Family Functioning and Parent Support Trajectories and Substance Use and Misuse among Minority Urban Adolescents: A Latent Class Growth Analysis

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Abstract

We sought to examine latent classes of family functioning and parent support trajectories during high school and whether these trajectories are associated with an increased risk of substance use and misuse among urban youth. A total of 850 adolescents (Mage = 15.1 years) were included in this study, assessed at baseline, 12-, 24-, and 36-months postbaseline, and completed self-report measures on past 30-day alcohol and marijuana use, binge drinking, and measures of family functioning and parent support. Latent class growth analysis revealed that trajectories of high family functioning and parent support are associated with a decreased risk of marijuana use. Findings may be helpful to inform family-based preventive interventions.

Keywords

Adolescent; substance use; longitudinal; family functioning; urban

INTRODUCTION

Urban adolescent substance use and misuse is a major public health concern in the United States. Researchers have reported racial/ethnic disparities in adolescent substance use and misuse, which result in a myriad of health and social consequences that disproportionally affect racial/ethnic minority urban populations, including the risk of STIs, intentional and unintentional injury, physical and social development, and incarceration. Ecodevelopmental family promotive factors, including family functioning and parent support, have been shown to play an important role in preventing and reducing substance use and misuse among

adolescents (Cordova, Huang, Arzon et al., 2011; Córdova, Huang, Garvey, Estrada, & Prado, 2014; Prado, Cordova et al., 2012). Yet, little is known about urban adolescent family functioning and parent support trajectories and their association with substance use and misuse, including past 30-day alcohol and marijuana use, and past 2-week binge drinking. Therefore, the purpose of this study was to examine (1) latent classes of ecodevelopmental family promotive factors trajectories, including family functioning and parent support, and (2) whether and to what extent these trajectories are associated with an decreased risk of past 30-day alcohol and marijuana use, and past 2-week binge drinking among urban adolescents.

Adolescent Substance Use and Misuse

Despite efforts aimed to curb the tide of substance use and misuse among adolescents, these behaviors remain prominent. Findings from the *Monitoring the Future* (MTF) study indicate that from 2008 to 2011, the prevalence of adolescent lifetime, annual, and 30-day illicit substance use has increased (Johnston, O'Malley, Bachman, & Schulenberg, 2012). Alcohol remains the most widely used substance in adolescents, with 40% of 12th graders reporting current alcohol use, defined as having drank alcohol during the 30-days prior to the survey (Johnston et al., 2012). Furthermore, findings from the *Youth Risk Behavior Surveillance* indicate that 21.9% of adolescents report binge drinking at least once in the last 30 days prior to the survey (CDC, 2012). Marijuana remains the most widely used *illicit* substance among adolescents (CDC, 2012; Johnston et al., 2012) with 21.1% of adolescents reporting past 30-day marijuana use. Relative to both Hispanic (42.1%) and non-Hispanic white (37.9%) adolescents, African American (43%) youth are more likely to report past 30-day marijuana use (CDC, 2012). Although these rates of marijuana use may be alarming, what may be more disconcerting is the fact that lifetime prevalence rates of marijuana use among adolescents has risen 3.1% from 36.8% in 2009 to 39.9% in 2011 (CDC, 2012).

Ecodevelopmental Framework

Several researchers have demonstrated the utility of ecological frameworks to understanding the etiology of adolescent substance use and misuse (Cordova et al., 2013; Hawkins, Catalano, & Miller, 1992; Stormshak et al., 2011). Expanding on Bronfenbrenner's (1979) ecological theory, the ecodevelopmental framework (Szapocznik & Coatsworth, 1999) postulates that adolescents are imbedded in integrated ecological systems that influence and are influenced by the youth. The ecodevelopmental framework (Szapocznik & Coatsworth, 1999) builds on Bronfenbrenner's (1979) work by considering developmental perspectives as well as the social interaction of multiple systems. These systems include the micro-, meso-, exo-, and macrosystems (Szapocznik & Coatsworth, 1999). In the present study, we focus on the family microsystem.

The family microsystem is the most proximal system in which the adolescent operates (Cordova et al., 2014; Prado, Cordova et al., 2012; Prado, Huang et al., 2013). Family ecodevelopmental promotive factors can include family functioning and parent support. Although some studies have applied the ecodevelopmental framework to understanding substance use and misuse behaviors in Hispanic youth (e.g., Cordova et al., 2011, 2012; Prado, Huang et al., 2012), relatively few studies that apply the ecodevelopmental

framework to an urban sample composed of predominantly African American youth exist. In addition, few studies have examined the effects of family ecodevelopmental trajectories on substance use and misuse among urban adolescents (Tobler & Komro, 2010).

Ecodevelopmental Family Promotive Factors: Family Functioning and Parent Support

Researchers and prevention practitioners have long attributed the family system as critical to the development of substance use and misuse in adolescents. Important constructs that have been scrutinized in the literature are family promotive factors, which define the family as a multidimensional system, including family functioning and parent support (Cordova et al., 2012; Miller, Ryan, Keitner, Bishop, & Epstein, 2000; Prado, Cordova, et al., 2012; Sandler, Schoenfelder, Wolchik, & MacKinnon, 2011). A family with high family promotive factors can be characterized by family functioning (i.e., a well-functioning family and low family conflict) and increased parent support. Family promotive factors have been shown to protect against urban adolescent substance use and misuse (Caldwell, Sellers, Bernat, & Zimmerman, 2004; Gillmore, Chen, Haas, Kopak, & Robillard, 2011; Schinke, Fang, Cole, & Cohen-Cutler, 2011; Tobler & Komro, 2010). In a well-functioning family system, adolescents experiencing a high level of family support and responsiveness to their emotional and social needs may result in increased communication and clear expectations about health risk behaviors which, in turn, has been shown to have promotive effects on engagement in substance use and misuse (Brody et al., 2004; Brody et al., 2001; DiClemente et al., 2001). Conversely, a family with risk factors may be characterized by low family functioning (i.e. a poorly functioning family system with high levels of family conflict) and low parent support. Poorly functioning family systems could result in adolescents feeling unsupported by their family, as well as disengaged or even alienated from family members, leading to a search for and obtaining support from, and a heightened level of identification with peer groups and other influences. Consequently, these experiences could increase adolescents' risk of engaging in health risk behaviors, including alcohol and marijuana use (Taylor, Merritt, & Brown, 2012). Therefore, interventions focusing on the family system to improve family promotive factors are important prevention strategies to reduce risky behaviors in adolescents (Gillmore et al., 2011; Schinke et al., 2011).

Although the importance of family functioning and parent support as a set of protective factors for substance use and misuse is well documented in the research literature, researchers have not studied trajectories of family functioning and parent support during adolescence and how these trajectories affect uptake of substance use and misuse (Tobler & Komro, 2010). To date, most researchers have focused on trajectories of substance use and misuse among adolescents. Equally important, however, is to examine trajectories of malleable factors, including family functioning and parent support, that can provide points of entry for preventive interventions (Prado, Cordova et al., 2012). From early to late adolescence, youth orientation toward their family lessens relative to peer groups and other influences outside the family system. These changes can transform how family members interact and their roles consequently affecting family functioning (Baer & Schmitz, 2007; Schwartz, Mason, Pantin, & Szapocznik, 2009), which is a process that evolves dynamically over time and should be analyzed in a way that captures the dynamism. Therefore, more research is needed about how family functioning and parent support change longitudinally

and how the change affects substance use and misuse, particularly in minority urban adolescent populations for whom we have limited research. The purpose of this study is to address this gap in the literature by examining family functioning and parent support trajectories and their relationship with past 30-day alcohol and marijuana use and binge drinking among a large sample of predominantly African American, urban and low-income adolescents in the Midwestern United States.

METHODS

Sample

The sample for this study consisted of 850 youth participating in a longitudinal study from mid-adolescence to early adulthood. Eligibility criteria included enrollment in one of four public high schools in a large mid-western city; being identified as at-risk for school dropout as indicated by a grade point average of 3.0 or lower at the end of the eight grade; and no diagnosis of emotional or developmental impairment. Data were initially collected from 850 adolescents who met the eligibility criteria during their first year of high school. Participants in the sample predominantly identified as African American ($N = 681$, or 80%), followed by non-Hispanic white ($N = 143$, or 17%), and mixed African American and non-Hispanic white ($N = 26$, or 3%). The sample was 50% female, with a mean age of 14.9 years (SD = .64) at baseline (Table 1 and Table 2).

Procedure

Data were collected in four waves corresponding to participants' high school years (M_{age} = 14.9, 15.9, 16.8, and 17.8, respectively). Participants completed a face-to-face interview at each wave and the interviews were conducted in private rooms in schools or in a community setting. Interviews lasted approximately 60 minutes. Additional methodological details have been reported elsewhere (Zimmerman, Caldwell & Bernat, 2002).

Measures

Family Functioning—Five items assessed reported levels of fighting and acting out in the individual's family (Moos & Moos, 1981). Participants indicated how often a series of statements represented their family dynamic, specifically the people they live with. Example statements included, "We fight in our family," "Family members get so angry they throw things," "Family members lost their tempers," "Family members criticize each other," and, "Family members hit each other in anger" ($a = .77$). The response format was a Likert-type scale, ranging from "1 = Hardly ever," to, "4 = Often."

Parent Support—Family support was measured with 5 items ($a = .89$) from the Parental Support Scale (Procidano & Heller, 1983). Participants were asked the extent to which they endorsed statements about their relationships with their primary caregiver. An example question is, "My mother/father enjoys hearing about what I think," and, "I rely on my mother/father for moral support." Response options ranged from, "1 = not true," to, "5 = very true." The scale was designed to assess emotional support, problem solving and moral support from primary care-givers.

Substance Use and Misuse—Three measures of substance use and misuse were used: past 30-day alcohol use, binge drinking in the last 2 weeks, and past 30-day marijuana use. For both 30-day measures, participants indicated if they had drank an alcoholic beverage or used marijuana in the 30 days prior to the assessment. For binge drinking items, participants reported if they had five or more drinks (a "drink" was defined as a glass of wine, bottle of beer, a shot glass of liquor, or a mixed drink) in a row in the 2 weeks prior to the assessment. For the purposes of this study, each item was dichotomized. All nonuse responses were coded as 0 and any use response was coded as 1.

Covariates—We included covariates to account for group differences based on gender, race/ethnicity, and socioeconomic status. Gender and race/ethnicity were self-reported at wave 1. Family SES was assessed on the basis of the highest occupational prestige score of either of the participants' parents (Nakao & Treas, 1990). Scores were constructed from three indices: a prestige rating of a given occupation and the concomitant educational attainment and income levels for that occupation. Scores for participants in this study ranged from 29.28 (private household work) to 64.38 (professional). The mean occupational prestige score was 39.92 ($SD = 10.4$), which represented blue-collar employment.

Analytic Approach

Latent class growth analysis with maximum likelihood estimation was used to examine trajectories of family functioning and parent support (Jung & Wickrama, 2008; Muthén & Asparaouhov, 2006). Following the steps outlined by Huang, Brecht, Hara, and Hser (2010), we first examined unconditional models to assess for number of class trajectories for family functioning and parent support. Next, we included in our models covariates (i.e., race, SES, gender) but no distal outcome. We then estimated three models for each family functioning and parent support with each distal outcome (i.e. past 30-day alcohol and marijuana use, and past 2-week binge drinking) without covariates. Finally, we ran three models each for family functioning and parent support, including both covariates and each distal outcome. We made several assumptions, including variances of intercepts were equal across latent classes, and residual variances were equal both across classes and time point. In addition, we constrained the variances of the slope growth factors to zero (Jung & Wickrama, 2008; Nagin & Land, 1993). All analyses were conducted using Mplus version 7 (Muthén & Muthén, 1998–2012).

The Akaike information criteria (AIC), Bayesian information criterion (BIC), and sample-adjusted BIC were used to select the models with the smallest combination of population misfit and sampling error. All are based on the negative log likelihood of the model with a penalty function for the number of parameters. Comparatively smaller values for all indices indicate the best model (Muthén, 2004). Entropy, a summary measure of how well people are classified into classes, is measured on a 0 to 1 scale; entropy greater than .80 indicates more distinct groups (Acock, 2008; Muthen, 2004). The Vuong, Lo, Mendell & Rubin (VLMR) examines the number of latent classes based on the following hypotheses: H_0– the number of latent classes is k–1, and H_1– the number of latent classes is k. In instances where the p value was greater than .05, we would reject the null hypothesis. Essentially, the VLMR examines the likelihood ratio of models, relative to its theoretical distribution. (Tolvanen, 2007).

FINDINGS

Family Functioning Unconditional Model

To identify the most parsimonious model with respect to the number of family functioning class trajectories, we examined five unconditional models (i.e., models without any covariates or distal outcomes). The AIC, BIC, Sample Adjusted BIC, entropy, and VLMR were used to select the best approximating model. Model fit indices indicated that, relative to a three-class trajectory model (BIC = 4549.00, entropy .89), the BIC value decreased to 4417.18 and entropy decreased at .84 in the four-class trajectory model, indicating an improvement in model fit. Although the BIC value decreased in the five-class trajectory (BIC = 4377.78), the VLMR tests were significant for models with three- ($p < .01$) and four- ($p = .05$) class trajectory groups, and nonsignificant for the five-class trajectory model ($p = .42$). Therefore, we identified the four-class trajectory model as the most parsimonious (Table 3). Class 1, hereafter referred to as *Low-Increasing Family Functioning*, consisted of 8.3% of participants. Approximately 6.6%% of participants were in class 2, referred to as *Low-Decreasing Family Functioning*. Class 3 comprised approximately 67.1% of participants and this class is referred to as *High-Increasing Family Functioning*. Finally, 17.9% of participants were in class 4, the *High Decreasing Family Functioning*. In general, the trajectories of both the *Low-Increasing* and *High-Increasing Family Functioning* improved over time, whereas the *Low-Decreasing* and *High-Decreasing Family Functioning* trajectory seemed to have a decreased trend over time (Table 4).

Family Functioning Conditional Models with a Covariate

Predicting Class Membership—Relative to the *High-Increasing Family Functioning* class (reference group), the *Low-Decreasing Family Functioning* class was more likely to have females. Class membership did not differ based on race or family socioeconomic status.

Covariates Predicting Family Functioning Trajectories—In addition to class membership, we also examined the associations between covariates and the four latent class memberships. The only significant association identified was that of race. This suggests that, compared to African American and white youth, mixed-race youth were significantly more likely to report higher levels of family functioning at baseline. None of the covariates, however, predicted family functioning class trajectory.

Family Functioning Conditional Models with Distal Outcome

Findings indicate that, relative to the *High-Decreasing Family Functioning* class, the *Low-Decreasing Family Functioning* class was less likely to report past 30-day alcohol use (OR = .89, $p < .05$). Compared to the *Low-Increasing* class, the *High-Decreasing* class was less likely to report past 30-day alcohol use (OR = .56, $p < .05$). The *High-Increasing* class was less likely to report past 30-day alcohol use (OR = .89, $p < .01$), as compared to the *Low-Decreasing* class. Relative to the *Low-Increasing* class, the *High-Increasing* class was less likely to report past 30-day alcohol use (OR = .56, $p < .05$). The *High-Decreasing* class was less likely to binge drink (OR = .92, $p < .05$), as compared to the *High-Increasing* class. The *High-Increasing* class, relative to the *Low-Increasing* class, was less likely to binge drink

(OR = .84, *p* < .05). When compared to the *High-Increasing*, *High-Decreasing*, and *Low-Increasing* classes, the *Low-Decreasing* class was more likely to report past 30-daymarijuana use (OR = 2.77, 1.38, and 1.48, respectively). Furthermore, the *High-Increasing* class, relative to both the *Low-Increasing* and *High-Decreasing* classes, was less likely to report past 30-day marijuana use (OR = .54 and .50, respectively). Relative to the *High-Decreasing* class, the *Low-Increasing* class was less likely to report past 30-day marijuana use (OR = .93 *p* < .01).

Family Functioning Conditional Models with Covariates and Distal Outcome

As can be seen in Table 5, findings indicate that, relative to the *High-Decreasing* and *High-Increasing Family Functioning* class, the *Low-Decreasing Family Functioning* class was more likely to report past 30-day marijuana use (OR = 1.69 and 2.95, respectively). Furthermore, the *Low-Increasing Family Functioning* class was more likely to report binge drinking (OR = 1.12, *p* < .05) and past 30-day marijuana use (OR = 2.29 and 1.31, respectively), as compared to the *High-Increasing* and *High Decreasing Family Functioning* classes. Finally, relative to the *High-Increasing Family Functioning* class, the *High-Decreasing Family Functioning* class was more likely to report past 30-day marijuana use (OR = 1.75, *p* < .001), but less likely to report past 30-day alcohol use (OR+.95, *p* < .01) and binge drinking (OR = .84, *p* = .01).

Parent Support Unconditional Model

Next, we examined five *Parent Support* unconditional models (i.e. models without any covariates or distal outcomes). The same model fit indices described above (i.e., AIC, BIC, Sample Adjusted BIC, entropy and VLMR) were used to select the best approximating model. Model fit indices indicated that, relative to a three-class trajectory model (BIC = 7642.81, entropy .82), the BIC value decreased to 7538.45 and entropy remained at .82 in the four-class trajectory model, indicating an improvement in model fit. Although the BIC value decreased in the five-class trajectory (BIC = 7485.66), the VLMR tests were significant for models with three- (*p* < .001) and four(*p* = .01) class trajectory groups, and nonsignificant for the five-class trajectory model (*p* = .50). Therefore, we identified the four-class *Parent Support* trajectory model as the most parsimonious (Table 3). Class 1, hereafter referred to as the *Low-Stable* class, consisted of 7.7% of participants. Approximately 12% of participants were in class 2, referred to as the *Low-Increasing* class. Class 3 comprised approximately 21.1% of participants and this class is referred to as the *High-Decreasing* class. Approximately 59.3% of participants were in class 4, referred to as the *High-Increasing* class. In general, the trajectories of both the *Low-* and *High-Increasing Parent Support* classes increased over time, *High-Decreasing Parent Support* decreased over time, and the *Low-Stable Parent Support* trajectory seemed to remain constant over time (Table 4).

Parent Support Conditional Models with a Covariate

Predicting Class Membership—The *Low-Stable* and *Low-Increasing Parent Support* classes were more likely to consist of females, as compared to the *High-Increasing Parent Support* classes (reference group). Relative to the *High-Increasing* class, the *Low-Stable*

class was more likely to consist of higher socioeconomic status. In addition, the *High-Decreasing* class was less likely to have African American youth, when compared to the *High-Increasing* class.

Covariates Predicting Trajectories—Next, we examined the associations between covariates and the four latent class memberships. The only significant association identified was that of race. This suggests that African American youth were significantly more likely to report higher levels of parent support at baseline, but their trajectories seemed to decrease over time, independent of the class membership.

Parent Support Conditional Models with Distal Outcome

Findings indicate that, relative to the *Low-Increasing Parent Support* class, the *High Increasing Parent Support* class was more likely to report past 30-day alcohol use (OR = 1.03, $p < 0.05$). Furthermore, when compared to the *Low-Stable* class, the *High-Increasing* class was less likely to report past 30-day alcohol use (OR = .88, $p < .01$). Relative to the *Low-Increasing* class, the *High-Decreasing* class was more likely to report past 30-day alcohol use (OR = 1.02, $p = .05$). The *High-Decreasing* class was less likely to report past 30-day alcohol use (OR = .88, $p < .05$), as compared to the *Low-Stable* class. Relative to the *High-Decreasing* class, the *High-Increasing* class was less likely to report binge drinking (OR = .88, $p < .05$). The *High-Increasing* class, relative to the *Low-Stable* class, was more likely to report binge drinking (OR = 2.05, $p < .05$). When compared to the *High-Increasing*, *High-Decreasing*, and *Low-Increasing* classes, the *Low-Stable* class was more likely to report past 30-day marijuana use (OR = 2.77, 1.38, and 1.48, respectively). The *High-Increasing* class was less likely to report past 30-day marijuana use, as compared to both the *Low-Increasing* and *High-Decreasing* classes (OR = .54 and .50, respectively). Relative to the *High-Decreasing* class, the *Low-Increasing* class was less likely to report past 30-day marijuana use (OR = .93, $p < .01$).

Parent Support Conditional Models with Covariates and Distal Outcome

As can be seen in Table 6, findings indicate that, relative to the *Low-Stable Parent Support* class, the *High-Increasing* and *High-Decreasing Parent Support* classes were more likely to report past 30-day alcohol use (OR = 1.26 and 1.34, respectively). When compared to the *High-Increasing* class, the *High-Decreasing* class was more likely to report binge drinking (OR = 1.41, $p < .05$) and past 30-days marijuana use (OR = 1.71, $p < .001$), but less likely to report past 30-day alcohol use (OR = .94, $p < .001$). Relative to the *High-Increasing* class, the *Low-Increasing* class was more likely to report past 30-day marijuana use (OR = 1.85, $p < .01$).

DISCUSSION

Our findings indicate that, in general, relative to higher family functioning and parent support trajectories, lower family functioning and parent support trajectories may be associated with an increased risk of substance use and misuse. Few researchers have examined the trajectories of family functioning and parent support and how these trajectories are related to substance use and misuse among urban adolescents (Tober &

Komro, 2010; Tobler, Livingston, & Komro, 2011). Our study adds to the current understanding of family effects on adolescent alcohol and drug use by using a multivariate longitudinal assessment of these factors. Identifying trajectories of family functioning and parent support and their influence on substance use and misuse can inform family-based prevention and early intervention of alcohol and marijuana using and binge drinking among urban adolescents. Our results suggest that family interventions that include several dimensions of parenting (i.e. family functioning and parent support) may have lasting effects on adolescent alcohol and substance use over time.

In this sample of urban youth, four distinct family functioning trajectories were identified: (1) *Low-Increasing* (8.3%), (2) *Low-Decreasing* (6.6%), (3) *High-Increasing* (67.1%), and (4) *High-Decreasing* (17.9%). In general, findings from our final model indicate that, irrespective of the trajectory (i.e. increasing and decreasing), relative to classes with higher reports of family functioning, classes with lower family functioning were at increased risk of substance use and misuse. For example, when compared to both the *High-Decreasing* and *High-Increasing* classes, the *Low-Decreasing* class was more likely to report past 30-day marijuana use. In addition, the *Low-Increasing* class was more likely to report binge drinking and past 30-day marijuana use, as compared to the *High-Increasing* and *High Decreasing* classes. Furthermore, relative to the *High-Increasing* class, the *High-Decreasing* class was more likely to report past 30-day marijuana use. Contrary to what we would have expected, however, the *High-Decreasing* class was less likely to report past 30-day alcohol use and binge drinking, as compared to the *High Increasing* class.

With respect to parent support, study findings indicate four heterogeneous trajectories, including (1) *Low-Stable* (7.7%), (2) *Low-Increasing* (12%), (3) *High-Decreasing* (21.1%), and (4) *High-Increasing* (59.3%) trajectories. In our final model, when compared to low and decreasing trajectories of parent support, high and increasing trajectories of parent support were associated with a decreased risk of misuse patterns of licit and illicit drug use, including binge drinking and marijuana use. For example, relative to the *High-Increasing* class, the *High Decreasing* class was more likely to report binge drinking and past 30-days marijuana use. Furthermore, relative to the *High-Increasing* class, the *Low-Increasing* class was more likely to report past 30-day marijuana use. Similar to the family functioning trajectories, however, parent support trajectories and their relation to past 30-day alcohol use were counterintuitive. Here again, relative to the *Low-Stable* class, the *High-Increasing* and *High-Decreasing* classes were more likely to report past 30-day alcohol use, and the *High-Decreasing* class was less likely to report past 30-day alcohol use, as compared to the *High-Increasing* class.

From a developmental perspective, the family functioning and parent support trajectories identified in this study and their relation to substance use and misuse raise the question: *In adolescence, are there more critical periods during development where family functioning and parent support may be more meaningful to ameliorate adolescent substance use and misuse?* Researchers have shown that the transition from 8th grade to 10th grade is a particularly vulnerable period for increased risk of adolescent substance use and misuse. Findings from the *Monitoring the Future* study, for example, show us that the prevalence of past 30-day illicit drug use increases from 7.7% in the 8th grade to 18.6% in 10th grade

(Johnston et al., 2012). The findings that, relative to trajectories of lower family functioning and parent support, higher levels of family functioning and parent support, are associated with a decreased risk of more problematic trends of substance misuse, including binge drinking and marijuana use, in late adolescence contributes to our understanding of the promotive effects of family functioning and parent support. Consistent with previous research on family functioning and parent support and substance use and misuse among adolescents (Frauenglass, Routh, Pantin, & Mason, 1997; Mak et al., 2010; Taylor et al., 2012), our findings underscore the importance of family functioning and parent support as promotive factors against substance use and misuse and expands on these findings by examining its influence over time. Researchers have consistently demonstrated that family systems characterized by low levels of family functioning may increase the risk of adolescent substance use and misuse (Mak et al., 2010). Our finding that low and decreasing family functioning and family support trajectories were related to an increased risk of marijuana use as compared to high and increasing family functioning and parent support trajectories is consistent with past research which has demonstrated that trajectories of positive constructs of family functioning are associated with a decreased risk of drug use (Tobler & Komro, 2010). However, our understanding of whether and the extent to which family functioning and parent support may be more meaningful during critical periods of adolescence remains limited. In other words, is family functioning and parent support more meaningful in 8th grade, relative to later adolescence? Future research aimed at answering this question may have great utility in moving the field forward.

Contrary to what we expected, youth in families with low and decreasing family functioning and parent support trajectories, as compared to those with high and increasing family functioning trajectories, were at less risk of engaging in past 30-day alcohol use. These results are somewhat surprising and do not support our a priori hypotheses. There are several plausible explanations for these findings. From a cultural perspective, researchers have indicated normative and permissive attitudes toward adolescent alcohol use among ethnic minority families (Caetano & Clark, 1999). Extending this logic to African American families, and particularly those who report higher levels of family functioning and parent support, it may be that these families do not perceive adolescent alcohol use as problematic until abuse (i.e. binge drinking) or illicit drug use (i.e. marijuana) occurs. In addition, participants who report higher levels of family functioning and parent support, as compared to their counterparts, might be more likely to participate in cultural-specific celebrations (e.g. family barbeques) where adolescent alcohol use might be more permissive. In fact, researchers have found that alcohol use behaviors were common among high school seniors in general, and especially among high school seniors who report higher parental education (Patrick et al., 2013). It is plausible that higher parental education is associated with higher family functioning and may provide high school seniors with additional resources to purchase larger quantities of alcohol and hence engage in alcohol use behaviors. In our previous research (Zimmerman et al., 2002), we have identified the targeted community as one with multiple ecological risk factors suggesting that there may be community risk factors at play that are not accounted for, including increased access to and prevalence of alcohol use might partially explain these findings. Although speculative, it also may be that lower functioning families drink less and have fewer opportunities (and alcohol) for their

children to drink, as compared to higher functioning families. Consequently, these youth may be more likely to smoke marijuana because other sources for experimentation are limited.

From an ecodevelopmental (Szapocznik & Coatsworth, 1999) perspective, the family microsystem is the most proximal and influential to adolescent development. The present study consisted of a sample that identified as predominantly African American urban youth. The patterns of substance use and misuse are known to be different among African American adolescents who historically report less alcohol use, but greater marijuana use than non-Hispanic whites and Hispanics (CDC, 2012; Johnston et al., 2012). Furthermore, due to the historical legacy of racism and discrimination, family structures and resources of African American families can be quite different than for non-Hispanic whites, and are often characterized by lower access to financial, educational, and other social material resources which may affect family functioning (Williams, Allen, & Robert Stockton, 1973). In spite of this, similar to previous research (Tobler & Komro, 2010), the majority of this sample of urban youth, whom was identified as at increased risk of high school dropout, experienced high-increasing trajectories of family functioning (67.1%) and parent support (59.3%). Thus, despite the potential additional ecodevelopmental risk factors (e.g. community-level factors) that may negatively affect urban youth substance use and misuse, participants may have benefited from the promotive effects of a positive family environment. Equally important, additional ecodevelopmental domains (e.g. peer groups) may play an important role in substance use and misuse especially in late adolescence (Patrick et al., 2013). Focusing on additional domains, including peers, combined with family, may be a more appropriate approach to prevention efforts aimed at ameliorating substance use and misuse in late adolescence and is warranted in future research. Research to examine the mediating and moderating effects of peer, school and community factors and substance use and misuse employing a latent class trajectory approach would be a critical next step to build our knowledge. In addition, we don't know empirically or theoretically how negative or positive change in these family factors impact substance use (particularly rapid change over a few years during a critical developmental transition period). Perhaps change itself, either positive or negative, can be disruptive, thus increasing risk of substance use and misuse. Ecodevelopmental theory and its testing perhaps now needs to focus more on dynamism in contexts over time.

Limitations

In interpreting these findings, a few limitations should be noted. One limitation of the current study is the reliance on substance use and misuse self-report measures. Therefore, it is possible that participants may have under- or over-reported substance use and misuse. Yet, we have no reason to believe that reporting bias may differ systematically across the latent classes we found. Second, we only have adolescent reports of family functioning indicators. Although an objective measure of family functioning may reduce response bias, the adolescents' interpretation of their family may be more influential on their alcohol and substance use. Future studies that include parent reports of family functioning to work toward a fuller understanding of family dynamics by examining parent-adolescent family functioning discrepancies (Cordova et al., in press) would be beneficial. Finally, this sample

is not representative of all urban adolescents in the United States, and thus findings may not generalize to other urban adolescent populations in the United States.

CONCLUSION

Researchers have yet to examine trajectories of family functioning and parent support and how these trajectories affect substance use and misuse among an urban sample composed of primarily African American, low SES youth. Our findings provide some evidence that family functioning and parent support trajectories are linked in important ways with substance use and misuse among urban youth; however, it remains unclear whether mediating (e.g. peer) and moderating (e.g. family SES) factors affect these processes. Future research examining these processes would be a critical next step to build our knowledge. Ecodevelopmental (Szapocznik & Coatsworth, 1999) preventive interventions for urban African American youth are non-existent. Identifying ecodevelopmental (Szapocznik & Coatsworth, 1999) risk and promotive factors may help with identifying urban youth who are at increased risk of engaging in substance use behaviors, as well as inform family-based preventive intervention for this population.

Biographies

David Cordova, Ph.D., is an Assistant Professor at the University of Michigan School of Social Work. His program of research focuses on the etiology of adolescent HIV risk behaviors, including substance use and sexual risk behaviors, and applying this research to the development and testing of preventive interventions.

Dr. Heinze's primary research interests include belonging motivation and developmental transitions in adolescence and emerging adulthood. He is also interested in the formation of social judgments that lead to social exclusion/ostracism or prejudicial behavior, and how valence in social climate affects individuals' mental and physical health.

Dr. Mistry is an Assistant Professor in The University of Michigan, Department of Health Behavior and Health Education. His research focuses on adolescent health and chronic diseases prevention. He has conducted studies in the U.S. and internationally in areas of tobacco use, physical activity, food choice, and health care utilization. He was a recipient of the Fulbright-Nehru Senior Scholar Award to study the implementation of India's tobacco control policy and adolescent tobacco use. He has been Principal Investigator and Co-Investigator on studies funded by the Centers for Disease Control and Prevention, the National Institutes of Health, the Agency for Healthcare Research and Quality, and the California Tobacco Related Disease Research Program.

Dr. Hsieh earned her M.P.H. and Ph.D. in Health Behavior and Health Education from the University of Michigan. Her research focuses on applying a resiliency perspective in examining risk and promotive factors for substance use and delinquent behaviors among adolescents. With the focus on developmental psychology in public health, her research interests are in identifying ecological and developmental factors that will facilitate positive development among children.

Dr. Sarah A. Stoddard is an Assistant Professor in the Division of Health Promotion and Risk Reduction in the School of Nursing at The University of Michigan. Her research interests include understanding the interaction between individual factors and social and environmental factors (e.g., neighborhood characteristics), and how together they shape the psychosocial development and health trajectories of at-risk urban youth; and the application of behavioral and ecological approaches to prevent violence and substance use in youth.

Christopher P. Salas-Wright, Ph.D., is an Assistant Professor at the University of Texas at Austin. His research interests include youth problem behavior, religiosity and spirituality, and adolescent substance abuse and violence prevention, particularly among Latino youth in both the United States and in Latin America.

Marc A. Zimmerman, Ph.D. is Professor in the Department of Health Behavior and Health Education in the School of Public Health. He is also a professor in Psychology, and the Combined Program in Education and Psychology at the University of Michigan, and a Research Scientist in the Center for Human Growth and Development. His research focuses on adolescent resilience associated with risk for violence, sexual risk behavior, and substance abuse.

GLOSSARY

Ecodevelopmental Framework — A risk and protective factors model that postulates adolescents are embedded in interconnected and interrelated contexts that both influence and are influenced by the adolescent over time

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TABLE 1

Reported frequencies of outcome variables by demographic characteristics

	30-Day Alcohol Use			Binge Drinking			30-Day Marijuana Use		
	No	Yes	Total	No	Yes	Total	No	Yes	Total
Gender									
Male	67 (32.8)	137 (67.2)	204	52 (37.7)	86 (62.3)	138	225 (63.0)	132 (37.0)	357
Female	111 (48.9)	116 (51.1)	227	63 (53.4)	55 (46.6)	118	63 (53.4)	55 (46.6)	389
Race									
White	31 (30.1)	72 (69.9)	103	27 (37.5)	45 (62.5)	72	70 (55.1)	57 (44.9)	127
Black	142 (45.4)	171 (54.6)	313	83 (47.7)	91 (52.3)	174	404 (67.9)	191 (32.1)	595
Mixed	5 (33.3)	10 (66.7)	15	5 (50.0)	5 (50.0)	10	18 (75.0)	6 (25.0)	24
	30d			Binge			MJ		
SES (Pearson r)	−.06			.03			−.08 *		

Note:

*
$p < .05$

TABLE 2

Socio-demographics

	Black	**Race White**	**Mixed**
N	681	143	26
Sex	.51	.45	.54
SES	39.81	40.31	40.56
W1 Family Functioning	3.20 (.02)	3.13 (.03)	3.23 (.07)
W2 Family Functioning	3.34 (.02)	3.28 (.06)	3.27 (.12)
W3 Family Functioning	3.42 (.02)	3.33 (.05)	3.28 (.12)
W4 Family Functioning	3.43 (.02)	3.43 (.05)	3.29 (.13)
W1 Parent Support	3.94 (.04)	3.74 (.08)	3.67 (.20)
W2 Parent Support	4.01 (.04)	3.79 (.08)	3.96 (.16)
W3 Parent Support	4.10 (.04)	3.93 (.08)	3.89 (.21)
W4 Parent Support	4.03 (.04)	3.77 (.08)	3.90 (.18)

Note. SES = highest parent occupational prestige score (Range: 29.28–64.38).

TABLE 3

Relative model fit by number of latent classes of family functioning and parent support trajectories

	Classes	Log Likelihood	No. of parameters	Entropy	AIC	BIC	Adj. BIC	VLMR
Family Functioning	1	−2682.19	6	n/a	5376.39	5404.86	5385.81	n/a
	2	−2318.50	9	.88	4655.01	4697.72	4669.13	$p < .001$
	3	−2234.03	12	.89	4492.06	4549.00	4510.89	$p < .01$
	4	−2158.00	15	.84	4346.00	4417.18	4369.54	$p < .05$
	5	−2128.18	18	.84	4292.37	4377.78	4320.62	$p = .42$
Parent Support	1	−4402.94	6	n/a	8817.89	8846.36	8827.30	n/a
	2	−3907.29	9	.85	7832.57	7875.28	7846.70	$p < .001$
	3	−3780.93	12	.82	7585.86	7642.81	7604.70	$p < .001$
	4	−3718.64	15	.82	7467.27	7538.45	7490.82	$p < .01$
	5	−3682.12	18	.77	7400.45	7485.66	7428.50	$p = .50$

TABLE 4

Unconditional latent class growth analysis

	Family Functioning				Parent Support			
	Low Increasing	Low Decreasing	High Increasing	High Decreasing	Low Stable	Low Increasing	High Decreasing	High Increasing
Means								
Intercept	2.32 ***	2.71 ***	3.36 ***	3.22 ***	2.31 ***	2.55 ***	3.83 ***	4.45 ***
Slope	.38 ***	−.26 ***	.13 ***	−.12 **	−.07	.56 ***	−.23 ***	.04 *
Number of subjects (%)	71 (8.3%)	56 (6.6%)	570 (67.1%)	152 (17.9%)	65 (7.7%)	101 (12.0%)	179 (21.1%)	503 (59.3%)
Entropy			.84				.82	
Goodness of Fit								
Bayesian (BIC)			4417.18				7538.45	
LMR LRT			p = .03				p = .02	

Note:

*
$p < .05$,

**
$p < .01$,

***
$p < .001$

TABLE 5

Family functioning latent class growth analysis with distal outcome and covariates

Parameter	Past 30 Day Alcohol Use				Binge Drinking in Past 2 Weeks				Past 30 Day Marijuana Use			
	LD	LI	HD	HI	LD	LI	HD	HI	LD	LI	HD	HI
a_0	2.75 (.14)**	2.29 (.10)**	3.20 (.07)**	3.36 (.06)**	2.73 (.15)**	2.28 (.10)**	3.19 (.07)**	3.35 (.06)**	2.74 (.15)**	2.29 (.10)**	3.19 (.07)**	3.35 (.06)**
$\bar{z}_0$	−.32 (.06)**	.34 (.05)**	−.13 (.06)*	.09 (.07)**	−.32 (.06)**	.34 (.05)**	−.13 (.06)*	.10 (.03)**	−.32 (.06)**	.34 (.05)	−.13 (.06)*	.10 (.03)**
	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
$\bar{I}$	−.54	−1.19	−.23	−.28	−.87	−.32	−.03	−.20	−.21	.05	.32	.86
Shared Coefficients												
a_0|Sex		−.03 (.03)				−.02 (.03)				−.03 (.03)		
a_0|SES		.00 (.00)				.00 (.00)				.00 (.00)		
a_0|Black		.05 (.03)				.05 (.03)				.05 (.03)		
a_0|Mixed		.14 (.06)*				.13 (.06)*				.12 (.07)+		
$\bar{z}_0$|Sex		.02 (.01)				.02 (.01)				.01 (.02)		
$\bar{z}_0$|SES		.00 (.00)				.00 (.00)				.00 (.00)		
$\bar{z}_0$|Black		−.01 (.02)				−.01 (.02)				−.01 (.02)		
$\bar{z}_0$|Mixed		−.06 (.07)				−.05 (.07)				−.06 (.07)		
Comparison		Odds Ratio				Odds Ratio				Odds Ratio		
LD vs. LI		.52				1.74				1.29+		
LD vs. HD		1.37+				2.33				1.69*		
LD vs. HI		1.31*				1.96				2.95*		
LI vs. HD		2.63				1.34				1.31*		
LI vs. HI		2.51+				1.12*				2.29**		
HD vs. HI		.95**				.84*				1.75***		
Number of subjects (%)	45 (6.1%)	55 (7.4%)	132 (17.6%)	516 (68.9%)	45 (6.0%)	55 (7.4%)	132 (17.6%)	516 (68.9%)	44 (5.9%)	55 (7.4%)	131 (17.4%)	518 (69.1%)
Entropy		.85				.85				.85		

	Past 30 Day Alcohol Use			Binge Drinking in Past 2 Weeks			Past 30 Day Marijuana Use		
	LD	LI	HD	HI	LD	LI	HD	HI	LD	LI	HD	HI
Fit Indices										
Log likelihood		−2111.30				−2009.52				−2269.35	
Bayesian (BIC)		4480.79				4277.22				7549.89	

Note: Standard errors in parentheses.

*
$p < .05$,

**
$p < .01$,

***
$p < .001$.

+
$p = .06$.

TABLE 6

Parent support latent class growth analysis with distal outcome and covariates

Parameter	Past 30 Day Alcohol Use				Binge Drinking in Past 2 Weeks				Past 30 Day Marijuana Use			
	Low	LI	HD	HI	Low	LI	HD	HI	Low	LI	HD	HI
α_0	2.28 (.21)**	2.23 (.23)**	3.67 (.16)**	4.26 (.16)**	2.27 (.21)**	2.22 (.23)	3.67 (.16)**	4.26 (.16)**	2.36 (.38)**	2.25 (.23)**	3.70 (.17)**	4.29 (.17)**
α_1	-.09 (.10)	.64 (.11)**	-.16 (.07)*	.08 (.06)	-.09 (.09)	.65 (.11)	-.16 (.07)*	.08 (.20)	-.12 (.18)	.63 (.12)**	-.16 (.08)+	.07 (.08)
ζ_0	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ζ_1	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
τ	-.60	-.21	-.31	-.37	.70	-.66	-.52	-.18	.63	.25	.33	.86
Shared Coefficients												
γ_0 | Sex		.02 (.06)				.01 (.06)				.01 (.07)		
γ_0 | SES		.00 (.00)				.00 (.00)				.00 (.00)		
γ_0 | Black		.21 (.09)*				.22 (.08)**				.21 (.09)*		
γ_0 | Mixed		-.12 (.31)				-.12 (.26)				.05 (.80)		
γ_1 | Sex		-.01 (.03)				-.01 (.03)				.00 (.03)		
γ_1 | SES		.00 (.00)				.00 (.00)				.00 (.00)		
γ_1 | Black		-.08 (.04)*				-.08 (.04)*				-.08 (.04)		
γ_1 | Mixed		-.01 (.10)				-.01 (.09)				-.01 (.09)		
Comparison		Odds Ratio				Odds Ratio				Odds Ratio		
Low vs. LI		1.26				.26				.68*		
Low vs. HD		1.34*				.30				.74*		
Low vs. HI		1.26*				.42				1.26**		
LI vs. HD		.90+				1.15+				1.08*		
LI vs. HI		.85*				1.62				1.85**		
HD vs. HI		.94***				1.41*				1.71***		
Number of subjects (%)	61 (8.2%)	78 (10.4%)	177 (23.6%)	433 (57.7%)	61 (8.1%)	76 (10.3%)	178 (23.7%)	433 (57.8%)	64 (8.6%)	76 (10.1%)	180 (24.1%)	428 (57.2%)
Entropy		.83				.84				.83		

| | Past 30 Day Alcohol Use | | | Binge Drinking in Past 2 Weeks | | | Past 30 Day Marijuana Use | | |
	Low	LI	HD	HI	Low	LI	HD	HI	Low	LI	HD	HI
Fit Indices												
Log likelihood		−3484.82				−3379.11				−3645.85		
Bayesian (BIC)		7227.82				7016.41				7549.89		

Note: Standard errors in parentheses.

*
$p < .05$,

**
$p < .01$,

***
$p < .001$.

+
$p = .06$.