Published in final edited form as:

Subst Use Misuse. 2014 June ; 49(8): 1069–1073. doi:10.3109/10826084.2014.862027.

Does diversity matter? The need for longitudinal research on adolescent alcohol and drug use trajectories

Elizabeth J. D'Amico, Joan S. Tucker, Regina A. Shih, and Jeremy N.V. Miles

There is a great deal of research aimed at better understanding transitions in alcohol and drug (AOD) use patterns across early to late adolescence (Brown, Flory, Lynam, Leukefeld, & Clayton, 2004; D'Amico, et al., 2001; Danielsson, Wennberg, Tengström, & Romelsjö, 2010; Jackson, Sher, Cooper, & Wood, 2002; Schulenberg, et al., 2005; Tucker, Ellickson, Orlando, Martino, & Klein, 2005); however, there are few published studies that utilize samples with substantial racial and ethnic diversity (Jackson & Sartor, in press). There is much more to be learned about how AOD use differs among youth of different races and ethnicities as they progress through early to middle and late adolescence. Most studies examining racial/ethnic differences have predominantly white samples (Flory, et al., 2006; Johnson & Hoffmann, 2000), compare only two ethnic groups (Brook, et al., 2004; Chen & Killea-Jones, 2006; Federman, Costello, Angold, Farmer, & Erkanli, 1997; Flory, et al., 2006; White, Jarrett, Valencia, Loeber, & Wei, 2007), and typically do not have sufficiently large samples of Asian or Hispanic youth (Johnson & Hoffmann, 2000; Vaughn, Wallace, Perron, Copeland, & Howard, 2008; White, et al., 2007).

In addition, there is little understanding of how individual, social and environmental contexts may be differentially associated with AOD use rates for different racial/ethnic groups. Given that many of these contexts are modifiable, a better understanding of how these contexts may interact to predict AOD use rates over time can provide important information for prevention and intervention efforts. Finally, it is important to better understand how outcomes related to AOD use may differ across racial/ethnic groups. Although research has shown that non-whites often have worse health outcomes (Caetano & Clark, 1998; Herd, 1989; Lieber, 2001; NIDA, 1998; Stinson, Grant, & Dufour, 2001; Sutocky, Shultz, & Kizer, 1993) and more problems (e.g., with family, accidents) associated with AOD use compared to whites (Galvan & Caetano, 2003) even with less AOD use, it is not clear why this occurs (NIAAA, 2002).

Census data suggest that Hispanics represent the nation's largest minority group, and this group is expected to triple in size from 2005 to 2050, accounting for most of the nation's population growth; the Asian and Pacific Islander population is also expected to triple and the African American population to double during this period (Passel & Cohn, 2008). Due to the increase in non-white populations over the next four decades, and the fact that non-whites tend to experience more social and health consequences from AOD use (Caetano & Clark, 1998; Lieber, 2001; NIAAA, 2002; NIDA, 1998; Stinson, et al., 2001), it is crucial to

examine AOD trajectories from early to late adolescence among non-white youth and assess how these trajectories may differ for these groups. This will inform prevention efforts as understanding differences between the timing of both initiation and escalation among these groups can help schools and providers pinpoint the best time to intervene. For example, programs may need to be sensitive to the earlier age of initiation for Hispanics and whites, and determining when escalation occurs can provide information on specific periods of risk for the different racial/ethnic groups.

In addition to better understanding racial/ethnic differences in substance use and non-use based on the broad racial/ethnic categories, a more fine-grained understanding of subgroup differences is also needed. The literature on AOD use among Asian Americans provides a useful example. Although Asian American adolescents on average have the lowest prevalence rates of AOD use, concern about AOD use among Asian American adolescents is growing (Hahm, Wong, Huang, Ozonoff, & Lee, 2008; Lee, Battle, Lipton, & Soller, 2010; Thai, Connell, & Tebes, 2010). Most epidemiological studies of adolescent AOD use tend to group Asian Americans together into one category. This hinders examination of the social, biological, and cultural factors that may contribute to the heterogeneity in risk for AOD use across diverse subgroups (e.g., Japanese, Korean, Chinese, Filipino, Vietnamese). The few studies comparing Asian subgroups show that these groups differ considerably in their drinking behavior (Lum, Corliss, Mays, Cochran, & Lui, 2009; Wong, Klinge, & Price, 2004). Among Hispanics, there is disagreement on whether there is heterogeneity in AOD use among Hispanic adolescent sub-groups (Nielsen & Ford, 2001; Wahl & Eitle, 2010); however, most studies find that the transition to young adulthood and adulthood is critical to focus on as there are statistically significant differences by Hispanic sub-groups in alcohol use in adulthood (Caetano, Ramisetty-Mikler, & Rodriguez, 2009; Nielsen, 2000; Warner, et al., 2006). Failure to consider variation in substance use across racial or ethnic subgroups not only neglects heterogeneity, but may also underestimate true prevalence rates of substance use and initiation (Hendershot, Dillworth, Neighbors, & George, 2008; Hendershot, MacPherson, Myers, Carr, & Wall, 2005; Wong, et al., 2004).

Because cultural and acculturation factors are strongly associated with race and ethnicity, it is important that these factors are measured in studies that seek to clarify underlying reasons for disparities by broad racial/ethnic groups, or racial/ethnic sub-groups. For example, measures such as machismo/marianismo, family connectedness, parental respect, ethnicity of social networks, collectivism, fatalism, parent-child acculturation discrepancy and acculturation stress (Unger, et al., 2002; Unger, Ritt-Olson, Wagner, Soto, & Baezconde-Garbanati, 2009; Vaeth, Caetano, & Rodriguez, 2012; Wahl & Eitle, 2010) can provide additional insight into potential disparities that might be found between groups. When these measures are not available, proxy measures should be included such as immigrant generational status, timing of migration, language solidarity, and language preference.

Work in this area has identified psychosocial and contextual factors that discriminate between AOD trajectories in which use was similar initially, but then diverged over time. The factors that have typically been assessed include individual beliefs and cultural influences, peer influence, family influence, and school and neighborhood context. However, it is important to note that the influence of an adolescent's individual, peer, and

family contexts are nested within schools and neighborhoods and interact with each other to influence AOD use (Ennett, et al., 2010). Focusing on one context without regard to others may overestimate the importance of that factor. For example, the negative effects of living in disadvantaged neighborhoods may be buffered by better parenting practices (Mrug, Gaines, Su, & Windle, 2010); thus, one might expect that living in a disadvantaged neighborhood is associated with less AOD use for youth with stronger family ties, but greater AOD use for those with weaker family ties. In addition, interactive effects may be stronger for certain racial/ethnic groups (e.g., African Americans) as they may experience greater stressors such as racial discrimination, or have fewer financial resources to buffer against the negative health effects of neighborhoods (Jackson, 2002; Turner & Avison, 2003; Williams & Collins, 2001), such that they are more sensitive to the presence of positive family characteristics.

Our group is attempting to address these existing gaps by conducting a longitudinal study of AOD use among a diverse group of approximately 4,000 youth from 6th grade to their second year after high school. We will examine how individual, peer, family, school, and neighborhood contexts may interact to affect AOD use trajectories and to examine how these contexts may differentially affect AOD use depending upon the race/ethnicity of the adolescent. Understanding how contexts interact over time as youth transition from early to late adolescence can help providers determine factors to target in interventions (e.g., work with parents to increase skills to counteract disadvantaged neighborhood or negative school climate) and for which groups these interventions will be most helpful (e.g., increased parent skills may be most helpful for African Americans). It may also inform policymakers whether certain school and neighborhood characteristics are especially salient in predicting AOD use trajectories over and above individual or family factors, such that intervening on these more distal factors could yield changes on a wider scale. For example, parental monitoring might be particularly important in deterring AOD use in neighborhoods that are less cohesive; thus working with neighborhood and school groups in those areas to increase parental monitoring would be one way to address AOD use.

In sum, work is needed with more diverse samples to understand potential racial/ethnic differences in AOD use during early to late adolescence and whether certain factors (e.g., parental monitoring, neighborhood resources) may affect AOD use more profoundly for certain groups of youth. It is also important to understand whether there is greater impairment in adaptation and functioning in a range of roles, contexts and situations due to AOD use across specific domains (e.g., academic, social, physical) for different racial/ethnic groups. This knowledge could lead to improved preventative interventions for this age group given relevant stakeholder engagement.¹

¹The reader interested in exploring the complexities of stakeholder policymaking is referred to Beccaria, Franca, Einstein, Stan & Thom, Betsy, (2013) Stakeholders in Opioid Drug User Treatment Policy: Similarities and Differences in Six European Countries *Substance Use and Misuse* 48:11. Editor's note.

References

- Brook JS, Adams RE, Balka EB, Whiteman M, Zhang C, Sugerman R. Illicit drug use and risky sexual behavior among African American and Puerto Rican urban adolescents: The longitudinal links. [Article]. *Journal of Genetic Psychology*. 2004; 165(2):203–220. [PubMed: 15259877]
- Brown TL, Flory K, Lynam DR, Leukefeld C, Clayton RR. Comparing the developmental trajectories of marijuana use of African American and Caucasian adolescents: Patterns, antecedents, and consequences. *Experimental and Clinical Psychopharmacology*. 2004; 12(1):47–56. [PubMed: 14769099]
- Caetano R, Clark CL. Trends in alcohol-related problems among Whites, Blacks, and Hispanics, 1984–1995. *Alcoholism: Clinical and Experimental Research*. 1998; 22:534–538.
- Caetano R, Ramisetty-Mikler S, Rodriguez LA. The Hispanic Americans Baseline Alcohol Survey (HABLAS): The association between birthplace, acculturation and alcohol abuse and dependence across Hispanic national groups. *Drug and Alcohol Dependence*. 2009; 99(1–3):215–221. [PubMed: 18945554]
- Chen KW, Killea-Jones LA. Understanding differences in marijuana use among urban Black and suburban White high school students from two U.S. community samples. *Journal of Ethnicity & Substance Abuse*. 2006; 5(2):51–73.
- D'Amico EJ, Metrik J, McCarthy DM, Frissell KC, Appelbaum M, Brown SA. Progression into and out of binge drinking among high school students. *Psychology of Addictive Behaviors*. 2001; 15:341–349. [PubMed: 11767267]
- Danielsson A-K, Wennberg P, Tengström A, Romelsjö A. Adolescent alcohol use trajectories: Predictors and subsequent problems. *Addictive Behaviors*. 2010; 35(9):848–852. [PubMed: 20626071]
- Ennett S, Foshee V, Bauman K, Hussong A, Faris R, Hipp J, et al. A social contextual analysis of youth cigarette smoking development. *Nicotine & Tobacco Research*. 2010; 12(9):950–962. [PubMed: 20688870]
- Federman EB, Costello EJ, Angold A, Farmer EM, Erkanli A. Development of substance use and psychiatric comorbidity in an epidemiologic study of white and American Indian young adolescents the Great Smoky Mountains Study. *Drug and Alcohol Dependence*. 1997; 44(2–3):69–78. [PubMed: 9088778]
- Flory K, Brown TL, Lynam DR, Miller JD, Leukefeld C, Clayton RR. Developmental patterns of African American and Caucasian adolescents' alcohol use. *Cultural Diversity and Ethnic Minority Psychology*. 2006; 12(4):740–746. [PubMed: 17087533]
- Galvan FH, Caetano R. Alcohol use and related problems among Ethnic Minorities in the United States. *Alcohol Research & Health*. 2003; 27(1):87–94. [PubMed: 15301403]
- Hahn HC, Wong FY, Huang ZJ, Ozonoff A, Lee J. Substance use among Asian Americans and Pacific Islanders sexual minority adolescents: Findings from the National Longitudinal Study of Adolescent Health. *Journal of Adolescent Health*. 2008; 42(3):275–283. [PubMed: 18295136]
- Hendershot CS, Dillworth TM, Neighbors C, George WH. Differential effects of acculturation on drinking behavior in Chinese- and Korean-American college students. *Journal of Studies on Alcohol*. 2008; 69(1):121–128.
- Hendershot CS, MacPherson L, Myers MG, Carr LG, Wall TL. Psychosocial, cultural and genetic influences on alcohol use in Asian American youth. *Journal of Studies on Alcohol*. 2005; 66(2): 185–195. [PubMed: 15957669]
- Herd, D. Alcohol Use Among U.S. Ethnic Minorities, National Institute on Alcohol Abuse and Alcoholism Research Monograph No. 18. DHHS Pub. No. (ADM)89-1435. Washington, DC: U.S. Government Printing Office; 1989. The epidemiology of drinking patterns and alcohol-related problems among U.S. Blacks; p. 3-50.
- Jackson, J. Health and mental health disparities among Black Americans. In: Hager, M., editor. *Modern psychiatry: Challenges in educating health professionals to meet new needs*. New York, NY: Josiah Macy Jr Foundation; 2002. p. 246-254.
- Jackson, KM.; Sartor, CE. The natural course of substance use and dependence. In: Sher, KJ., editor. *The Oxford handbook of substance use disorders*. New York: Oxford University Press; (in press).

- Jackson KM, Sher KJ, Cooper ML, Wood PK. Adolescent alcohol and tobacco use: Onset, persistence and trajectories of use across two samples. *Addiction*. 2002; 97(5):517–531. [PubMed: 12033653]
- Johnson RA, Hoffmann JP. Adolescent cigarette smoking in U.S. racial/ethnic subgroups: findings from the National Education Longitudinal Study. *Journal of Health and Social Behavior*. 2000; 41:392–407. [PubMed: 11198564]
- Lee JP, Battle RS, Lipton R, Soller B. 'Smoking': Use of cigarettes, cigars and blunts among Southeast Asian American youth and young adults. *Health Education Research*. 2010; 25(1):83–96. [PubMed: 19959564]
- Lieber CS. Liver diseases by alcohol and hepatitis C: Early detection and new insights in pathogenesis lead to improved treatment. *American Journal on Addictions*. 2001; 10(Suppl):29–50. [PubMed: 11268819]
- Lum C, Corliss HL, Mays VM, Cochran SD, Lui CK. Differences in the drinking behaviors of Chinese, Filipino, Korean, and Vietnamese college students. *Journal of Studies on Alcohol and Drugs*. 2009; 70(4):568–574. [PubMed: 19515297]
- Mrug S, Gaines J, Su W, Windle M. School-level substance use: effects on early adolescents' alcohol, tobacco, and marijuana use. *Journal of Studies on Alcohol and Drugs*. 2010; 71(4):488–495. [PubMed: 20557827]
- NIAAA. Alcohol Alert: Alcohol and minorities: An update (Vol. 55). Rockville, MD: NIAAA; 2002.
- NIDA. Drug use among racial/ethnic minorities (Vol. NIH Publication No. 98-3888). Rockville, MD: NIDA; 1998.
- Nielsen AL. Examining drinking patterns and problems among Hispanic groups: Results from a national survey. *Journal of Studies on Alcohol*. 2000; 61(2):301–310. [PubMed: 10757141]
- Nielsen AL, Ford JA. Drinking patterns among Hispanic adolescents: Results from a national household survey. *Journal of Studies on Alcohol*. 2001; 62(4):448–456. [PubMed: 11513223]
- Passel, JS.; Cohn, D. Pew Research Center Social and Demographic Trends. Washington DC: Pew Research Center; 2008. U.S. population projections: 2005–2050.
- Schulenberg JE, Merline AC, Johnston LD, O'Malley PM, Bachman JG, Laetz VB. Trajectories of marijuana use during the transition to adulthood: The big picture based on national panel data. *Journal of Drug Issues*. 2005; 35(2):255–279. [PubMed: 16534532]
- Stinson FS, Grant BF, Dufour MC. The critical dimension of ethnicity in liver cirrhosis mortality statistics. *Alcoholism: Clinical and Experimental Research*. 2001; 25:1181–1187.
- Sutocky JW, Shultz JM, Kizer KW. Alcohol-related mortality in California, 1980 to 1989. *American Journal of Public Health*. 1993; 83:817–823. [PubMed: 8498618]
- Thai ND, Connell CM, Tebes JK. Substance use among Asian American adolescents: Influence of race, ethnicity, and acculturation in the context of key risk and protective factors. *Asian American Journal of Psychology*. 2010; 1(4):261–274.
- Tucker JS, Ellickson PL, Orlando M, Martino SC, Klein DJ. Substance use trajectories from early adolescence to emerging adulthood: A comparison of smoking, binge drinking, and marijuana use. *Journal of Drug Issues*. 2005; 35:307–332.
- Turner R, Avison W. Status variations in stress exposure: Implications for the interpretation of research on race, socioeconomic status, and gender. *Journal of Health and Social Behavior*. 2003; 44(4):488–505. [PubMed: 15038145]
- Unger JB, Ritt-Olson A, Teran L, Huang T, Hoffman BR, Palmer P. Cultural values and substance use in a multiethnic sample of California adolescents. *Addiction Research & Theory*. 2002; 10(3):257–279.
- Unger JB, Ritt-Olson A, Wagner KD, Soto DW, Baezconde-Garbanati L. Parent-child acculturation patterns and substance use among Hispanic adolescents: A longitudinal analysis. *The Journal of Primary Prevention*. 2009; 30(3–4):293–313. [PubMed: 19384604]
- Vaeth PAC, Caetano R, Rodriguez LA. The Hispanic Americans Baseline Alcohol Survey (HABLAS): The association between acculturation, birthplace and alcohol consumption across Hispanic national groups. *Addictive Behaviors*. 2012; 37(9):1029–1037. [PubMed: 22613057]
- Vaughn M, Wallace J, Perron B, Copeland V, Howard M. Does marijuana use serve as a gateway to cigarette use for high-risk African-American youth? *American Journal of Drug and Alcohol Abuse*. 2008; 34(6):782–791. [PubMed: 19016184]

- Wahl AM, Eitle TM. Gender, acculturation and alcohol use among Latina/o adolescents: a multi-ethnic comparison. *Journal of Immigrant and Minority Health*. 2010; 12(2):153–165. [PubMed: 18807187]
- Warner LA, Valdez A, Vega WA, de la Rosa M, Turner RJ, Canino G. Hispanic drug abuse in an evolving cultural context: An agenda for research. *Drug and Alcohol Dependence*. 2006; 84(Suppl 1):S8–S16. [PubMed: 16750335]
- White HR, Jarrett N, Valencia EY, Loeber R, Wei E. Stages and sequences of initiation and regular substance use in a longitudinal cohort of black and white male adolescents. *Journal of Studies on Alcohol and Drugs*. 2007; 68(2):173–181. [PubMed: 17286335]
- Williams D, Collins C. Racial residential segregation: A fundamental cause of racial disparities in health. *Public Health Reports*. 2001; 116(5):404–416. [PubMed: 12042604]
- Wong MM, Klingle RS, Price RK. Alcohol, tobacco, and other drug use among Asian American and Pacific Islander adolescents in California and Hawaii. *Addictive Behaviors*. 2004; 29(1):127–141. [PubMed: 14667425]

Glossary: Brief scientific definitions

Machismo	an attitude, quality, or way of behaving that agrees with traditional ideas about men being very strong and aggressive.
Marianismo	an attitude, quality, or way of behaving that agrees with traditional ideas about women being submissive, selfless, feminine and pure.

Biographies

Elizabeth J. D'Amico, Ph.D.

Elizabeth D'Amico is a senior behavioral scientist at the RAND Corporation and a licensed clinical psychologist. She is nationally recognized for her work developing, implementing, and evaluating interventions for adolescents. She is a member of the Motivational Interviewing Network of Trainers (MINT). D'Amico currently has several grants in the field that evaluate motivational interviewing interventions with youth in a variety of settings, including middle schools, primary care, teen court, homeless shelters, and a new grant focused on developing and testing an integrated healing and MI group intervention for Native American youth in urban settings. She also has a longitudinal study that examines substance use patterns over eight years among a large sample of youth from middle school through high school. D'Amico received her Ph.D. in clinical psychology from the University of Texas, Austin.

Joan S. Tucker, Ph.D.

Joan S. Tucker is a senior behavioral scientist at the RAND Corporation. She conducts research primarily in the areas of substance use and HIV/AIDS. Her work on substance use includes identifying developmental trajectories of substance use, risk factors for initiation and escalation, and short- and long-term consequences of use during adolescence and young adulthood. Her HIV-related research includes investigating the impact of mental health and substance use problems on adherence to antiretroviral medications; prevalence and correlates of risky sexual practices among HIV-positive adults with serious mental illness; and the interrelationships of substance use, violence, and HIV-related risk behavior among homeless adults and youth. Much of Tucker's recent research has used social network analysis to better understand the social context of substance use and sexual risk behavior. Tucker received her Ph.D. in social psychology from University of California, Riverside.

Regina A. Shih, Ph.D.

Regina Shih is a senior behavioral and social scientist at the RAND Corporation. Her work focuses on environmental risk factors that contribute to the development and trajectory of mental health and substance use disorders across the lifespan. She is currently leading a project funded by NIA to develop a national database of neighborhood environment indicators over two decades and to examine whether demographic, social, economic, and physical characteristics of neighborhoods influence cognitive aging and dementia risk. Shih's other work includes examination of school and neighborhood characteristics that contribute to racial/ethnic disparities in adolescent substance use, and racial/ethnic differences in how cultural factors are related to adolescent substance use. She has led a variety of other environmental health projects for domestic and international clients including studies that assessed the health and mental health effects of lead exposure and ambient air pollution. Shih received her Ph.D. in psychiatric epidemiology from Johns Hopkins Bloomberg School of Public Health.

Jeremy N.V. Miles, Ph.D.

Dr. Miles is a quantitative psychologist with experience in designing and analyzing randomized trials and experiments, often with complex and innovative design features. He has published several papers dealing with methodological issues in randomized trial design, including power and sample size estimation, significance testing, allocation, and cluster

randomization. He has also examined both predictors and outcomes of AOD use in adolescents and adults. In addition, Miles has authored six well-received textbooks on statistical methods, served as associate editor of both *The British Journal of Mathematical and Statistical Psychology* and *Frontiers in Quantitative Psychology and Measurement*, and is statistical adviser to the editorial board of the *British Journal of Health Psychology*. Miles received his Ph.D. from the University of Derby, U.K.