Stress burden, drug dependence and the nativity paradox among U.S. Hispanics

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Abstract

It seems well established that exposure to social stress, including acculturation stress, increases risk for psychiatric and substance problems, and that the disadvantaged experience higher levels of such exposure. Such evidence points to the expectation that immigrant minority groups must be at elevated risk relative to their native-born counterparts. That the opposite appears to be true for various immigrant groups within the U.S. constitutes what has been referred to as the nativity health paradox. This paper examines the association between nativity and drug dependence among the distinctive and understudied Hispanic population of South Florida and attempts to evaluate competing explanations for the apparent advantage of immigrant populations. Based on data on a representative sample young adults of Cuban and other Hispanic backgrounds (n = 888), we found the paradox to be limited to women and confirmed the finding of prior research that acculturation plays a major role in explaining this difference in risk. We also found cumulative exposure to major and potentially traumatic events to be lower rather than higher among immigrants, to be a strong predictor of drug dependence and to contribute importantly toward accounting for observed nativity differences among women. Taken together, cumulative stress exposure and degree of acculturation explained 40% of the nativity difference. Finally, our results suggest that social support matters for risk primarily because such support more effectively acts to reduce exposure to social stress among foreign-born young Hispanic women.

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Keywords: Hispanic; Nativity; Drugs; Dependence; Acculturation; Stress

1. Introduction

The “stress process model” (Billings and Moos, 1982; Pearlin, 1989; Pearlin et al., 1981) has become a highly prominent theoretical framework for conceptualizing both status differences in health and variations in the risk, and protective factors implicated in these differences. This model developed out of a recognition that the health significance of life stress depends upon more than differences in the extent of stress exposure, involving also the influence of social and personal resources that exert both mediating and moderating effects in the linkage between stress exposure and health outcomes.

Research accumulated over the past 20 years has provided strong support for the utility of this model (Aneshensel and Phelan, 1999; Avison and Gotlib, 1994; Kaplan, 1983). For example, the stress process has been reported to account for a substantial minority of observed differences in depressive symptomatology across individuals and for a large portion of reliably observed variation across social statuses (Turner and Lloyd, 1999). In addition, there is now convincing evidence that a high level of cumulative exposure to major stressors increases risk for the occurrence of drug dependence as well as the occurrence of depressive and/or anxiety disorders (Turner and Lloyd, 2003, 2004).

A fundamental proposition associated with this framework is that social positions substantially define the conditions of life to which individuals are subjected (Kohn, 1969, 1972). To the extent that important differences in personal histories and in current social conditions tend to be conditioned by social statuses, including those of gender, ethnicity and nativity, the hypothesis follows that relationships between these statuses and substance use problems at least partially arise from status variations in exposure to stress.

Research has also established three additional points of relevance to this paper. The first is that the significance of
social stress for mental health and substance use risk has been demonstrated to apply within as well as across groups described by gender, race, ethnicity, and socioeconomic status (Aneshensel and Phelan, 1999). Second, exposure is differentially distributed such that disadvantaged groups tend to experience significantly higher levels of social stress (Turner and Avison, 2003; Turner et al., 1995). Third, the acculturation process is a source of stress that has been linked with health and substance-use risk in studies within the United States (e.g. Cobas et al., 1996; Vega et al., 1999a,b), and throughout much of the rest of the world (Al-Issa and Tousignant, 1997).

However, in most countries for which data are available, immigrant status has been found to be associated with elevated risk for mental health and drug-use problems relative to being native-born. For example, this pattern of findings has been observed among Southeast Asian immigrants in Canada (Amaral-Dias et al., 1984; Morgan et al., 1984), Turkish immigrants in Belgium (Gailly, 1997), former Soviet Union residents in Israel (Schiff et al., 2005), South Sea Island immigrants to Australia (Kahn and Fua, 1995), and four immigrant minority groups in Sweden (Anders, 2001).

Taken together, this array of evidence points strongly to the expectation that immigrant minority groups must be at elevated risk for mental health and substance problems relative to their native-born counterparts. After all, they tend to be of comparatively low socioeconomic status and it is clear that they experience higher levels of acculturation stress. That the evidence, at least with respect to Hispanic immigrants in the U.S., is contrary to this expectation constitutes a highly provocative paradox, the answer to which may be of substantial significance to prevention science. This paper examines the association between nativity and drug dependence among the distinctive and understudied Hispanics resident in South Florida and attempts to evaluate competing explanations for the apparent advantage of immigrant populations.

2. Background

Although there is evidence that the health paradox among Hispanics extends to groups of differing national origins, this apparent advantage has been best documented with respect to Mexican Americans (Scribner, 1996). It appears that this paradox with respect to psychiatric and substance use problems was first convincingly demonstrated by the Los Angeles site of the Epidemiologic Catchment Area studies (Hough et al., 1983; Robbins and Regier, 1991). U.S.-born Mexican Americans were found to have higher rates of several disorders, including drug abuse or dependence, than Mexican immigrants (Burman et al., 1987). In a comprehensive subsequent study of both rural and urban participants and employing DSM-III-R criteria, Vega et al. (1998) confirmed the paradox, observing a prevalence rate for any study disorder among U.S.-born persons of Mexican descent that was double that observed among immigrants. With respect to drug dependence, the prevalence among immigrants was less than a quarter of that observed for the native-born. Importantly, Vega et al. (1998) also provide a comparison with rates observed in Mexico City. In general, rates of psychiatric disorders among immigrants residing in the U.S. less than 13 years were similar to those observed for Mexico City residents. For drug dependence, the prevalence among Mexico City residents was substantially lower than for recent immigrants to the U.S. (0.8 and 3.0%, respectively), effectively ruling out the “healthy immigrant” hypothesis as an explanation. Consistent with some prior arguments (Scribner, 1996; Vega and Rumbaut, 1991) Vega et al. (1998) note “Mexican immigrants share the lower risk status of their national origin, but acculturation has deleterious effects on many aspects of their health at the population level” (p. 777).

It does seem clear that this group-level difference in health risk must be attributable to systematic group-level differences in social experience. Although more specific hypotheses have been offered (León, 2002), most are associated with the acculturation hypothesis—the idea that aspects of Hispanic culture are protective and their loss or diminishment through acculturation represents the most plausible explanation for the paradox (Scribner, 1996). Low acculturation may act to reduce risk by buffering the impact of social stress or by limiting exposure to stressful circumstances and events, or both. In addition, the apparent significance of low acculturation may arise largely from associated differences in family social support. A prominent hypothesis in the field is that social support from family, assumed to be characteristically high within Hispanic cultures, contributes to the lower rates of disorder among recent immigrants (Escobar, 1998). This paper assesses the extent to which acculturation, as estimated by diminished Spanish language predominance, and Hispanic cultural orientation, accounts for observed nativity differences in drug dependence.

Finally, prior findings from the present study have revealed a clear linkage between lifetime exposure to major and potentially traumatic events, and the subsequent onset of drug dependence (Turner and Lloyd, 2003). The apparent role of variations in stress exposure raises the question of whether there are important cultural differences in capacity or tendency to protect family members from stressful experiences.

3. Data and methods

This paper is based on a study of the prevalence and social distributions of psychiatric and substance use disorders, and of factors that increase and decrease risk for such disorders among a representative cohort of 1803 young adults. Most (93%) were between 19 and 21 years of age when interviewed between 1997 and 2000. The study possesses unique potential for contribution in at least two respects. First, this is one of the first large-scale community studies to estimate the occurrence of disorders based on DSM-IV criteria. Second, our study population is ethnically diverse, allowing consideration of ethnic variations in risk and in factors that influence risk. Specifically, the sample was drawn such that approximately 25% are of Cuban origin, 25% “other Hispanic”, 25% African-American, and 25% non-Hispanic White. However, the present paper considers only those participants of Hispanic heritage (n = 888).
3.1. Sample

Our approach in drawing this sample was in accord with the view that there are important cultural variations within broad ethnic statuses. In an effort to minimize the effects of such variations on results, we have distinguished Cuban-Americans from other Hispanics and, within this latter category, focused on Hispanics from families originating in countries in the Caribbean basin. This distinction was based on the fact that, within South Florida, Cubans tend to be advantaged relative to other ethnic minorities in terms of the size of the community, and with respect to socioeconomic status, and political influence. The most prominent group within the “other Hispanic” category is Nicaraguan at 34%, with Mexicans, Dominicans, Hondurans and Colombians each representing between 6 and 9%. With the exception of four participants who described themselves as Panamanian, Salvadoran or Venezuelan, the remaining 27% of those included in this category designated themselves as Hispanic American or Latino/a.

This study builds on a previous three-wave investigation based in the Miami-Dade public school system (Vega and Gil, 1998). All 48 of the county’s public middle schools and all 25 public high schools, as well as alternative schools, had participated. Questionnaires were administered annually between 1990 and 1993 beginning in grades 6 and 7 and ending when participating students were in grades 8 and 9. This prior study had originally been funded as an all-male investigation. However, discomfort with this in the context of developing inclusiveness policies led those investigators to add a small sample of girls. Their detailed analyses provided assurance that wave 1 participants were highly representative of the population from which they were drawn and that this was also true for the wave 3 participants, despite a nearly 20% attrition across the three data points (Vega and Gil, 1998).

Within the confines of ethnicity criteria, all female participants in the earlier investigation (n = 410) and a random sample of 1273 male participants were ultimately selected for follow-up. Because a relatively small number of females were included in the parent study, a supplementary sample was randomly drawn from the Miami-Dade county 1990 sixth- and seventh-grade class roster. Overall, 70.1% of those sampled were successfully recruited to the study. By far the greatest loss occurred among the new sample of females who had no involvement in the earlier study. A success rate of 76.4% was achieved among those in the original sample, despite the fact that many had left home for college or other reasons. Details on our sampling frame and losses to interview are summarized in Fig. 1.

Those interviewed were compared with the total sample drawn from the original study population on a wide array of early adolescent behaviors and family characteristics (analyses not shown) including family structure, parental education and income, parental substance use, and reports by respondents of substance use within the wave 1 and wave 3 questionnaires. No statistically significant differences were observed. Comparisons

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**Fig. 1. Sampling framework.**
Aktan et al., 1997; Midanik et al., 1999; Rohde et al., 1997), contiguous United States. Approximately 30% of the interviews who were away at university or who had moved elsewhere in the ing previously mailed support materials were employed for those as the respondent chose. However, telephone interviews utiliz-

ing, 2 days on general interviewing techniques and procedures and 5 days on the Michigan Composite International Diagnostic Interview. Except for the initial cohort of field staff, this training was followed by the observation of two interviews conducted by experienced interviewers, and being observed while conducting two. The use of portable computer-assisted personal interviews was followed by the observation of two interviews conducted by

All interviewers held bachelors degrees and most had some graduate education. They were given a total of 7 days of train-

ing, 2 days on general interviewing techniques and procedures and 5 days on the Michigan Composite International Diagnostic Interview. Except for the initial cohort of field staff, this training was followed by the observation of two interviews conducted by experienced interviewers, and being observed while conducting two. The use of portable computer-assisted personal interviews (CAPI) assured appropriate skip patterns and greatly facilitated reliable administration. Our standard practice was face-to-face interviewing in the respondent’s home or in our research offices as the respondent chose. However, telephone interviews utilizing previously mailed support materials were employed for those who were away at university or who had moved elsewhere in the contiguous United States. Approximately 30% of the interviews were conducted by telephone. Although most evidence suggests that in-person and telephone interviews yield comparable data (Aktan et al., 1997; Midanik et al., 1999; Rohde et al., 1997), contrary findings have also been reported (Aquilino, 1994). The effect of interviewing mode was assessed in the present case using logistic regression. The presence versus absence of a drug-dependence diagnosis was regressed on interviewing mode with and without controls on gender and ethnicity. No evidence was found of any interviewing mode effect either within or across status categories.

All interviews were conducted in English. They were not offered in Spanish because the young adult study participants were part of a cohort assembled when they were in sixth or sev-

enth grade in the local public school system. Thus, all were fluent in English, having resided in Miami for 10 or more years by the time of the present study. In an effort to increase confidence with respect to cross-cultural comparability of the meaning of questionnaire items, we conducted 4 days of focus group work with minority adolescents of diverse national origins. This work yielded some slight modifications in question wording, but only for a small minority of items.

3.2. Measures

3.2.1. Diagnostic assessment. Data on the lifetime occurrence of psychiatric and substance disorders were obtained through interview modules that allowed estimation of DSM-IV diag-

noses. Our basic instrument was the Michigan Composite Intern-
national Diagnostic Interview (CIDI) that was employed in the National Comorbidity Survey (NCS) (Kessler et al., 1994). The CIDI is a fully-structured interview, based substantially on the Diagnostic Interview Schedule (DIS) (Robbins et al., 1981) and designed to be administered by non-clinicians trained in its use (Robbins et al., 1988; World Health Organization, 1990). Using the Michigan CIDI, as updated by NCS researchers to cover DSM-IV criteria, we assessed major depression, dys-
thymia, generalized anxiety disorder, social phobia, panic disor-
der, alcohol abuse and dependence, drug abuse and dependence, posttraumatic stress disorder and antisocial personality disor-
der. These latter two modules had been borrowed from the DIS (Robbins et al., 1981) for the NCS. Evidence for the validity of Michigan CIDI diagnostic estimates, evaluated against Struc-
tured Clinical re-interviews (Spitzer et al., 1990), have been reported for most NCS disorders, including affective disorders (Blazer et al., 1994), anxiety disorders (Wittchen et al., 1995, 1996), addictive disorders (Nelson et al., 1996; Warner et al., 1995), and posttraumatic stress disorder (PTSD) (Kessler et al., 1995).

Along with the Michigan CIDI, our assessment instrument included a reliable module (Horton et al., 1998) taken from the revised DIS (Robbins et al., 1995) assessed attention-deficit (AD) and hyperactivity disorder (HD), and included items to allow assessment of childhood conduct disorder. The NCS strat-
ey of a preliminary screening process was extended to also include the lifetime use of individual licit and illicit drugs. The goal of this extension was to reduce any fall-off in reporting that might be occasioned by learning, during the course of the inter-

view, that positive responses and not negative responses to drug questions tend to be followed by a large battery of additional questions.

Our analyses focused on drug dependence as defined by DSM-IV. We did not include consideration of DSM-IV drug abuse because of uncertainty about how meaningful that diag-
nosis may be among late-adolescents and young adults. The criteria for abuse were met by a single recurring problem asso-
ciated with use and, in our view, qualifying for the diagnosis may be as much a function of one’s social context, in terms of opportunities, demands and supports, as of the individual’s behavior.

The decision to limit consideration to drug dependence rather than also considering comparable alcohol problems was based on the aim of avoiding the large degree of right-censoring that would be associated with alcohol dependence. A substantial por-
tion of first-onsets of alcohol dependence occurs at ages older than those represented in this study cohort. In contrast, as Warner et al. (1995) have shown for the age cohort most closely corre-
sponding with the present sample, the cumulative probability of drug dependence within the United States is asymptotic by age 19. This suggests that virtually all cases of drug dependence that will occur in this study population are represented in present data.

In each analysis, the outcome variable was the first lifetime occurrence of drug dependence, defined as when three or more of
seven DSM-IV dependence symptoms and remaining diagnostic criteria were met within a single year (total prevalence = 16.8%). Although qualifying cases include dependence on sedatives (2%), tranquilizers (6.7%), stimulants (2%), cocaine (20.8%), hallucinogens (8.7%), and heroin (2%), 82.4% involved marijuana dependence, singly or in combination with other drug dependencies.

3.2.2. Demographics. Ethnicity was measured by the respondents’ self-reported ethnic group identification. Because this sample is in the transition to adulthood, socioeconomic status (SES) is estimated in terms of parental education, income and occupational prestige level. Most of the SES data were obtained in 30-minute telephone interviews with a parent, primarily mothers, which were conducted in English or Spanish at the respondent’s preference. However, it was necessary to rely on information provided by the young-adult participants for 33% of the sample. Scores on these three status dimensions were standardized, summed, and divided by the number of these for which the parent or young-adult participant were willing and able to provide information. It is worth noting that relationships observed between socioeconomic status of origin and health outcomes such as substance use problems were substantially less subject to the interpretive dilemma that would characterize associations with respondent’s own achieved socioeconomic status. Clearly, one’s status of origin cannot be a consequence of that individual’s level of substance-use problems.

3.2.3. Social support. Because ample evidence had suggested its primary significance for health outcomes, social support as experienced or perceived was the focus of our interest. To assess such social support with respect to one’s family we employed an eight-item scale of previously demonstrated reliability (Turner and Lloyd, 1999; Turner and Marino, 1994). In the present study Cronbach’s alpha is 0.91.

3.2.4. Acculturation. There seem good grounds for conceptualizing acculturation as a complex multidimensional construct (Keefe and Padilla, 1987; Oetting, 1993; Oetting and Beauvais, 1991; Padilla, 1980; Szapocznik et al., 1978). However, as Vega and Gil (1998) have noted, linear acculturation models (Rogler et al., 1991), which rely largely on language behavior, have been widely used in health research (e.g. Cuellar et al., 1980; Marin et al., 1987), presumably because they are easy to operationalize. They have argued that language behavior “is very powerful for depicting subgroup-level differences because embedded in language is cultural imagery, values, knowledge of customs, and access to a cultural group and its respective artifacts. In short, language use is a reference point for cultural allegiance and social expectations” (Vega and Gil, 1998, p. 128).

Consistent with this perspective and evidence of the predictive efficacy of language behavior (Cobas et al., 1996; Vega et al., 1998a,b), acculturation was estimated by means of a five-item linear language behavior measure derived by Vega (Vega and Gil, 1998) from the work of Cuellar et al. (1980). Higher scores represent higher levels of acculturation. The reliability of this measure is 0.82.
through the year prior to the first onset of drug dependence. Secondary occurrences of any particular event are not added to the count.

4. Results

Preliminary analyses revealed no difference between Cubans and other Hispanics in the lifetime incidence of drug dependence disorders among either males or females. Given our focus on the role and significance of nativity, this similarity and the need to maintain reasonable statistical power advised combining the Cuban and other Hispanic sub-groups for the purpose of descriptive analyses.

Table 1 assessed nativity differences by gender for the combined Cuban/other Hispanic sample on drug dependence and the hypothesized risk and protective factors. Scores for 17 participants with missing data on Hispanic orientation have been imputed by mean substitution. The majority (88%) of missingness was traced to interview instructions that routed participants who declared their ethnicity as “other” than non-Hispanic White, Cuban, African-American, or Other Hispanic, to bypass these questions. These respondents subsequently identified themselves typically as

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
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<tbody>
<tr>
<td>Lifetime drug dependence rate (%)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>U.S.-born</td>
<td>21.9</td>
<td>18.2***</td>
<td>20.1**</td>
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<tr>
<td>Foreign-born</td>
<td>18.7</td>
<td>6.9</td>
<td>12.7</td>
</tr>
<tr>
<td>Mean pre-immigration stressor count</td>
<td>0.546</td>
<td>0.708</td>
<td>0.669</td>
</tr>
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<td>U.S.-born</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Foreign-born</td>
<td>0.793</td>
<td>0.738</td>
<td>0.765</td>
</tr>
<tr>
<td>Mean post-immigration stressor count</td>
<td>6.622</td>
<td>5.809**</td>
<td>6.264**</td>
</tr>
<tr>
<td>U.S.-born</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foreign-born</td>
<td>6.083</td>
<td>4.772</td>
<td>5.413</td>
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<tr>
<td>Hispanic orientation mean score</td>
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<td></td>
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<tr>
<td>U.S.-born</td>
<td>4.918</td>
<td>5.016</td>
<td>4.915</td>
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<tr>
<td>Foreign-born</td>
<td>4.759</td>
<td>4.816</td>
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<tr>
<td>Acculturation mean score</td>
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<tr>
<td>U.S.-born</td>
<td>4.332***</td>
<td>4.147***</td>
<td>4.241***</td>
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<tr>
<td>Foreign-born</td>
<td>4.056</td>
<td>3.814</td>
<td>3.952</td>
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<td>Family social support</td>
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<td>U.S.-born</td>
<td>35.120</td>
<td>34.388</td>
<td>34.811</td>
</tr>
<tr>
<td>Foreign-born</td>
<td>34.409</td>
<td>34.313</td>
<td>34.354</td>
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<tr>
<td>Unweighted data, Ns</td>
<td>251</td>
<td>242</td>
<td>493</td>
</tr>
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</table>

Table 1 Drug dependence, stress and protective factors by nativity status by gender

* Counted before age 6 among U.S.-born.
+ Counted since turning age 6 among U.S.-born.
\( p<0.05 \) (differences across nativity status: Chi-square test for rates, t-test for means).
\( * p<0.01 \) (differences across nativity status: Chi-square test for rates, t-test for means).
\( ** p<0.001 \) (differences across nativity status: Chi-square test for rates, t-test for means).

The results obtained for female Hispanics provide at least a partial explanation for why a nativity advantage is not observed among males. While these bivariate descriptive data are suggestive, the likely patterns of intercorrelation among measures must be controlled to assess their unique contribution to the risk of drug dependence. The remaining analyses are therefore multivariate and based on discrete-time event history regression (Allison, 1984; Singer and Willett, 1993). Time at risk is divided into years, with data for the earliest 5 years collapsed into a single period, and the remaining information grouped into 17, 1-year intervals representing ages 6–22 years. Survival time in years to the onset of drug dependence, operationalized by meeting DSM-IV criteria of manifesting three clinically significant symptoms of impairment or distress within the same 12-month period, among the 58 respondents who met the lifetime criteria, and the entire time at risk among 384 right-censored subjects, is thus divided into a total of 3967 person-periods. Time and family socioeconomic status were controlled in all equations. Time is fit as a quadratic function (Singer and Willett, 2003) based on preliminary analysis that suggested it is the most parsimonious and empirically best-fitting form. This specification is also consistent with the established finding that the cumulative risk for first onset of drug dependence becomes asymptotic by early adulthood (Warner et al., 1995). We present regression equations rather than survival curves because our epidemiologically-oriented hypotheses concern variations in risk that are associated with social statuses and other factors that increase and decrease such risk, rather than the form of hazard profiles across time per se.
Table 2

<table>
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<td>b</td>
<td>b</td>
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<td>b</td>
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<tr>
<td>Cuban</td>
<td>0.057**</td>
<td>0.056**</td>
<td>0.064**</td>
<td>0.042**</td>
<td>0.084**</td>
<td>0.149**</td>
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<td>Immigrant &lt;6</td>
<td>0.654*</td>
<td>0.708**</td>
<td>0.605**</td>
<td>0.684**</td>
<td>0.661**</td>
<td>0.603**</td>
<td>0.623**</td>
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<td>Hispanic orientation</td>
<td>-1.502**</td>
<td>-1.101**</td>
<td>-1.469**</td>
<td>-1.072**</td>
<td>-0.921**</td>
<td>-0.874**</td>
<td>-0.874**</td>
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<tr>
<td>Acculturation</td>
<td>0.157**</td>
<td>0.037**</td>
<td>0.063**</td>
<td>0.089**</td>
<td>0.048**</td>
<td>-0.020**</td>
<td>-0.020**</td>
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<td>Family social support</td>
<td>0.709**</td>
<td>0.732**</td>
<td>0.754**</td>
<td>0.727**</td>
<td>0.727**</td>
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<tr>
<td>Cumulative stress</td>
<td>0.140**</td>
<td>0.157**</td>
<td>0.056**</td>
<td>0.056**</td>
<td>0.056**</td>
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<td>Prior disorders</td>
<td>0.112**</td>
<td>0.112**</td>
<td>0.112**</td>
<td>0.112**</td>
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<tr>
<td>ADHD</td>
<td>-43.938***</td>
<td>-43.126***</td>
<td>-42.635***</td>
<td>-42.604***</td>
<td>-41.385***</td>
<td>-41.457***</td>
<td>-42.004***</td>
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<td>Conduct disorder</td>
<td>0.056**</td>
<td>0.056**</td>
<td>0.056**</td>
<td>0.056**</td>
<td>0.056**</td>
<td>0.056**</td>
<td>0.056**</td>
</tr>
<tr>
<td>Alcohol dependence</td>
<td>-0.032</td>
<td>-0.032</td>
<td>-0.032</td>
<td>-0.032</td>
<td>-0.032</td>
<td>-0.032</td>
<td>-0.032</td>
</tr>
</tbody>
</table>

Note: *N* = 3967 person-years, based on 442 respondents with complete data; 58 first-onsets occurred. b = Coefficients are unstandardized logistic regression parameter estimates; time and socioeconomic status are controlled.

It should be noted that our analyses assume that measures taken in young adulthood of hypothesized protective factors represent status on these dimensions during the period of risk for the occurrence of drug dependence. However, since substance problems may have influenced status on these factors, such an assumption cannot be accepted with confidence. Thus, in contrast to findings on the stress exposure—drug dependence association, where time ordering is clear, temporal priority cannot be guaranteed with respect to these hypothesized protective variables. Table 2 presents the results of these analyses applied to our sample of young Hispanic women. The first equation (Model 1) makes clear that the advantage with respect to risk among immigrants is restricted to those who were 6 years old or older at the time of immigration. As noted above, 6 years was the average age at immigration among the foreign-born in the sample.

Models 2 through 6 evaluate hypothesized protective factors one-at-a-time and in combination. Hispanic orientation is unassociated with the outcome while both acculturation, indexed by language usage, and family social support make significant and independent contributions to the prediction of drug dependence risk. While family social support was of little explanatory significance with respect to nativity differences in risk, level of acculturation accounts for (mediates) approximately 27% of the advantage observed for the foreign-born whose parents immigrated when they were aged six or older ([1.502 – 1.101]/1.502 = 0.276). In separate analysis (not shown) cumulative stress alone was found to account for about 14% of the nativity difference. When stress exposure and protective factors are considered together (Model 6), nearly 40% of the nativity difference is explained, with only acculturation and cumulative stress making significant independent contributions to the equation ([1.502 – 0.921]/1.502 = 0.387).

Based on Model 6, we estimated the practical significance of differences on these two variables by computing the relative odds of disorder onset at one standard deviation above and below the mean on each measure. The relative odds for those high, compared to those low, in stress exposure was 2.58, while that for those low in acculturation was 0.38. Stated another way, the odds ratio for those high in acculturation in contrast to those low in acculturation was 2.65.

There is now a substantial body of literature indicating that psychiatric disorders are associated with the subsequent onset of drug disorders and that the strongest observed associations involve externalizing disorders (Kessler et al., 1994). These observations raise a question of whether the linkages observed in these analyses may derive from the joint associations of drug dependence, cumulative stress and acculturation with the prior occurrence of depressive/anxiety disorders or of the externalizing disorders of ADHD, alcohol dependence or childhood conduct disorder. The final equation in Table 2 makes clear that the demonstrated associations are in no way influenced by differences in the prior occurrence of such disorders.

Systematic tests for interaction effects revealed little in the way of conditional relationships. We found no evidence that any of the hypothesized protective factors moderate or buffer the effects of stress exposure. While the absence of an ethnicity-by-nativity interaction suggests equivalent effects of nativity across Cuban and non-Cuban Hispanic young women, we did observe a significant ethnicity-by-stress exposure interaction. Fig. 2 presents a representation of this conditional association. It appears that the linkage between stress exposure and risk for drug dependence is weaker among women of Cuban heritage than for those with other Hispanic backgrounds. At low levels of exposure to major and potentially traumatic events, non-Cuban young women are substantially advantaged relative to their Cuban counterparts—an advantage that declines with increasing stress burden such that, at very high levels of exposure, risk is slightly lower in the Cuban sub-group. This difference in regression slopes suggests that there is something
distinctive about the social context experienced by young Cuban women that more effectively moderates the impact of increasing levels of social stress. This something may involve higher levels of social resources in the form of the presence of more members of one’s extended family and/or higher levels of social support from family and friends. The elevated risk observed among the young Cuban women at low and moderate levels of stress exposure could not be explained by differences in any of the variables we have considered here. However, we note that only 31% of the Cuban origin group were foreign born compared to 58% of the other Hispanics, and that the average age at immigration was about 4 years among Cubans compared to nearly 7 years for other Hispanics. Thus, fewer of the Cuban women were foreign born and those that were had been in the U.S. longer on average. Given that risk increases with increasing acculturation and recognizing that time in the country can be thought of as a rough proxy for acculturation, it may be that the explanation lies in differences in acculturation that are not captured by the measure of language use and preference.

Results reported above reflect the assumption of proportional hazards, which is supported for all but two covariates. Tests revealed that the positive effect of cumulative stress on the risk for dependence onset is greater for a given level of exposure at earlier time periods than later, and that the negative relationship between family social support and dependence risk tends to decrease in magnitude over time.

5. Discussion

The question of the significance of the stress process model for understanding the origins of psychiatric and substance disorders, and for explaining nativity differences in such disorders, is an important one about which there is very little credible information. Although some research has reported linkages between drug use disorders and recent life events, as well as certain other stress process variables, significant interpretive problems necessarily attach to most of these findings. The problem that has been difficult to surmount is that age of disorder onset varies widely and the first onset of drug dependence generally will have preceded the occurrence of those stressors that have conventionally been assessed. Although survival analyses assure that the stressors considered here were temporally prior to each onset of drug dependence, it has not been possible to consider the role and significance of such other stress dimensions as recent life events, chronic stressors and discrimination stress (see Turner and Avison, 2003). For this reason, the significance of stress exposure in accounting for nativity differences in risk for drug dependence may be underestimated in these results.

It seems reasonable to assume that the opposite may be true with respect to the protective factors considered. Because family social support, acculturation and Hispanic orientation were assessed in young-adulthood, their consideration requires the assumption that the scores obtained are representative of the individual’s status on each dimension throughout development and prior to the first onset of drug dependence. Since any causation that may be involved in observed associations may go in both directions, these results may somewhat overestimate the causal significance of these factors.

If these results are taken at face value, they provide clear support for the acculturation hypothesis. Our primary index of acculturation, Spanish language use and preference, is the major factor in explaining 40% of the observed nativity difference in risk for drug dependence. However, our results provide little in the way of insights into what it is about acculturation that increases danger for adverse outcomes. Neither ethnic pride, as reflected in the Hispanic orientation measure, or family social support, in any way mediates the acculturation—drug
Appendix A. Study measures

Spanish language preference

1. What language do you prefer to speak?
2. What language do (did) you speak at school?
3. What language do you speak with friends?
4. In what language are the magazines you read?
5. In general, in what language are the movies, T.V., and radio programs you like to watch and listen to the most?

Response categories range from (1) Spanish all the time to (5) English all the time.

Lifetime exposure to major and potentially traumatic events

1. Did you ever lose your home because of a natural disaster (if necessary, fire, flood or hurricane?)
2. Have you ever had a serious accident, injury or illness that was life threatening or caused long-term disability?
3. Have you ever witnessed a serious accident or disaster where someone else was hurt very badly or killed?
4. Did you ever have sexual intercourse when you did not want to because someone forced you or threatened to harm you if you did not?
5. Were you ever touched or made to touch someone else in a sexual way because they forced you in some way, or threatened to harm you if you did not?
6. Were you regularly physically abused by one of your parents, step parents, grandparents, or guardians?
7. Were you regularly emotionally abused by one of your caretakers?
8. Were you ever physically abused or injured by a spouse/boyfriend/girlfriend?
9. Were you ever physically abused or injured by someone else you knew?
10. Did you witness your mother or another close female relative being regularly physically or emotionally abused?
11. Have you ever been shot at with a gun or threatened with another weapon but not injured?
12. Have you ever been shot with a gun or badly injured with another weapon?
13. Have you ever been chased but not caught when you thought you could really get hurt?

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Appendix A. Study measures

Hispanic orientation

1. You have a strong sense of yourself as a member of your ethnic group.
2. You identify with other people from your ethnic group.
3. Most of your close friends are from your own ethnic group.
4. Your ethnic heritage is important in your life.
5. You are more comfortable in social situations where others are present from your ethnic group.
6. You are proud of your ethnic heritage.
7. Your ethnic group had a lot to do with who you are today.
8. Your ethnic background plays a big part in how you interact with others.
9. You prefer to date people from your ethnic group.
10. Your values, attitudes and behaviors are shared by most members of your ethnic group.

Response categories range from (1) strongly disagree to (7) strongly agree.
14. Have you ever been physically assaulted or mugged?
15. Have you ever seen someone chased but not caught, or threatened with serious harm?
16. Have you seen someone else get shot at or attacked with another weapon?
17. Have you ever seen someone seriously injured by gunshot or some other weapon?
18. Have you ever actually seen someone get killed by being shot, stabbed, or beaten?
19. Have you ever been in a car crash in which someone was killed or badly injured?
20. Have you ever been told that someone you knew had been shot, but not killed?
21. Have you ever been told that someone you knew had been killed with a gun or other weapon?
22. Has anyone else you knew died suddenly or been seriously hurt?
23. Have you ever been told that someone you knew killed him- or herself?
24. Have you ever been told that someone you knew had been raped?
25. Did you ever fail a grade in school?
26. Did your father or mother not have a job for a long time when they wanted to be working?
27. Were you ever sent away from home or kicked out of the house because you did something wrong?
28. Were you ever abandoned by one or both of your parents?
29. As a child, did you ever live in an orphanage, a foster home, a group home or were you a ward of the state?
30. Were you ever forced to live apart from one or both of your parents?
31. Did your parents ever divorce/separate?
32. Have you ever had a child who died at or near birth, or one that was taken away from you?
33. Have you ever discovered your spouse/boyfriend/girlfriend was unfaithful?

Response categories: (0) No; (1) Yes.

Family social support

1. You feel very close to your family.
2. You have family who would always take the time to talk over your problems, should you want to.
3. Your family often lets you know that they think you are a worthwhile person.
4. When you are with your family, you feel completely able to relax and be yourself.
5. No matter what happens you know that your family will always be there for you should you need them.
6. You know that your family has confidence in you.
7. You feel that your family really cares about you.
8. You often feel really appreciated by your family.

Response categories range from (1) strongly disagree to (5) strongly agree.