, gender, age, academic performance, ethnicity, and acculturation. Socioeconomic status was measured dichotomously, through participation in the Federal school lunch program. Such participation varied significantly by ethnicity, with 86% of the Mexican heritage respondents, 73% of other Latino respondents, and 36% of the non-Hispanic White respondents participating. Students indicated their gender by marking male or female. The student's age was measured in years based on the student's reported birth date. The student's "usual grades in school," on a Likert scale from 0 (mostly F's) to 9 (mostly A's), provided a self-reported global assessment of academic performance.

Ethnicity was considered jointly with linguistic acculturation in the analysis to divide respondents into four categories: Spanish dominant Mexican youth, Bilingual Mexican youth, English dominant Mexican youth, and non-Hispanic Whites, who served as the reference group in multivariate analyses. Students self-identifying only as "White" or "Anglo" were contrasted with those from a Mexican background, that is, who self-identified as "Mexican, Mexican American, or Chicano/a."[2] The Mexican heritage group was divided into three groups through a measure of linguistic acculturation, whether they used Spanish or English as their predominant language.[3] Spanish language dominance was determined by opting to complete a Spanish-language rather than an English-language questionnaire and/or by indicating that one spoke Spanish with friends "all" or "most" of the time. An English dominant Mexican heritage group was comprised of those who indicated they spoke English with friends "all" or "most" of the time. The remaining third group of Mexican heritage respondents were a large bilingual group who indicated that they spoke English and Spanish with friends "about equally."

Although multidimensional measures of acculturation are desirable, such measures were unavailable for the present analysis. While linguistic acculturation captures only one dimension of acculturation, we believe it is sufficiently capable of yielding meaningful results for three reasons. First, linguistic acculturation accounts for up to 65% of the variance in multidimensional measures of acculturation (Rogler et al., 1991; Samaniego & Gonzales, 1999). Second, it is commonly used in substance use research that has demonstrated that this overall measure of acculturation is a good predictor of substance use by Latino youth (Epstein, Botvin and Diaz, 2000, 2001). Third, there are several mechanisms through which linguistic acculturation may influence substance use. Because children learn English faster than adults, the acculturation gap between parents and children may lead to family conflict (Marsiglia et al. 2002; Rogler et al. 1991), which can undermine families' ability to monitor their children (Chilcoat and Anthony 1996; Zatz and Portillos 2000). English language acquisition also facilitates social networking with native born youth and may lead to adoption of permissive mainstream drug norms and behaviors (Escobar 1998). Bilingualism or maintenance of the native language is associated with less substance use for youth (Kulis, Napoli, and Marsiglia 2002). For these reasons, we view the use of the linguistic acculturation measure to be justified.

[2]About 17 percent of the Mexican heritage respondents identified with another ethnic or racial group, most commonly as "white" or "American Indian," which arguably reflects for many of them an amalgamated Mexican "mestizo" cultural identity more than a truly multi-ethnic one.

[3]Differences in language use among "White" respondents could not be analyzed. We excluded from analysis seven "White" respondents (e.g., Bosnians) who reported speaking a language other than English with friends.

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Although individual level measures of ethnicity, acculturation, and SES were included in the analysis, some neighborhood measures had no clear parallel at the individual level. Data were unavailable to control for individual-level residential instability, family structure, or years since arrival in the United States.

Analysis strategy

After presenting bivariate relationships with the substance use outcomes and considering interrelationships among the neighborhood level variables and how the latter varied across subgroups of students from different ethnic and acculturation backgrounds, the key tests of the impact of neighborhood factors are examined with multivariate mixed models. These procedures address the nesting of individual student data within schools, and the fact that the neighborhood and schools levels were defined as being equivalent. We used SAS Proc Mixed to estimate fixed effects while accounting for random effects at the neighborhood/school level. All neighborhood effects are examined after controlling at the individual level for SES, ethnicity, acculturation, gender, age and academic performance. Tests for neighborhood effects were first conducted on the total sample of Mexican heritage and non-Hispanic White adolescents, and then for sub-groups of respondents separated by ethnicity and level of linguistic acculturation. Tests for whether neighborhood effects were moderated by ethnicity and acculturation were performed using interaction terms, which are described in the text and summarized in tabular results.

Results

Descriptive statistics for all the variables in the analysis are presented in Table 1 at the individual unit of analysis. After eliminating respondents who were neither Mexican heritage nor White there were 3,721 respondents, although somewhat fewer provided complete information on the outcome and some control variables. Most respondents were of Mexican heritage (80%) and the remainder non-Hispanic Whites. Students ranged from 11 to 17, but 86% were either 12 or 13 years old, the age that is typical for 7th graders. There were nearly equal numbers of girls and boys. Most of the students were from lower income families, receiving either a free (74%) or reduced (7%) price federally subsidized school lunch.

The means for substance use in Table 1 are after the original Likert scales were logged, and hence cannot be interpreted directly. Examining the original variables (not presented), only 17% reported one or more alcohol drinks in the last 30 days and a somewhat smaller percentage reported any last 30 day cigarette (13%) or marijuana use (14%). Among those who did drink alcohol the mode was between 2 and 3 recent drinks. Relative to these figures, the national proportions for eighth graders—one year older than the sample youth—are roughly similar: 20% of eighth graders reporting they consumed alcohol in the last 30 days (Johnston, O'Malley & Bachman, 2003). Most cigarette and marijuana users appeared to be experimenting, with the mode among users being just one cigarette and one episode of marijuana use in the last month. The typically modest amounts of use need to be remembered in interpreting results. Although they constituted small minorities (3-4%), the sample included substantial numbers (N > 100) of students who were regular or heavy substance users, such as drinking alcohol and using marijuana more than once per week.

The students tended to live in predominantly Mexican heritage neighborhoods, but the presence of residents of Mexican heritage in the community ranged widely, from 7% to 77%. A high degree of residential instability was also typical, with most students living in neighborhoods where more than half the residents had lived in different residences five years earlier. However, there were no neighborhoods where recent immigrants were predominant, and some where there were nearly none. Although most students lived in

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neighborhoods with poverty rates substantially higher than the national average, the poverty rates varied from less than half to almost five times the national rate. There was also great variation in violent crime rates and the proportion of single mother families, from relatively quite low to very high.

Correlations with the substance use outcomes in Table 2 indicate that there were much stronger relationships with individual than with neighborhood level variables. More alcohol, cigarette and marijuana use was reported by males and by students with relatively poorer grades. Older students reported more cigarette and marijuana use. Spanish dominant Mexican heritage and Non-Hispanic White respondents tended to report less substance use, while English dominant Mexican heritage respondents reported more such use. Small correlations with some neighborhood level variables appear both in expected and unexpected directions. Respondents in poorer neighborhoods reported more cigarette and marijuana use, those in more crime-ridden neighborhoods reported more alcohol use, and those in neighborhoods with many single mother households reported more marijuana use. Unexpectedly, neighborhood residential instability was associated with less alcohol and marijuana use, and students from neighborhoods with more Mexican heritage residents reported more cigarette use.

In preliminary analyses, we also investigated interrelationships among the predictors at the neighborhood level, and tested for differences in the distributions of neighborhood factors among respondents from different ethnic and acculturation subgroups (results not presented in tables). Although there were some moderately strong positive correlations between the neighborhood predictors – for example, indicating that neighborhoods with higher concentrations of Mexican background residents tended to have higher poverty rates ($r = .69$) – an analysis of variance inflation factor statistics (VIFs) using OLS regression procedures showed that they would pose no problem of multicollinearity in multivariate models. The VIFs were satisfactory, all less than 6 and nearly all less than 2. Furthermore, model effects remained stable when the three most highly correlated neighborhood variables (% Mexican background, % recent immigrants, % poor) were each entered as predictors without the other two (not presented).

ANOVA tests for differences in means with Scheffé contrasts demonstrated consistent differences between White and Latino students, as well as between more and less acculturated Latinos (results not presented in tables). Compared to Non-Hispanic Whites, Latino students lived in neighborhoods with significantly higher percentages of Mexican heritage residents, recent immigrants, and families with incomes below the poverty line. Among the Latino students, those who were less linguistically acculturated (Spanish dominant or bilingual) differed from more acculturated students (English dominant) along the same lines, i.e., they lived in neighborhoods with more Mexican heritage residents, more recent immigrants, and more poverty. Differences in violent crime rates were confined to two Latino groups, with the most acculturated (English dominant) students exposed to higher neighborhood crime rates than bilingual students. Neighborhood residential instability was significantly higher for Spanish dominant Latinos and for White students than for English dominant Latinos, the group who lived in the most residentially stable neighborhoods. Although there were no significant differences across ethnic and acculturation subgroups in the neighborhood proportion of single mother families, the differences on other neighborhood variables was an additional reason to investigate how neighborhood effects on substance use might vary across these subgroups.

Table 3 presents results for the total sample from multivariate mixed models that account for random effects at the neighborhood level while controlling for individual level predictors of recent alcohol, cigarette and marijuana use. The neighborhood predictors include the impact

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of the neighborhood's ethnic and immigrant composition, its socioeconomic composition (poverty), and level of neighborhood disorganization and social control (violent crime rate, residential instability and single mother households). Overall, the models show that, while individual characteristics are mostly consistent predictors of all three substance use outcomes, neighborhood level influences are rarely appreciable factors for the combined sample of Latino and White students after individual level and other neighborhood level influences are controlled. Only one neighborhood effect was statistically significant—residential instability—and it emerged only as a risk factor for cigarette use, an outcome that did not show the same relationship with the neighborhood variable at the bivariate level. Individual level effects mostly mirrored those shown in bivariate results. Males were more at risk of cigarette and marijuana use than females, but no significant gender differences in alcohol use emerged. Students with poor grades and older students used more of all three substances. Students from lower SES families reported less alcohol and marijuana use in the multivariate tests, although not in the bivariate results. Finally, there were substantial differences in substance use by ethnicity and acculturation. Compared to the non-Hispanic White students in the reference group, the most linguistically acculturated Latino students used more of all three substances, and bilingual students used more alcohol and marijuana than White students. In contrast, the least linguistically acculturated students used cigarettes less than White students did.

More persuasive and patterned evidence of neighborhood effects emerged only after investigating ethnic and acculturation subgroups separately. Table 4 presents tests of individual and neighborhood level effects first for the three Mexican heritage student subgroups who were distinguished by level of linguistic acculturation, and compared to a fourth group of non-Hispanic White students (Table 4). Significant neighborhood level effects appeared for each of the three substances, but they tended to be confined to a particular subgroup, and that subgroup varied by substance. One important overall finding, however, was that there was no evidence of significant neighborhood effects for White students; all the neighborhood effects appeared for subgroups of Mexican heritage students. This supported the hypothesis that neighborhood effects would be moderated by ethnicity, i.e., that they would impact Latino and White students in different ways or to different degrees. Tests of interaction effects, described below, showed that many of these ethnic differences in neighborhood effects were statistically significant.

Differences in neighborhood effects among the three Mexican heritage groups emerged in distinctive patterns. Significant neighborhood effects on cigarette use were confined to the most acculturated English dominant group, and effects on marijuana were restricted to the bilingual group. Different neighborhood effects on alcohol appeared for the least acculturated Spanish dominant group as well as the most acculturated English dominant group. For the two variables measuring the ethnic and immigrant composition of the neighborhood, effects were in the same direction across substances and across the acculturation spectrum. Alcohol and marijuana use was higher for certain students from neighborhoods with higher proportions of Mexican heritage residents, and use of all three substances was lower for subgroups of students from neighborhoods with many recent immigrants. Both of these neighborhood effects predicted alcohol use among the least acculturated students, as well as marijuana use by the bilingual students. The protective effects of high immigrant neighborhood composition against cigarette use appeared only for the most acculturated subgroup.

Two other neighborhood variables had significant effects on different substances and on different Mexican heritage subgroups, although in different directions. Residential instability predicted heavier cigarette use by the most acculturated English dominant students, but less marijuana use by the bilingual group. The neighborhood proportion of single mother

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families was related in the opposite way, predicting less cigarette use by the most acculturated subgroup, but less marijuana use by the bilingual group. Lastly, there were scattered undesirable effects of neighborhood violent crime and poverty only among the most acculturated students for whom these variables predicted increased alcohol and cigarette use, respectively.

To determine if the variations in neighborhood effects across the subgroups represented significant differences by ethnicity and acculturation, two types of tests for moderator effects were conducted using interaction terms. Using the combined sample, we tested for moderation by ethnicity, whether any of the neighborhood variables predicted the outcomes in significantly different ways for Mexican heritage versus non-Hispanic White students (indicated by $_{H}$ to the right of the coefficient for Whites in Table 4). Similar tests for moderation by linguistic acculturation were repeated on the Mexican heritage students only, testing whether the neighborhood effect for each acculturation subgroup differed significantly from the effects for the other two subgroups (indicated by $_{I}$ to the right of the group that differed). Tests for ethnic differences—between Mexican heritage and White students—showed significant differences in the effects of neighborhood Mexican composition on alcohol use, in the effect of neighborhood immigrant composition on alcohol and cigarette use, in the effect of neighborhood residential instability on cigarette use, and in the effect of the concentration of single mother families on marijuana use. In most of these instances, the neighborhood effect for White students, although non-significant, was of appreciable size and in the opposite direction of the significant effect shown for a Mexican heritage subgroup. The tests for differences among students of Mexican heritage showed generally that particular neighborhood effects applied to only one of the linguistic acculturation subgroups and not to the other two. One exception was the effect of neighborhood residential instability. Such instability appeared to protect bilingual students from alcohol and marijuana use more than for other Mexican heritage students. English dominant students, who evidenced a contrary, undesirable impact of residential instability on cigarette use, were shown to differ not from other Mexican heritage students but only from White students.

In additional exploratory analysis (results not presented), we investigated alternative definitions of neighborhood level ethnic, immigrant and socioeconomic composition. To help clarify the salience of Mexican cultural or social influences in the neighborhood, we substituted for the first measures (% Mexican heritage) the percentage of neighborhood respondents born in the U.S. but of Mexican heritage and substituted for the second measure (% recent immigrants) the percentage who were born in Mexico (regardless of time in the U.S.). Results showing significant neighborhood influences were similar using the first substitution but there were no significant effects using the second substitution. This suggested that effects due to the prevalence of Mexican heritage residents in the neighborhood may be attributable to the presence of second and later generations, while the more salient immigrant composition effects are attributable to relatively recent arrivals.

Discussion

This study focused on neighborhood factors associated with youth alcohol, cigarette, and marijuana use. Many results appear in patterns that align with theories of neighborhood influences, including suggestions that immigrant adaptation and segmented assimilation processes influence youth at both individual and group levels. The findings showing an apparently protective effect of high concentrations of recent immigrants against use of all three substances, but only by Mexican heritage respondents, is a pattern that is perhaps better anticipated in the “immigrant advantage” literature than in the neighborhood effects literature. What is curious is that these effects are substance-specific to different linguistic

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acculturation sub-groups: less alcohol use for the Spanish dominant in heavily immigrant neighborhoods, but less marijuana use for the bilingual, and less cigarette use among the English dominant.

The reasons for these substance- and sub-group-specific effects require greater study. Perhaps there is a clue in that two of these protective effects due to immigrant composition – involving the less linguistically acculturated Spanish dominant and bilingual groups—were accompanied by effects suggesting that more thoroughly "Mexican" neighborhoods present risk factors for use of the same substances. Recall that the latter measure included the second and later generations of Mexican heritage residents, and that we obtained similar results with a measure restricted to the neighborhood composition of native U.S. born residents of Mexican heritage. The results at the individual level suggest some parallels, such as the consistent finding that less linguistically acculturated Mexican heritage youth are at substantially less risk of substance use, and that their most linguistically acculturated counterparts are actually at higher risk of use of some substances than native born Whites. These findings align well with arguments that Latino immigrants undergo a process of segmented assimilation that is different from that of European and some other immigrant groups.

Taken together, these findings regarding recent immigrant and "Mexican" neighborhood composition may relate to differences in the overall availability and level of use of substances, the focus of cultural norms regarding substance use, access to wider peer networks of more acculturated youth, and the operation of "oppositional" culture. Less linguistically acculturated youth may have more or less access to substances depending on their encapsulation within immigrant enclaves on the one hand, or exposure on the other hand to wider networks that include second and later generation peers with more substance use experience and opportunities.

The neighborhood effects were confined to alcohol for the least linguistically acculturated Spanish dominant group, perhaps because alcohol is the least stigmatized and most commonly used substance in Mexican culture. In contrast, the bilingual youth may have more variation in exposure to illicit substances like marijuana because they are integrated, by definition, with both English and Spanish speaking peers; their use levels seem to balance between the mitigating influence of proportionally more recent immigrants and the exacerbating influence of more acculturated neighborhood residents of Mexican heritage. The latter may reflect greater adherence to unconventional or oppositional norms, such as contempt for education and participation in drug subcultures. Among youth who are more acculturated, the progressively weakened influence of Mexican cultural traditions may be accompanied by persistent structural barriers to full participation within the middle-class mainstream, perhaps producing the "downward assimilation" among second- and third-generation Mexican-American children discussed by Portes and Rumbaut (2001). In neighborhoods where there is a large population of second- and third- generation Mexican-Americans but few recent Mexican immigrants, immigrant children may be on an assimilation path where their guides have multi-generation experience of discrimination as they learned to become ethnic "minorities." In the process they may have lost some of the protective aspects of Mexican culture while facing formidable structural conditions that lessen their chances for upward mobility. When considered along with the desired outcomes associated with higher neighborhood concentrations of recent immigrants, which also extended to English dominant respondents' use of cigarettes, these findings may suggest that the protective effects of Mexican culture on youth living in immigrant enclaves sometimes extend beyond the immigrant youth themselves to their more acculturated counterparts living nearby (Marsiglia & Waller, 2002).

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Other neighborhood structural effects that conform to prevailing theories of neighborhood effects on risk behaviors include the positive relationships between violent crime rates and alcohol use, and between poverty rates and cigarette use. These two neighborhood conditions are often is described in terms of social disorganization and a lack of social control. Here children are less “safe” in a variety of ways, less well protected by parents and other adults, and thus perhaps more subject to peer influences to engage in substance use.

Two of the remaining neighborhood variables produced effects in opposite directions for different sub-groups of respondents. Neighborhood residential instability was associated with more cigarette use among the English dominant but less use of marijuana among the bilingual group. For the first group such high rates of neighborhood turnover may reflect the social disorganization and lack of social control so often described in the neighborhood effects literature, but for the bilingual, residential instability may impede the ability to develop or cement ties with deviant peers who have access to marijuana.

The presence of many single mother households in the neighborhood was, conversely, associated with less cigarette use among the English dominant and more marijuana use among the bilingual. The reasons for this pattern are difficult to find in theory. They may have some relationship to the absence of male models of cigarette use in the family in the first instance, and the relative lack of parental monitoring of deviant peers in the second instance. That single mother households in the neighborhood may be protective, if only for a specific group, runs counter to prior research and suggests a need for investigation into the characteristics of single mother households in predominantly Latino and immigrant neighborhoods in sunbelt communities like Phoenix. The lack of information in our data about individual family composition and history allows us only to speculate about the underlying dynamics at work. It may be that there are differences in employment status, gender role norms, social support resources, and other factors that operate to permit these single mothers to provide effective social control during different stages of the acculturation process.

Finally, the absence of links between neighborhood factors and substance use by non-Hispanic White students underscores the need to consider inter- and intra-ethnic variability in future research on the impact of neighborhoods on youth. The lack of evidence of neighborhood influences on White youth could be a reflection of different patterns of familial, peer, school, and neighborhood social integration for this group. Most White youth were parts of numerical minorities in their schools and among youth in their neighborhoods; they also lived in relatively more residentially unstable neighborhoods. However, the different results may be due to low statistical power, given the smaller size of the White group. It is notable that the effects of neighborhood immigrant composition and violent crime were in the same direction and usually about the same size for Whites as for the Latinos who showed significant neighborhood effects.

Overall, the results demonstrate both that patterns of neighborhood disadvantage are especially risky for certain groups of ethnic minority youth, and that the youth appear to have cultural and social resources to draw upon from their immigrant heritage. Although small, neighborhood influences on substance use are appreciable, and their impact in a large southwest city appears to be shaped by patterns of immigration and ethnic composition, residential settlement and economic development, as well as cultural history. Just as the experiences of different immigrant and ethnic groups vary enormously, regional and community level variations may play an important role in how neighborhood factors affect youth substance use.

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Limitations

Interpretation of the neighborhood effects we found is limited by the fact that our models included only structural factors, and not direct measures of the intermediate social processes that they are hypothesized to influence, such as “collective efficacy” for children, and individual perceptions of neighborhood dangers. The somewhat scattered set of neighborhood effects raises cautions that they may reflect accumulated random error from multiple tests. Another limitation is the absence of individual/household measures of residential instability, family structure, and years since arrival in the U.S. as controls. It is possible that a different picture of neighborhood effects would emerge if these individual level measures had been included in the models.

Additionally, the findings here were based on distinctions among Mexican heritage youth by level of linguistic acculturation. Had we used multidimensional measures of individual acculturation, such as measures that capture attitudes and norms, we may have found more consistent patterns. In addition, our findings are limited to an investigation of neighborhood effects on substance use by Latino youth of Mexican heritage and how they compare to effects for non-Hispanic White youth living in the same neighborhood. Because of their sparse representation in Phoenix public schools and in our sample, we were unable to explore neighborhood influences on youth from other ethnic groups, including African Americans, American Indians, Asian Americans, and Latino youth from families with Caribbean, Central American and South American origins. Just as we have presented evidence suggesting that neighborhood effects may have distinctive influences for certain groups of Mexican heritage youth, research on these other ethnic groups is needed to complete the picture of how neighborhood ethnic and socioeconomic composition can affect youth substance use.

As in other studies of neighborhood factors in residents' drug use, we find their impact is restricted to a similarly small range, especially in comparison to individual level predictors. This is perhaps an inevitable result of the greater degree of variation to be found within than between neighborhoods (Duncan and Raudenbush 1999). It also suggests that the youths' individual characteristics are more salient than neighborhood characteristics in understanding their drug use behaviors. Our results contain repeated indications that among Mexican heritage youth, a lower level of linguistic acculturation—Spanish monolingualism—is associated with substantially less substance use while greater linguistic acculturation—English monolingualism—is linked to more substance use even in comparison to non-Latino whites.

Despite the study's limitations, findings point to the protective or resiliency effects of family and culture of origin and align with theories of segmented assimilation that maintain that second and later generation Latinos face problematic choices in attempting to become culturally and socially integrated into mainstream society. More research is needed that integrates family, peer and community characteristics into a model of youth substance use, while controlling for key identified factors such as ethnicity, multidimensional acculturation and generation status. Such research can advance prevention science and policy by identifying forms of biculturalism in neighborhoods that operate as a natural prevention mechanism. Similarly, research that distinguishes neighborhood and school context promises to be informative. In other research we have explored how school context influence individual substance use (Kulis, Marsiglia, Nieri, Sicotte, and Hohmann-Marriott, 2004). A logical next step is to examine how school and neighborhood influences operate in tandem to influence youth outcomes.

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Table 1

Descriptive Statistics for Study Variables

Variable	N	Mean	S.D.
Outcomes			
Recent Alcohol Use	3699	0.39	0.65
Recent Cigarette Use	3704	0.54	0.71
Recent Marijuana Use	3684	0.15	0.42
Neighborhood Predictors			
% Mexican Background	3721	50.18	18.79
% Recent Immigrants	3721	12.55	5.77
% Officially Poor	3721	24.09	9.43
Total Violent Crime Rate	3721	24.04	15.45
% Different Residence 5 Years Ago	3721	54.52	8.56
% in Single Mother Family	3721	24.75	5.77
Individual Predictors			
Gender: Male=1; Female=0	3623	0.51	0.50
Usual Grades	3693	6.56	1.84
In School Lunch Program (Y=1; N=0)	3721	0.81	0.39
Age in Years	3721	13.05	0.78
Mexican Heritage, Spanish Dominant	3721	0.13	0.34
Mexican Heritage, Bilingual	3721	0.30	0.46
Mexican Heritage, English Dominant	3721	0.37	0.48
Non-Hispanic White	3721	0.20	0.44

* $p < .05$

** $p<.01$

*** $p<.001$

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Table 2

Correlations between Recent Substance Use and Study Variables

	Alcohol	Cigarettes	Marijuana
Outcomes			
Recent Alcohol Use	….	0.453***	0.482***
Recent Cigarette Use	0.453**		0.457***
Recent Marijuana Use	0.482**	0.457***	….
Neighborhood Predictors			
% Mexican Background	0.027	0.037*	0.024
% Recent Immigrants	−0.027	0.012	−0.009
% Officially Poor	0.012	0.055***	0.053**
Total Violent Crime Rate	0.059***	0.018	0.031
% Different Residence 5 Years Ago	−0.066***	−0.001	−0.046**
% in Single Mother Family	0.003	0.017	0.043**
Individual Predictors			
Gender: Male=1; Female=0	0.039*	0.097***	0.089***
Usual Grades	−0.136*	−0.200***	−0.191***
In School Lunch Program (Y=1; N=0)	−0.032	0.014	−0.025
Age in Years	0.046	0.069***	0.078***
Mexican Heritage, Spanish Dominant	−0.068***	−0.108***	−0.064***
Mexican Heritage, Bilingual	0.001	0.017	−0.016
Mexican Heritage, English Dominant	0.093***	0.111***	0.126***
Non-Hispanic White	−0.054***	−0.056***	−0.068***

* p < .05

** p<.01

*** p<.001

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Table 3

Neighborhood and Individual Level Predictors of Recent Substance Use, Total Sample

	Alcohol	Cigarettes	Marijuana
Neighborhood Predictors			
% Mexican Background	.079 (.047)	.051 (.044)	.002 (.028)
% Recent Immigrants	−.030 (.047)	−.076 (.044)	−.006 (.028)
% Below Poverty Line	−.034 (.044)	.039 (.042)	.016 (.027)
Violent Crime Rate	.036 (.019)	.014 (.018)	.015 (.012)
% Different Residence	.011 (.029)	.057* (.028)	−.007 (.018)
% Single Mother Family	.015 (.027)	−.036 (.026)	.013 (.016)
Individual Predictors			
Gender: M=1; F=0	.022 (.021)	.096*** (.023)	.050*** (.014)
Usual Grades	−.042*** (.006)	−.064*** (.006)	−.036*** (.004)
In School Lunch Program	−.132*** (.033)	−.053 (.035)	−.098*** (.022)
Age in Years	.048** (.015)	.097*** (.016)	.049*** (.010)
Spanish Dominant	−.010 (.043)	−.157*** (.046)	.012 (.028)
Bilingual	.079* (.037)	.050 (.040)	.057* (.024)
English Dominant	.152*** (.034)	.118** (.037)	.132*** (.022)
Intercept	.364*** (.042)	.410*** (.044)	.101*** (.027)
N	3570	3575	3557
−2 Res. Log Likelihood	6921.6	7465.6	3758.5

* p < .05

** p<.01

*** p<.001

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Table 4

Neighborhood and Individual Level Predictors of Recent Substance Use, by Ethnic and Acculturation Subgroups

	Alcohol				Cigarettes				Marijuana			
	Spanish Dominant	**Bilingual**	**English Dominant**	**White**	**Spanish Dominant**	**Bilingual**	**English Dominant**	**White**	**Spanish Dominant**	**Bilingual**	**English Dominant**	**White**
Neighborhood Predictors												
% Mexican Background	.149* *I* (.075)	.015 (.003)	.036 (.070)	−.039 *H* (.073)	.003 (.074)	−.023 (.084)	.019 (.054)	−.007 (.091)	−.015 (.073)	.078* *I* (.033)	.002 (.048)	−.008 (.050)
% Recent Immigrants	−.187* *I* (.076)	.008 (.060)	−.011 (.068)	−.007 *H* (.089)	−.001 (.076)	−.029 (.076)	−.149** *I* (.056)	.136 *H* (.111)	.016 (.067)	−.074* *I* (.033)	−.027 (.046)	−.050 (.046)
% Below Poverty Line	−.032 (.057)	−.043 (.055)	.026 (.076)	−.061 (.083)	−.044 (.057)	.012 (.070)	.142* *I* (.060)	−.108 *H* (.102)	−.035 (.053)	−.019 (.030)	.057 (.052)	.025 (.016)
Violent Crime Rate	.024 (.028)	.009 (.026)	.062* *I* (.028)	.007 (.029)	−.030 (.028)	−.001 (.032)	.018 (.022)	.053 (.036)	−.013 (.026)	−.002 (.015)	.025 (.019)	.012 (.024)
% Different Residence	.085 (.051)	−.050 *I* (.040)	.010 (.043)	.018 (.043)	.031 (.051)	.024 (.052)	.082* (.036)	−.014 *H* (.054)	−.022 (.045)	−.080*** *I* (.022)	.025 (.030)	.012 (.024)
% Single Mother Family	.005 (.040)	.015 (.033)	.008 (.043)	−.036 (.052)	−.022 (.041)	−.025 (.042)	−.083* *I* (.036)	.016 (.064)	−.007 (.036)	.040* *I* (.019)	−.009 (.030)	−.047 *H* (.029)
Individual Predictors												
Gender: M=1; F=0	.068 (.051)	−.032 (.040)	.053 (.038)	.000 (.044)	.171** (.053)	.093* (.043)	.048 (.039)	.140** (.052)	.086** (.028)	.020 (.024)	.064* (.027)	.035 (.024)
Usual Grades	−.022 (.016)	−.037** (.011)	−.049*** (.010)	−.045*** (.013)	−.053** (.016)	−.054*** (.012)	−.065*** (.010)	−.087*** (.016)	−.007 (.009)	−.033*** (.007)	−.050*** (.007)	−.021** (.007)
In School Lunch Program	−.296* (.118)	−.118 (.076)	−.151* (.059)	−.110* (.052)	−.138 (.119)	−.177* (.081)	−.107 (.060)	.029 (.061)	−.165* (.069)	−.134** (.047)	−.098* (.042)	−.073* (.029)
Age in Years	.071* (.036)	.039 (.027)	.061* (.026)	.023 (.035)	.062 (.036)	.073* (.029)	.138*** (.027)	.064 (.041)	−.006 (.020)	.053** (.016)	.089*** (.019)	−.014 (.019)
Intercept	.496*** (.122)	.474*** (.080)	.508*** (.065)	.341*** (.064)	.345* (.123)	.642*** (.088)	.564*** (.064)	.384*** (.078)	.228*** (.036)	.220*** (.049)	.185*** (.046)	.133* (.036)
N	465	1069	1334	702	465	1071	1335	704	464	1066	1324	703
−2 Res. Log Likelihood	817	2148.9	2827.2	1273.6	840.2	2316.3	2920.2	1520.2	284.6	1063.9	1885.6	455.6

* p < .05

** p<.01

*** p<.001

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[H] Tests for interaction effects: significant differences in this neighborhood effect for Mexican heritage versus non-Hispanic White students (H) at $p < .05$.

[I] Tests for interaction effects: significant differences in the neighborhood effect between this and the other two Mexican heritage acculturation subgroups.