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Karen G. Chartier

Virginia Commonwealth University

Tom Carmody

University of Texas Southwestern Medical Center at Dallas

Maleeha Akhtar

University of Texas Health at Houston

See next page for additional authors

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Authors

Karen G. Chartier, Tom Carmody, Maleeha Akhtar, Mary B. Stebbins, Scott T. Walters, and Diane Warden



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Hispanic Subgroups, Acculturation, and Substance Abuse Treatment Outcomes

Karen G. Chartier, PhD, MSW^a, Tom Carmody, PhD^b, Maleeha Akhtar, MPH^c, Mary B. Stebbins, MSW^{a,d}, Scott T. Walters, PhD^e, and Diane Warden, PhD, MBA^b

^aVirginia Commonwealth University School of Social Work and Department of Psychiatry, 1000 Floyd Avenue, PO Box 842027, Richmond, VA 23284, USA

^bUniversity of Texas Southwestern Medical Center at Dallas, Department of Psychiatry, 5323 Harry Hines Blvd., Dallas, TX, 75390-9066, USA

^cUniversity of Texas Medical School at Houston, Department of Family & Community Medicine, 6431 Fannin St., Suite JLL. 324, Houston, TX 77030, USA

^dLongwood University, College of Education and Human Services, 201 High Street, Farmville, VA 23909, USA

^eUniversity of North Texas Health Science Center, School of Public Health, Department of Behavioral and Community Health, 3500 Camp Bowie Blvd., Fort Worth, TX, 76107, USA

Abstract

This study explored Hispanic subgroup differences in substance use treatment outcomes, and the relationship of acculturation characteristics to these outcomes. Data were from a multisite randomized clinical trial of motivational enhancement therapy versus treatment as usual in a sample of Spanish-speaking substance abusers. Participants were Cuban American ($n=34$), Mexican American ($n=209$), Puerto Rican ($n=78$), and other Hispanic American ($n=54$). Results suggested that Cuban Americans and individuals with more connection to Hispanic culture had lower treatment retention. Hispanics born in the U.S and those who spoke English at home had a lower percentage of days abstinent during weeks 5-16, although Puerto Ricans born in the U.S. and Cuban Americans living more years in the U.S. had a higher percentage of days abstinent in weeks 1-4 and 5-16, respectively. Results may inform future hypothesis-driven studies in larger Hispanic treatment seeking samples of the relationship between acculturation and treatment outcome.

Corresponding author: Karen G. Chartier, PhD, Virginia Commonwealth University, School of Social Work, 1000 Floyd Avenue, P.O. Box 842027, Richmond, VA 23284-0716, USA, phone: 804-828-2865; fax: 804-828-0716; kgchartier@vcu.edu
stebbinsmb@vcu.edu
Thomas.Carmody@utsouthwestern.edu
Maleeha.N.Akhtar@uth.tmc.edu
scott.walters@unthsc.edu

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Conflicts of Interest: None

Keywords

Hispanic subgroups; treatment outcomes; retention; abstinence; acculturation factors

1. Introduction

Individuals of Hispanic origin are one of the fastest growing segments of the United States population. In 2012 there were 52 million people of Hispanic origin, comprising 16.9% of the 309 million people in the U.S population (U.S. Bureau of the Census, 2012). By 2050, the Hispanic population in the U.S. is expected to grow to 112 million, which will account for approximately one third of the projected U.S. population (U.S. Bureau of the Census, 2012). The term Hispanic broadly refers to “a person of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish culture or origin, regardless of race” (National Institute on Drug Abuse, 2003, p. 5). The countries of origin, immigration histories, socioeconomic conditions, and acculturation experiences are diverse across these groups (Alvarez, Jason, Olson, Ferrari, & Davis, 2007). However, Hispanics are often studied as a single population, which can mask important differences (Amaro, Arevalo, Gonzalez, Szapocznik, & Iguchi, 2006).

In fact, Hispanic subgroups differ in their rate of substances used in the general population and among individuals seeking treatment for substance abuse. A National Institute on Drug Abuse (NIDA) report (2003) provided drug use prevalence rates by Hispanic subgroup (Puerto Rican, Mexican, Cuban, Central American, South American, and other Hispanic). This report identified Puerto Ricans and other Hispanics as having the highest rates of recent (i.e., past month) illicit drug use in the U.S. Hispanic population (6.9% and 8.2%, respectively), while South Americans had the lowest at 2.1%. Recent marijuana use was highest among Puerto Ricans (5.6%) and lowest among Cubans and South Americans (each 2.1%), and recent cocaine use was highest among other Hispanics (1.7%) and lowest among Cubans (0.5%). The rates of recent heavy alcohol use were highest among Mexicans (7.4%) and lowest among Cubans (1.7%). Additionally, of the reported 13% of substance abuse treatment admissions involving Hispanics documented in the 2003 Treatment Episode Data Set (Substance Abuse and Mental Health Services Administration: Office of Applied Studies, 2006), 41% of admissions involved Mexican Americans, 34% involved Puerto Ricans, 3% involved Cubans, and the remaining 22% involved other Hispanics. Across these groups, the primary substance of abuse for Mexicans and other Hispanics was alcohol (27.1% and 24.9%, respectively), for Puerto Ricans opiates (47.5%), and for Cubans opiates and alcohol (20.3% and 19.1%, respectively).

There are several factors that could account for substance use differences. Previous studies have shown that substance use patterns of immigrant populations tend to be similar to those of their country of origin (Vega et al., 1998), although there may be some differences between alcohol and drug use (Borges et al., 2011). Conversely, the substance use patterns of Hispanics who are more integrated into the U.S. culture tend to be more consistent with the overall use patterns of native-born Americans (Farabee, Wallisch, & Maxwell, 1995; Finch, 2001). The differences may also reflect the substance use patterns of the geographic

region where each subgroup resides (Alvarez et al., 2007), including the local characteristics associated with the distribution and availability of drugs and the normalization of their use in that area (Finch, 2001). According to the National Drug Threat Survey, by U.S. regions, illicit drugs available at high levels in 2004 were methamphetamine in the Pacific and West, cocaine and methamphetamine in the Southwest, Midwest, and Southeast, and cocaine and heroin in the Northeast, while marijuana was reported to be highly available across all regions (U.S. Department of Justice, 2005). Although there is no specific information on regional substance use rates by Hispanic subgroup, geographically Cuban Americans tend to live in the Miami area, Puerto Ricans primarily in urban areas along the East Coast, and Mexican Americans primarily in the West but also dispersed throughout urban and rural parts of the U.S. (Alvarez, Olson, Jason, Davis, & Ferrari, 2004).

Acculturation is also associated with substance abuse in U.S. Hispanics, but there is some evidence that the influence of this process differs depending on Hispanic subgroup. Alegria, Canino, Stinson, and Grant (2006) and Alegria et al. (2008) provide evidence that this relationship is more consistent in Mexican Americans than in Cuban Americans and Puerto Ricans. Acculturation is defined as a process of intercultural contact whereby individuals adjust behaviors and attitudes associated with an immigrant culture toward those of a host culture (Zemore, 2007). Some common proxy measures of acculturation include length of U.S. residence, birthplace (U.S. versus foreign-born), and English or Spanish language preferences. Those who have longer residencies in the U.S. are at higher risk for alcohol and illicit drug use (Alegria, Sribney, Woo, Torres, & Guarnaccia, 2007). English language preference at home is also associated with increased risk for substance use disorders (Ortega, Rosenheck, Alegría, & Desai, 2000), and Hispanics born in the U.S. are more likely to experience substance use disorders than their foreign-born peers (Alegria et al., 2006; Alegria, Mulvaney-Day, et al., 2007). These three factors are thought to reflect a lower retention of traditional family values and more exposure to a U.S. culture that has a greater availability of drugs and more relaxed norms regarding alcohol and drug use (Alvarez et al., 2004; Borges et al., 2011; Gil, Wagner, & Vega, 2000).

The heterogeneity of the U.S. Hispanic population underscores the need for studies of substance use treatment outcomes by nationality groups; however there is a paucity of research in this area. We identified only one study, Guerrero, Cepeda, Duan, and Kim (2012), that examined the relationship between Hispanic subgroup and substance abuse treatment outcomes. This study of treatment centers in Los Angeles County, California, reported that Cubans and Puerto Ricans were less likely than Mexicans and other Hispanics to complete substance abuse treatment. Additionally, there have been few studies on the association between acculturation and substance use or retention in treatment samples. Arroyo, Miller, and Tonigan (2003) reported a positive relationship between acculturation and heavier alcohol use in Mexican Americans prior to treatment entry, but did not find an association between acculturation and drinking outcomes after treatment completion. Brocato (2013) reported reduced treatment retention for Hispanics, primarily of Cuban descent, who were less acculturated or foreign born. Conversely, Amodeo, Chassler, Oettinger, Labiosa, and Lundgren (2008) reported that clients *not* born in Puerto Rico had shorter stays in treatment, although nativity was not associated with retention after

accounting for the use of illicit drugs and psychiatric disorders. More broadly, studies report a relationship between acculturation factors and treatment utilization. For example, Zemore, Mulia, Yu, Borges, and Greenfield (2009) showed, using National Alcohol Survey data, that the utilization of treatment services was significantly lower for Spanish-speaking respondents than their English-speaking counterparts.

In an initial attempt to address this gap in the literature and generate hypotheses for future studies, we analyzed data from the National Drug Abuse Treatment Clinical Trials Network's multisite trial of motivational enhancement therapy (MET) in Spanish-speaking substance users (Carroll et al., 2009). Primary results for the trial showed improvements in substance use and retention both for Hispanic participants receiving the MET and treatment as usual (TAU) conditions (both provided in Spanish), but greater effectiveness for MET in those with a primary alcohol problem. For the current study, we examined substance abuse treatment outcomes, as well as the relationship between acculturation factors and treatment outcomes by Hispanic subgroup. NIDA's 2009-2013 Health Disparities Strategic Plan points to the "need to focus on diversity within racial/ethnic group minority populations," including ethnic subgroups within the population (National Institute on Drug Abuse, 2008, p. 7).

For this preliminary study, we expected that there would be subgroup differences in treatment outcomes, including retention and abstinence. Additionally, based on our review of the literature, acculturation appears to be differentially associated with substance use and treatment retention. We expected that increased acculturation (e.g., being U.S. born, English language preference, and more years living the U.S.) would be associated with poorer abstinence outcomes, but also that lower acculturation would be associated with lower treatment retention, although not consistently across all groups. We hypothesized that there would be less support for these relationships in Cuban Americans and Puerto Ricans than in Mexican Americans. Results from this study may help generate hypothesis-driven research with larger samples in this important but understudied area.

2. Materials and methods

2.1. Study design and procedures

The data for this secondary analysis came from a multisite trial conducted within the National Drug Abuse Treatment Clinical Trials Network, of standard outpatient treatment plus MET versus TAU in an intent-to-treat sample ($N=405$) of Spanish-speaking substance users (Carroll et al., 2009). The randomized clinical trial was conducted in five substance abuse treatment centers located in Miami, Florida; New York City, New York; Portland, Oregon; Greeley, Colorado; and Santa Fe, New Mexico. The trial evaluated whether MET provided in Spanish within the first month of treatment improved treatment outcomes. Sites were selected based on the availability of bilingual outpatient substance abuse treatment and bilingual counselors. The study protocol and informed consent were approved by Institutional Review Boards affiliated with each site (Carroll et al., 2009).

2.1.1. Participants—Eligible participants in the main trial were seeking outpatient treatment for any substance use disorder, including cocaine, alcohol, heroin, methamphetamine/amphetamine, marijuana, benzodiazepines, phencyclidine (PCP), opiates,

and barbiturates and had used any of those substances in the past 28 days (Carroll & Szapocznik, 2003). Participants understood and spoke Spanish as their principal language. They were at least 18 years old, able to provide informed consent, and determined to have stable living arrangements and to be likely to stay in the area for the following 4 months at the time of trial enrollment. Participants were willing to be randomized to a study condition and contacted for follow-up assessments at 4 and 12 weeks post-active trial intervention.

Participants were excluded if they were seeking detoxification-only treatments, methadone maintenance, or inpatient residential programs (Carroll & Szapocznik, 2003). Individuals reporting significant suicidal or homicidal ideation, who were not medically or psychiatrically stable, or who were likely to be incarcerated for more than three weeks were not eligible to participate. Individuals mandated to treatment were excluded if court, probation, or parole requirements did not align with the protocol and treatment provided. Participants were also excluded if they had previously participated in a MET study.

This analysis included 375 Hispanic American adults from the main study. Participants were classified by their Hispanic subgroup, including Cuban American ($n=34$), Mexican American ($n=209$), Puerto Rican ($n=78$), and other Hispanic American ($n=54$). These groups were formed based on the participant's birthplace (e.g., Cuba, Mexico, and Puerto Rico) with the exception of those who were born in the U.S. We classified 65 U.S. born participants by their parents' birthplace if both parents were from the same country. Other U.S. born participants were excluded from this analysis. Participants in the 'other' Hispanic subgroup were from Central and South American countries and the Dominican Republic; the largest number of participants were from Guatemala ($n=14$), Honduras ($n=12$), Nicaragua ($n=9$), and Columbia ($n=6$). Most participants from the intent-to-treat trial sample ($N=375/405$; 92.59%) were assigned to a group.

2.1.2. Assessment schedule—The clinical trial schedule involved a screening interview, a one-day baseline visit, three individual MET or TAU counseling sessions, a 10-minute weekly visit with a research assistant during the 28-day active trial intervention, a post-intervention visit at the end of the active trial phase (week 4), and follow-up visits at 8 and 16 weeks (Carroll & Szapocznik, 2003). Participants were randomized to a trial condition (MET or TAU) using the urn randomization system, balanced by gender, employment status, criminal justice status, and primary drug of choice. The randomization visit marked day one of the study's active intervention phase, during which participants had 28 days to complete three MET or TAU (i.e., standard individual counseling) sessions. Based on an intent-to-treat approach, participants were followed until the last follow-up visit regardless of the number of sessions completed.

2.1.3. Intervention—The clinical trial used Spanish-speaking bilingual counselors employed by the participating treatment centers. Counselor characteristics and counselor and supervisor training were described in Carroll et al. (2009). Counselors followed a manualized protocol, and were randomly assigned to a participant in either the MET or TAU conditions (Carroll & Szapocznik, 2003). TAU participants attended weekly sessions with a counselor per standard treatment center protocol. MET participants attended weekly sessions with a counselor trained in MET-based therapy. The MET counselors utilized “feedback

regarding personal risk, negative consequences, or impairment related to substance use; emphasis on personal responsibility to change; the provision of clear advice to change; presentation of a menu of change options; an empathic therapist style; and facilitation of the patient's self-efficacy" (Carroll & Szapocznik, 2003, p. 17). The first MET session focused on reviewing a personalized feedback form, which summarized information about neuropsychological or liver function tests and the participant's substance use history and related consequences. The second and third sessions focused on discussing plans for changing substance use behaviors. Participants did not participate in other individual clinic sessions during the active intervention phase, but may have attended other regular treatment program activities (e.g., group counseling sessions). Most participants completed all three MET or TAU sessions. For the participants included this analysis, there were no differences ($p = .449$) in the mean number of MET or TAU sessions attended across the Hispanic subgroups (Cuban Americans: $M = 2.56$, $SD = 0.82$; Mexican Americans: $M = 2.39$, $SD = 0.92$; Puerto Ricans: $M = 2.35$, $SD = 1.00$; and other Hispanic Americans: $M = 2.52$, $SD = 0.88$).

2.2. Measures

2.2.1. Baseline measures—Sociodemographics collected included gender, age, years of education, marital status, and employment status.

Substance use was characterized by a participant's self-defined primary substance used (e.g., alcohol, cocaine, marijuana, opioids, benzodiazepines, or methamphetamine). Participants reported, for their primary substance, the number of years of regular substance abuse and the number of days of use in the past 28 days (Carroll et al., 2009). *Addiction severity* was measured at baseline by the Addiction Severity Index (ASI). The ASI composite scores summarize different problem areas, including alcohol use, drug use, employment, family/social, legal, medical, and psychiatric (McGahan, Griffith, Parante, & McLellan, 1982). Higher scores (range 0-1) indicate greater problem severity. Composite scores are reliable and valid across a wide range of clinical and research applications (McLellan et al., 1985).

Several *acculturation measures* were used for the study. Participants reported the number of years lived in the USA, the primary language spoken at home (i.e., English, Spanish, both equally, or other), and their birthplace (U.S. or not). The Bicultural Involvement Questionnaire (BIQ) (Szapocznik, Kurtines, & Fernandez, 1980) is a 24-item scale and assessed each participant's level of comfort in the American culture (Americanism subscale) and the Hispanic culture (Hispanicism subscale) independent of each other. Higher scores on the two subscales reflected greater involvement in the respective culture. Cronbach's alpha coefficients for Americanism and Hispanicism scores were good among the participants in this trial, .88 and .85, respectively (Santa Ana et al., 2009).

2.2.2. Treatment outcomes—Retention in treatment (two variables) was measured: 1) as a continuous variable by the percentage of days each participant was enrolled in the outpatient treatment program through the entire study (weeks 1-16), and 2) as a categorical variable (yes/no) according to whether the participant was actively enrolled in the community treatment program at the final, week 16, follow-up visit.

Abstinence outcomes were based on each participant's primary substance used and covered two study phases: 1) the 4-week period of active study therapy, and 2) the follow-up study period. Variables were measured continuously and included percentage of days abstinent in weeks 1-4 and percentage of days abstinent in weeks 5-16. Abstinence was assessed by self-report using a substance use calendar. For weeks 1-4 participant reports were collected at weekly study visits during the active intervention phase and the 4 week post-intervention visit; and for weeks 5-16 at the two study follow-up visits in weeks 8 and 16. The calendar approach was adapted from the Time Line Follow-Back interview (Sobell & Sobell, 1992). Carroll et al. (2009) reported adequate correspondence between participants' self-reports of drug use and urine samples.

2.3. Analysis

Baseline sociodemographic, substance use, and acculturation characteristics for the four Hispanic subgroups (Cuban American, Mexican American, Puerto Rican, and other Hispanic American) were compared using the Kruskal-Wallis test for continuous variables and the chi-square test for categorical variables. These statistical tests also compared unadjusted estimates for continuous and categorical treatment outcomes (retention and abstinence) across groups.

Multivariate analyses were conducted. Hispanic groups were compared on treatment outcomes after adjustment for the following covariates: age, gender, education, marital status, employment, treatment condition, and primary drug (i.e., alcohol versus other). The adjusted percents, for actively enrolled at week 16, were estimated using a logistic regression model to compute a probability of the outcome for each subject with the covariates fixed at their mean values. The adjusted means were computed using an analysis of covariance model (ANCOVA) with the covariates fixed at their mean values.

Multivariate regression models tested the association of the five acculturation measures (i.e., number of years lived in the USA; primary language spoken at home; birthplace; Americanism score; and Hispanicism score) to retention and abstinence treatment outcomes. Models included treatment condition and controlled for Hispanic subgroup, baseline sociodemographics (i.e., gender, age, education, employment, and marital status), substance use variables, including alcohol as primary drug (versus other substances), years of primary substance abuse, and past 28-day drug use, and the seven composite addiction severity scores. Logistic regression was used for the retention outcome 'enrolled at follow-up (week 16)' (yes/no) and linear regression for other treatment outcomes. The logistic model tested a reduced number of variables to account for lower power with a dichotomous outcome; excluded covariates were years of primary substance abuse, past 28-day drug use, and employment, family/social, legal, medical, and psychiatric addiction severity. The modifying effect of Hispanic group with treatment condition and acculturation measures in predicting treatment outcomes was examined. Interaction effects were tested in regression models that included all individual variables and only one interaction term.

3. Results

3.1. Baseline measures for Hispanic subgroups

All sociodemographic characteristics (see Table 1) varied significantly across groups. Mexican Americans had the highest percentage of males and were younger and had fewer years of education than the other three groups. Puerto Ricans and Mexican Americans were, respectively, least and most likely to be employed, with the rates of employment for Cuban Americans and other Hispanics falling in between. Mexican Americans and other Hispanics were the most likely to be married/cohabitating or to have been married, while Puerto Ricans were the least likely to be married and Cuban Americans were more proportionally distributed across the three marital categories.

Hispanic subgroups reported different primary substances used. Mexican Americans were mostly alcohol users, while other Hispanic Americans were primarily alcohol and cocaine users. Cuban Americans and Puerto Ricans reported more varied primary substances used and higher percentages of illicit drugs used (i.e., cocaine and marijuana; and opioids—Puerto Ricans only). All groups had on average 11 years of primary drug abuse. Puerto Ricans and Cuban Americans reported more days of primary drug use in the 28 days before baseline. Mexican Americans had the lowest addiction severity in multiple domains. ASI scores were highest for Cuban Americans in the family/social and legal domains, Puerto Ricans in the employment domain; Cubans and Puerto Ricans in the drug, medical, and psychiatric domains; and Cubans and other Hispanics in the alcohol domain.

The four subgroups differed on four of the five acculturation factors examined. A larger percentage of Puerto Ricans and Cubans Americans were born in the U.S., and both groups reported more years living there. Most participants reported Spanish as their primary language spoken at home. However, Puerto Ricans had the largest percentage of participants who identified English as their home spoken language. Puerto Ricans and Cuban Americans had higher scores on the Americanism subscale, but there were no group differences on the Hispanicism subscale.

3.2. Unadjusted and adjusted treatment outcome estimates

Retention outcomes (Table 2) varied across Hispanic groups, but primary substance use outcomes by group were non-significant. Cuban Americans had lower rates of retention than other Hispanic subgroups based on the unadjusted, but not the adjusted mean percentage of days enrolled in outpatient treatment. Both the unadjusted and adjusted estimates for active treatment enrollment at week 16 showed that Cuban Americans were least likely to be enrolled in the clinic program.

3.3. Multivariate predictive models

The relationships between acculturation measures and treatment outcomes are presented in Table 3. Participants with greater involvement in their Hispanic culture (i.e., with higher Hispanicism scores) were less likely to be actively enrolled in treatment at the 16 week follow-up. Participants who were born in the U.S. (versus those who were not) and spoke English at home (versus Spanish or other) had fewer days abstinent in weeks 5-16.

When interaction effects were tested, the relationships between treatment condition and retention or abstinence outcomes did not differ based on Hispanic subgroup (all p -values for condition \times subgroup $> .05$). However, subgroup membership modified the effects of two acculturation variables (i.e., born in the U.S. and length of time in USA) with abstinence outcomes, but not retention outcomes. The interaction of U.S. birthplace by subgroup was significant for Puerto Ricans compared to Mexican Americans in predicting abstinence in weeks 1-4 (overall $p = .0451$; Cubans versus Mexicans $B = -5.34, p = .639$ and Puerto Ricans versus Mexicans $B = -15.98, p = .014$). In Figure 1, showing percents adjusted for covariates, Mexican Americans had a similar percentage of days abstinent regardless of birthplace, while being born in the U.S. was associated with a higher percentage of days abstinent for Puerto Ricans. No subjects in the other Hispanics subgroup were born in the U.S. (data not shown).

In addition, the interaction of years living in the U.S. by Hispanic subgroup was significant for Cubans compared to Mexicans in predicting abstinence in weeks 5-16 (overall $p = .017$; Cubans versus Mexicans $B = .67, p = .017$; Puerto Ricans versus Mexicans $B = -0.06, p = .784$; and other Hispanics versus Mexicans $B = -.43, p = .199$). Figure 2 shows the plotted estimated relationship between years living in U.S. and percentage of days abstinent in weeks 5-16 for each Hispanic subgroup. More years living in the U.S. was associated with a higher percentage of days abstinent for Cuban Americans and little difference in abstinence for Mexican Americans.

4. Discussion

Overall, this study showed that the four Hispanic subgroups were heterogeneous and that their relationships to substance abuse treatment outcomes were mixed. The groups varied on all sociodemographic variables examined; reported different primary substances used; and had different levels of addiction severity in multiple domains. Our results were similar to the NIDA (2003) report that more Mexican Americans used alcohol as their primary substance and Puerto Ricans used more illicit drugs. We also found that a greater percentage of Puerto Ricans and Cuban Americans compared to Mexican Americans and other Hispanics in our sample were U.S. born and had lived more years in the U.S. We expected that there would be differences between subgroups in treatment retention and abstinence outcomes. Cuban Americans were less likely than the three other Hispanic groups to be enrolled in treatment at week 16, but there were no subgroup differences for abstinence. We also expected that factors associated with increased U.S. acculturation would be associated with poorer substance use outcomes. In fact, speaking English at home and being born in the U.S. were associated with a lower percentage of days abstinent. However, there was also evidence that greater affiliation with the Hispanic culture (higher Hispanicism) was associated with lower retention. This finding marginally supported our hypothesis that lower acculturation would be associated with lower treatment retention. Brocato (2013) and Zemore et al. (2009) previously reported lower retention or treatment utilization, respectively, for Hispanics who were less acculturated or Spanish-speakers compared to English-speakers. However, a higher Hispanicism score (i.e., a greater degree of comfort with Spanish language or preference for Hispanic activities) does not preclude a similar level of comfort or preference for American culture (Szapocznik et al., 1980).

If confirmed in larger studies, these findings may have implications for outpatient treatment planning for Hispanics with substance use disorders. All Hispanic subgroups had similar abstinence outcomes in response to treatment, and the interaction effect between treatment condition and Hispanic subgroup on treatment outcomes was non-significant. Conversely, Cuban Americans had lower treatment retention at study follow-up, a finding supported in the earlier Guerrero et al. (2012) study. This could be because Cuban Americans in our sample had more severe substance abuse related problems at treatment entry. Cuban Americans, for example, reported the highest ASI family/social problems scores and may have had fewer family supports for remaining in treatment. The importance of family is a core value among Hispanics (Caplan, 2007), and the breakdown of family cohesion is a risk factor for substance use and related disorders in Hispanic Americans (Gil et al., 2000; Savage & Mezuk, 2014). Alternatively, Cuban Americans tend to be better educated and have higher incomes than other Hispanic groups (Caetano, Ramisetty-Mikler, & Rodriguez, 2009). It is possible that Cuban Americans left treatment because they had other options for addressing their substance abuse problems; although in the current sample socioeconomic measures like level of education are lower than those reported in general population Cuban samples (e.g., Alegria et al., 2006). Additionally, in our comparison of treatment outcomes by Hispanic subgroups, we controlled for differences in socioeconomic resources like education and employment (income and health insurance status were not available in the data set). We also controlled for whether a participant's primary drug of abuse was alcohol or another drug, but did not control for group differences in addiction severity. King and Canada (2004) previously reported higher rates of treatment drop out for cocaine abusers; most Cuban Americans in our sample reported cocaine (47.06%) as their primary substance used. In the Guerrero et al. (2012) study, differences in retention across Hispanic subgroups were accounted for by such factors as mental illness and drug use (days of use and type of drug abused) before admissions.

Differential effectiveness in treatment retention for Cubans as well as individuals with higher Hispanicism scores may point to the need for more tailored strategies in these groups if our findings are replicated. For example, Field and Caetano (2010) showed that ethnic matching between participant and provider was most beneficial in reducing drinking outcomes for foreign-born Hispanics receiving a brief motivational intervention. Suarez-Morales et al. (2010) did not find support for the effectiveness of ethnic matching (either for abstinence or retention outcomes) in the Carroll et al. (2009) sample, although this specific question about the benefits in participants with higher Hispanicism scores was not tested. Their study did find that therapists' characteristics (i.e., therapist having higher Hispanicism scores and lower Americanism scores) were associated with fewer substance use days during the 16-week trial, but not with retention (Suarez-Morales et al., 2010). Other studies point to the importance of organizational cultural competence in clinics that treat Hispanics and other ethnic minorities. Culturally competent treatment centers might be especially effective at retaining individuals with more comfort with Hispanic culture. Having managers at a substance abuse treatment center who strongly endorse the importance of culturally competent practices and implementing culture-specific assessment and treatment practices have been shown to improve retention in treatment (Guerrero, 2013; Guerrero & Andrews, 2011). Still, research on programmatic and personnel factors in Hispanic subgroups is

needed to understand the potential influence of these and other factors on retention outcomes.

Our study found that two acculturation characteristics, i.e., being U.S. born and speaking English at home, were predictive of reduced abstinence in weeks 5-16. This finding corresponds with others studies reporting more drug use and greater risk for substance use disorders in individuals with higher acculturation (Alegria et al., 2006; Alegria, Mulvaney-Day, et al., 2007; Alegria, Sribney, et al., 2007). Arroyo et al. (2003) found a positive association between acculturation and heavy drinking in a Mexican American sample prior to treatment entry, but did not find an association with outcomes after treatment completion. There are some distinctions between the current study and the Arroyo et al. study that may account for the different results, including sample size with the current study's being larger. Our sample also included subjects who spoke Spanish as their principal language, while Arroyo et al. (2003) reported that few of their participants "strongly identified with Mexican culture" (p. 103). Specific hypotheses have been used to help explain the relationships of acculturation factors with substance use in the U.S. For example, the cultural assimilation hypothesis predicts greater substance use among those who are more integrated into the U.S. culture (Alegria et al., 2006), attributing this relationship to a loosening of traditional family values (Gil et al., 2000), the incorporation of more liberal substance use norms (particularly for women) (Zemore, 2005), and greater access to drugs but maybe not alcohol (Borges et al., 2011). Another hypothesis is selective immigration, which predicts a protective effect for being foreign born and suggests that healthier individuals are more likely to immigrate to the U.S. than those with poorer health (Alegria et al., 2006). Zsembik and Fennell (2005) considered the evidence for this hypothesis across Hispanic groups, indicating its greater relevance to Mexican Americans than to Puerto Ricans and Cuban Americans. Two reasons were that Puerto Ricans can as U.S. citizens more easily travel back and forth to Puerto Rico and Cuban Americans have primarily immigrated to the U.S. for political reasons. Acculturative stress may be a distinct but related process to acculturation, and higher levels have been associated with increased substance use and greater drinking problems in Hispanics (Gil et al., 2000; Lee et al., 2013). Some stressors associated with U.S. immigration are environmental (e.g., financial, language barriers, and unsafe neighborhoods), social (loss of social networks and social status), and societal (e.g., discrimination) (Caplan, 2007). These three hypotheses overlap some; for example, acculturative stress may decrease while acculturation increases with more time in the U.S., and the 'immigrant paradox' points to protective effects for being foreign born despite the likely presence of more stressors for new U.S. immigrants (Caplan, 2007). The cultural assimilation hypothesis appears to be most salient in explaining our findings related to acculturation and abstinence outcomes (English language preference and being U.S. born were associated with reduced abstinence and may to reflect greater adoption of U.S. substance use patterns), but components of the other two hypotheses may provide some explanation.

However, our preliminary findings indicate that the relationship between acculturation and abstinence outcomes is not homogenous across Hispanic groups. Previous studies with Hispanic subgroups support this general finding and have identified variable associations between birthplace and substance use disorders. For example, foreign nativity compared to

U.S. nativity was not protective for Puerto Ricans in predicting a substance use disorder in one study (Alegria et al., 2008), while in another study foreign nativity for Puerto Ricans and Cuban Americans was protective for some but not all alcohol and drug use disorders (Alegria et al., 2006). This was in contrast, in these studies, to a consistent protective effect in Mexican Americans for being foreign born. Studies of general health have also reported a protective effect for being *U.S. born* in some Hispanic groups. Jerant, Arellanes, and Franks (2008) found that U.S. born Mexican Americans had poorer mental and physical health than foreign born Mexican Americans, while, conversely, U.S. born Puerto Ricans and U.S. born Cuban Americans had improved mental or physical health compared to those who were foreign born. Zsembik and Fennell (2005) also reported reduced health for Mexican Americans with longer length of residence in the U.S., but improved health for Cuban Americans. We found that U.S. birthplace and more years living in the U.S. were associated with increased abstinence in Puerto Ricans and Cuban Americans, respectively, although our findings still require confirmation in a larger Hispanic treatment sample.

These interaction effects were statistically significant in models that controlled for demographics, some socioeconomic variables, and substance use and addiction severity at treatment entry. Other potential explanations for the reported interactions include differences in the acculturation and immigration experiences of each Hispanic subgroup. For Puerto Ricans, the lack of protection for island nativity may be because, as U.S. citizens, they are exposed to some U.S. cultural influences in Puerto Rico (Alegria et al., 2008). Alternatively, it could be that the combination of lower socioeconomic status and being island-born in the U.S. places them at a higher risk for poor health (Zsembik and Fennell, 2005). Puerto Ricans report low socioeconomic status relative to other groups in the general population, and island-born Puerto Ricans report lower levels of education and income than U.S. born Puerto Ricans (e.g., see Alegria et al., 2006). The level of socioeconomic disadvantage for Puerto Ricans in the current sample was extreme (74% unemployment), which likely corresponds with other stressors (e.g., unsafe neighborhoods and discrimination; Caplan, 2007) that were not accounted for in our models. Conversely, for Cuban Americans the acculturation measure of more years living in the U.S. could be associated with greater protection relative to other Hispanic groups. Cuban Americans tend to live in more geographically and socially concentrated areas, which may promote the retention of traditional cultural values and provide some protection against the negative effects of U.S. acculturation (Zsembik & Fennell, 2005). For example, Alegria, Shrout, et al. (2007) reported high levels of ethnic identity and low levels of cultural conflict for Cuban Americans compared to other Hispanic groups.

5. Limitations

To our knowledge, this was only the second study to examine substance abuse treatment outcomes by Hispanic subgroups. Guerrero et al. (2012) identified Hispanic subgroup differences in treatment completion, while our study examined both retention and abstinence outcomes. There were a number of limitations to this study. The sample sizes of some Hispanic subgroups were small and there were small numbers of participants born in the U.S. or speaking English at home outside the Puerto Rican group. This has likely limited our ability to identify additional significant relationships among the variables we examined, and

we were unable to disaggregate the ‘other’ Hispanic group to specific subgroups. Additionally, because of sample size, we limited the number of covariates that we included in some models. Addiction severity, mental illness, and the amount and type of drugs abused (Amodeo et al., 2008; Guerrero et al., 2012) warrant study in larger samples, as possible explanations for subgroup differences in treatment retention. Some important socioeconomic measures (i.e., income and health insurance status) may also provide explanations for subgroup differences, but could not be assessed as covariates because they were not available in the data set. The results for Hispanic subgroups were likely confounded by study site characteristics. For instance, subgroup rates of primary drug use and addiction severity may be related to the nature of the services provided by each treatment site. Follow-up and retention rates varied across the sites (Carroll et al., 2009). And because Hispanic groups tend to concentrate in different U.S. geographic regions, Hispanic subgroup effects are entangled with study site effects. Finally, the effects we observed were in a sample of clients who agreed to participate in a clinical trial, which evaluated only one kind of treatment approach (i.e., MET versus TAU) that includes a particular combination of motivational interviewing, tailored feedback, and other elements. Our findings may not generalize to the larger population of U.S. Hispanics in substance abuse treatment, and other treatment approaches might find a different effect by Hispanic subgroup (e.g., brief interventions conducted in non-treatment samples). Our sample was primarily male and did not allow us to consider gender differences, including those related acculturation (Zemore, 2005). Our results, therefore, may be less generalizable to Hispanic women.

Given these limitations, our results are intended to generate hypotheses for testing in larger, more diverse Hispanic treatment samples. Two such hypotheses are that: 1) greater involvement in Hispanics culture is associated with reduced treatment retention, but greater acculturation is associated with reduced substance use abstinence; and 2) the relationships between acculturation and substance use abstinence are varied by Hispanic subgroup, i.e., greater acculturation is associated with improved abstinence in some groups. There are a number of large and diverse epidemiologic datasets, including the Hispanic Americans Baseline Alcohol Survey (HABLAS; Caetano, Ramisetty-Mikler, & Rodriguez, 2008) and National Latino and Asian American Study (NLAAS; Alegria et al., 2008) that have been used to examine Hispanic subgroup differences in substance use and related disorders; however, there are few Hispanic substance abuse treatment samples with data for examining treatment outcomes between subgroups. This NIDA Clinical Trials Network study of Spanish-speaking substance users (Carroll et al., 2009) provided key data (e.g., birthplace information for participants and their parents, both retention and abstinence outcomes, and acculturation measures) for a preliminary analysis of treatment outcomes by Hispanic subgroups.

6. Conclusions

This study's analysis of treatment outcomes and acculturation disaggregated by Hispanic subgroup begins to fill an important and large gap in the substance abuse treatment research literature. We found that Cuban Americans and individuals with more connection to the Hispanic culture had lower treatment retention, and that acculturation measures such as U.S. birthplace and years living in the U.S. were associated with reduced abstinence in some but

not other Hispanic subgroups. Our findings provide evidence that the relationships between acculturation and abstinence outcomes are likely complicated and varied across Hispanic groups. These results may provide a preliminary focus for additional research in this sparsely studied area.

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Highlights

- Hispanic subgroups reported different substances used and addiction severity.
- Cuban Americans had lower treatment retention at follow-up than other subgroups.
- More involvement in the Hispanic culture was associated lower treatment retention.
- Hispanics who spoke English at home had fewer days abstinent.
- U.S. birthplace and more years in the U.S. predicted abstinence in some Hispanics.

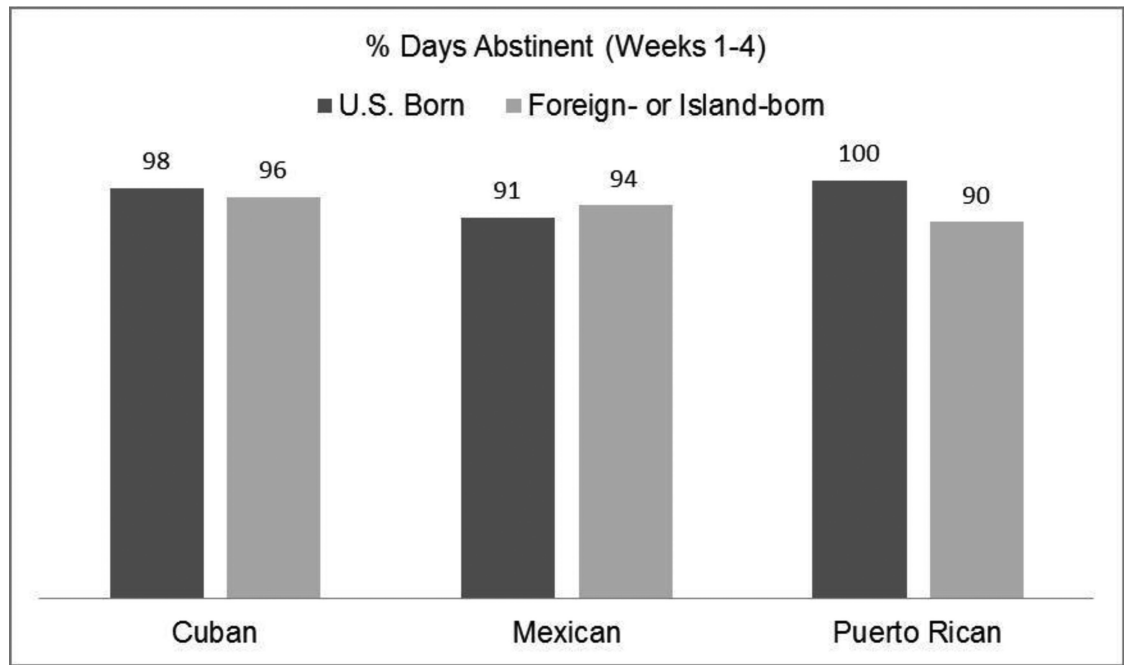


Figure 1. Adjusted Percent Days Abstinent in Weeks 1-4 by Birthplace and Hispanic Subgroup (No participants in the other Hispanic American category were born in the U.S. Their results are not shown.)

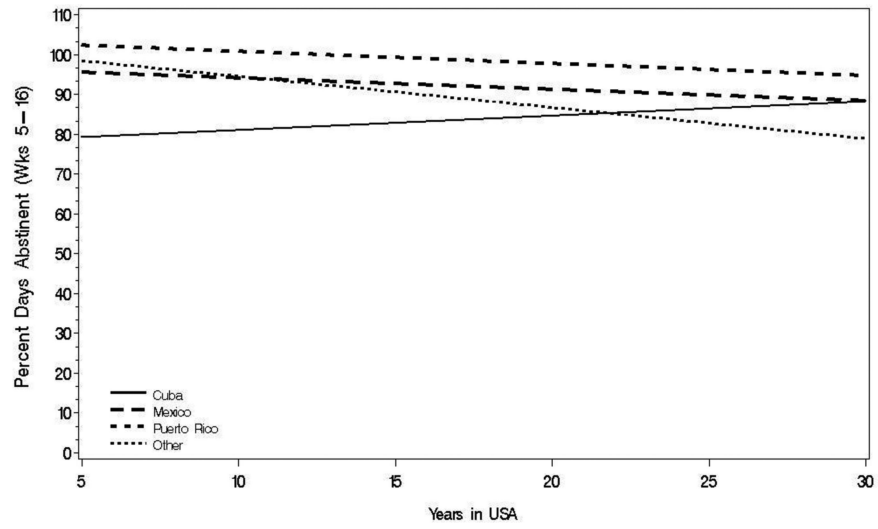


Figure 2. Estimated Relationship between Years Living in the U.S. and Days Abstinent in Weeks 5-16 by Hispanic Subgroup

Table 1

Baseline Characteristics for Hispanic Subgroups

| | <u>Cuban</u> (<i>n</i> = 34) M (SD) or % | <u>Mexican</u> (<i>n</i> = 209) M (SD) or % | <u>Puerto Rican</u> (<i>n</i> = 78) M (SD) or % | <u>Other</u> (<i>n</i> = 54) M (SD) or % | <u>Total</u> (<i>N</i> = 375) M (SD) or % | <i>p</i> |
|--|---|--|--|---|--|----------|
| <u>Sociodemographics</u> | | | | | | |
| Male | 79.41 | 97.13 | 80.77 | 79.63 | 89.60 | *** |
| Age | 36.50 (8.44) | 29.36 (7.72) | 39.13 (8.56) | 33.13 (9.51) | 32.58 (9.14) | *** |
| Years of education | 11.24 (2.73) | 8.50 (3.20) | 10.96 (2.18) | 9.67 (3.85) | 9.43 (3.27) | *** |
| Employed | | | | | | *** |
| Yes, full- or part-time | 55.88 | 88.04 | 10.26 | 50.00 | 63.47 | |
| No, unemployed | 32.35 | 10.05 | 74.36 | 38.89 | 29.60 | |
| No, other | 11.76 | 1.91 | 15.38 | 11.11 | 6.93 | |
| Marital status | | | | | | *** |
| Married/cohabitating | 35.29 | 53.11 | 11.54 | 46.30 | 41.87 | |
| Widow/sep/div | 26.47 | 13.40 | 47.44 | 20.37 | 22.67 | |
| Never married | 38.24 | 33.49 | 41.03 | 33.33 | 35.47 | |
| <u>Substance Use</u> | | | | | | |
| Primary substance used | | | | | | *** |
| Alcohol | 32.35 | 83.25 | 17.95 | 64.81 | 62.40 | |
| Cocaine | 47.06 | 9.57 | 42.31 | 22.22 | 21.60 | |
| Marijuana | 14.71 | 3.83 | 12.82 | 9.26 | 7.47 | |
| Opioids | 2.94 | 0.48 | 26.92 | 3.70 | 6.67 | |
| Benzodiazepines | 2.94 | 0.00 | 0.00 | 0.00 | 0.27 | |
| Methamphetamine | 0.00 | 2.87 | 0.00 | 0.00 | 1.60 | |
| Years of regular substance abuse, primary drug | 12.74 (9.47) | 9.93 (7.85) | 11.81 (10.44) | 13.26 (9.36) | 11.06 (8.88) | |
| Past-28 day primary drug use | 9.41 (7.87) | 5.41 (7.48) | 10.76 (9.95) | 7.41 (7.90) | 7.17 (8.41) | *** |
| Addiction severity | | | | | | |
| Alcohol | 0.25 (0.21) | 0.15 (0.17) | 0.18 (0.22) | 0.25 (0.24) | 0.18 (0.20) | * |
| Drugs | 0.16 (0.12) | 0.04 (0.08) | 0.14 (0.11) | 0.08 (0.11) | 0.08 (0.11) | *** |
| Employment | 0.66 (0.29) | 0.66 (0.23) | 0.89 (0.19) | 0.74 (0.24) | 0.72 (0.24) | *** |
| Family/Social | 0.29 (0.25) | 0.10 (0.15) | 0.16 (0.20) | 0.19 (0.20) | 0.14 (0.19) | *** |
| Legal | 0.21 (0.20) | 0.16 (0.17) | 0.09 (0.17) | 0.16 (0.18) | 0.15 (0.18) | ** |
| Medical | 0.25 (0.36) | 0.07 (0.18) | 0.23 (0.32) | 0.09 (0.23) | 0.12 (0.25) | *** |
| Psychiatric | 0.35 (0.25) | 0.06 (0.14) | 0.33 (0.25) | 0.24 (0.26) | 0.17 (0.23) | *** |
| <u>Acculturation Measures</u> | | | | | | |
| Born in U.S. (Yes) | 14.71 | 4.31 | 26.92 | 0.00 | 9.33 | *** |
| Years living in USA | 20.86 (13.86) | 8.91 (6.83) | 22.26 (14.23) | 13.89 (8.89) | 13.49 (11.34) | *** |

| | Cuban (<i>n</i> = 34) M (<i>SD</i>) or % | Mexican (<i>n</i> = 209) M (<i>SD</i>) or % | Puerto Rican (<i>n</i> = 78) M (<i>SD</i>) or % | Other (<i>n</i> = 54) M (<i>SD</i>) or % | Total (<i>N</i> = 375) M (<i>SD</i>) or % | <i>p</i> |
|-------------------------|--|---|---|--|---|----------|
| Language spoken at home | | | | | | *** |
| English | 0.00 | 0.96 | 7.69 | 1.85 | 2.40 | |
| Spanish | 88.24 | 88.52 | 65.38 | 79.63 | 82.40 | |
| Both equally | 11.76 | 10.05 | 26.92 | 14.81 | 14.40 | |
| Other | 0.00 | 0.48 | 0.00 | 3.70 | 0.80 | |
| Americanism subscale | 2.95 (1.60) | 2.72 (1.16) | 3.36 (1.31) | 2.77 (1.32) | 2.88 (1.28) | ** |
| Hispanicism subscale | 4.49 (0.72) | 4.25 (0.74) | 4.38 (0.68) | 4.40 (0.66) | 4.32 (0.72) | |

Notes: Estimates are mean (standard deviation) or percentage; widow/sep/div = widowed/separated/divorced

*
p < .05

**
p < .01; and

p < .001.

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Table 2

Unadjusted and Adjusted Treatment Outcomes by Hispanic Subgroup

| | <u>Unadjusted</u> | | <u>Adjusted^a</u> | |
|--------------------------------------|-----------------------|------------------|-----------------------------|--------------|
| | M or % (95% C.I.) | <i>p</i> | M or % (95% C.I.) | <i>p</i> |
| <u>Retention in Treatment</u> | | | | |
| Enrolled at follow-up (week 16) | <i>n</i> = 358 | | <i>n</i> = 357 | |
| Cuban American | 27.59% (14.44, 46.24) | <0.001 | 26.72% (13.08, 46.78) | 0.015 |
| Mexican American | 63.68% (56.81, 70.04) | | 64.40% (55.35, 72.54) | |
| Puerto Rican | 43.59% (33.06, 54.73) | | 41.30% (26.86, 57.42) | |
| Other Hispanic American | 58.00% (44.06, 70.77) | | 57.63% (43.03, 71.01) | |
| % Days enrolled through 16 weeks | <i>n</i> = 358 | | <i>n</i> = 357 | |
| Cuban American | 68.31 (55.02, 81.60) | 0.031 | 69.19 (55.22, 83.15) | 0.248 |
| Mexican American | 86.66 (81.61, 91.71) | | 85.95 (79.54, 92.36) | |
| Puerto Rican | 76.81 (68.70, 84.91) | | 77.40 (66.28, 88.51) | |
| Other Hispanic American | 83.28 (73.16, 93.40) | | 82.50 (72.36, 92.63) | |
| <u>Primary Substance Use</u> | | | | |
| % Days abstinent (weeks 1-4) | <i>n</i> = 327 | | <i>n</i> = 326 | |
| Cuban American | 94.90 (89.12, 100.68) | 0.524 | 96.73 (90.68, 102.77) | 0.605 |
| Mexican American | 93.80 (91.56, 96.04) | | 92.02 (89.18, 94.87) | |
| Puerto Rican | 91.02 (87.25, 94.78) | | 95.29 (90.32, 100.27) | |
| Other Hispanic American | 94.68 (90.22, 99.14) | | 93.65 (89.15, 98.14) | |
| % Days abstinent (weeks 5-16) | <i>n</i> = 269 | | <i>n</i> = 268 | |
| Cuban American | 86.90 (79.50, 94.31) | 0.207 | 87.71 (79.93, 95.48) | 0.425 |
| Mexican American | 94.77 (92.24, 97.30) | | 95.24 (91.93, 98.56) | |
| Puerto Rican | 92.00 (87.28, 96.71) | | 91.76 (85.70, 97.81) | |
| Other Hispanic American | 94.64 (89.54, 99.75) | | 93.93 (88.77, 99.09) | |

Notes: Estimates are mean or percentage (95% confidence interval)

^a covariates were age, gender, education, marital status, employment, treatment condition, and primary drug (i.e., alcohol versus other).

Table 3

Association between Acculturation Measures and Treatment Outcomes

| | Retention | | Primary Substance Use | |
|---|--|--|--|---|
| | Enrolled at follow-up (week 16) ^a N = 353 O.R. (95% C.I.) | % Days enrolled through 16 weeks ^b N = 353 B (95% C.I.) | % Days abstinent (weeks 1-4) ^c N = 322 B (95% C.I.) | % Days abstinent (weeks 5-16) ^b N = 264 B (95% C.I.) |
| Born in U.S. (ref. no) | 0.93 (0.36, 2.37) | -4.37 (-19.50, 10.76) | -6.11 (-12.52, 0.30) | -8.45 (-16.02, -0.87) |
| Years living in USA | 0.98 (0.95, 1.02) | -0.45 (-1.00, 0.09) | -0.15 (-0.38, 0.09) | -0.11 (-0.38, 0.16) |
| Language spoken at home (ref. Spanish or other) | | | | |
| English | 1.02 (0.23, 4.55) | 3.51 (-21.78, 28.80) | 1.96 (-7.93, 11.85) | -17.97 (-30.18, -5.76) |
| Both equally | 1.02 (0.48, 2.16) | 1.78 (-10.43, 13.99) | 4.36 (-0.49, 9.21) | 0.01 (-5.44, 5.47) |
| Americanism (per 1 point increase) | 1.10 (0.87, 1.38) | 2.78 (-0.91, 6.47) | -0.39 (-1.88, 1.10) | 0.75 (-0.91, 2.41) |
| Hispanicism (per 1 point increase) | 0.68 (0.48, 0.96) | -3.22 (-8.76, 2.32) | -1.33 (-3.58, 0.92) | -1.75 (-4.12, 0.62) |

Notes: Statistics are odds ratio or beta coefficient (95% confidence intervals); Bold values are statistically significant at $p < .05$; ref. = reference group; covariates included Hispanic subgroups and baseline sociodemographic, substance use, and addiction severity variables

quadratic terms for

^a the 'enrolled at follow-up (week 16)' model tested a reduced number of predictors to account for lower power with a dichotomous outcome

^b medical severity and

^c past 28-day primary drug use were included in some models.