# The Impact of Substance Use During Middle School and Young Adulthood on Parent–Young Adult Relationships

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## Abstract

Sharp increases in substance use and other risk behaviors during adolescence and young adulthood threaten the quality of the parent-child relationship, a critical context for positive adjustment and well-being. There is a dearth of research, however, on the influence of adolescent and young adult substance use on the parent–young adult relationship. Study aims were to examine longitudinally the associations between classes of adolescent and young adult alcohol and marijuana use, and the impact of alcohol and marijuana use on parent-young adult relationship dynamics and quality. We analyzed longitudinal data collected with a socioeconomically and racially diverse urban community sample of 593 parents and their children over six years to identify latent classes of growth in adolescent alcohol and marijuana use, and test for differences in young adult alcohol and marijuana use and parent-young adult relationship quality by latent classes. Structural equation modeling results showed that (a) alcohol and marijuana use during the middle school years predicted adult alcohol and marijuana use during young adulthood, (b) high-risk alcohol and marijuana use, specifically, was associated with poorer parent-young adult relationship quality, (c) initiation of marijuana use during young adulthood was also associated with poorer parent-young adult relationship quality, and (d) for minority youth in all alcohol risk classes, parent-young adult relationship quality was lower. Results show that growth in alcohol and marijuana use during adolescence, and initiation of marijuana use later in young adulthood, exert unique, detrimental effects on parent–young adult relationship quality. Implications for future research and prevention and intervention development for young adults are discussed.

### Keywords

parent-child relationships; young adult; relationship quality; marijuana; alcohol

Parental guidance and support are critical for children's development during the transition to young adulthood (Aquilino, 2006; Kins, Beyers, Soenens, & Vansteenkiste, 2009). According to the 2010 U.S. Census, 57% of men and 49% of women between ages 18 and 24 lived with their parents. For young adult children living at home and living independently, parents provided approximately $2,200 annually throughout the transition to

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adulthood (Agliata & Renk, 2008; Treas & Gubernskaya, 2012). For young adult children living away from home, parents also provide an average of 367 hours of instrumental and emotional support each year (Schoeni & Ross, 2004; Seltzer, Strohm, & Bianchi, 2010). These types of parent support and the quality of the parent–young adult relationship significantly affect young adults' adjustment (Caruthers, Van Ryzin, & Dishion, 2014; Levitt, Silver, & Santos, 2007; Schwartz, 2016).

Increases in substance use and other risk behaviors during adolescence and young adulthood, however, threaten the parent-young adult relationship and parents' ability to support their children (e.g., Brody, Yu, Chen et al., 2010; Madkour, et al., 2017; Patock-Peckham & Morgan-Lopez, 2009). Young adults ages 18 to 25 use alcohol and marijuana at rates higher than those at any other age group (Centers for Disease Control and Prevention, 2010). National data from the Substance Abuse and Mental Health Services Administration (2014) show that more than half of individuals (139.7 million) living in the U.S., age 12 or older, report using alcohol, and 23% of these individuals are classified as binge drinkers. During the past 15 years, marijuana use by individuals age 12 years and older has increased significantly (SAMHSA, 2017), with about 24 million Americans age 12 years or older (8.9% of U.S. population) using marijuana.

## Parent-Child Interactions and Substance Use Risk

There is extensive empirical research on the development, maintenance, and treatment of child substance use within family contexts (e.g., Dodge, Malone, Lansford, Miller, Pettit, & Bates, 2009; Ennett, Bauman, Hussong, Faris, Foshee, Cai, & DuRant, 2006). One of the most studied family contexts is the parent-child relationship. The relationship between parent-child interactions and child substance use is cyclical. Relationship qualities and ongoing transactions between children and parents, in sequence and across development, result in accumulation of substance use risk (e.g., Barrett & Turner, 2006; Brody, Yu, Chen, Kogan, & Smith, 2012; Schwartz, 2016; Stormshak, Connell, & Dishion, 2009). Parent-child interactions characterized by positive and clear communication, closeness, and parental supervision reduce children's risk (Brody, Yu, Chen, Kogan, & Smith, 2012; Kogan, 2017; Madkour et al., 2017; Schwartz, 2016). Positive parent-child interactions, in turn, increase the likelihood that children remain connected to their parents, heed their guidance (Vakalahi, 2001; VanRyzin & Dishion, 2012), and make choices that buffer themselves from deviant relationships that increase their risk (Aquilino, 2006; Kins, Beyers, Soenens, & Vansteenkiste, 2009).

Parent-child interactions characterized by negative communication and conflict, coercion, hostility, and permissive or controlling parenting, in contrast, increase children's substance use risk (Dishion & Patterson, 2006; Griffin, Botvin, Scheier, Diaz, & Miller, 2000; Stormshak, Connell, & Dishion, 2009) and a cycle of negative reinforcement ensues between parents and children. Substance use also compromises children's psychological, social, and physical capacities and parent-child interactions become more negative (Barrett & Turner, 2006; Fischer, Forthun, Pidcock, & Dowd, 2007). Parents feel frustrated and helpless to engage their children, leading to disengagement and escalation of substance use

over time (Dishion & Patterson, 2006; Dodge, Malone, Lansford, Miller, Pettit, & Bates, 2009; Stormshak, Connell, & Dishion, 2009).

Of the limited research on parent-young adult interactions and young adult substance use risk, research suggests that parenting styles, skills, and parent confidence influence young adults' alcohol use (Nelson, Padilla-Walker, Christensen, Evans, & Carroll, 2011; Patock-Peckham and Morgan-Lopez, 2009). Parental permissiveness about drinking, for example, during early adulthood is linked to young adults' increased heavy drinking and associated negative consequences (e.g., Patock-Peckham and Morgan-Lopez, 2009; Walls, Fairlie, & Wood, 2009). Using prospective longitudinal data, Madkour et al. (2017) found that nurturing, close, and communicative parent–young adult relationships independently reduced young adults' risk for heavy episodic drinking beyond contributions of parent–adolescent relationships.

Grounded in a developmental, transactional model, we predict that substance use in adolescence would adversely impact the quality of the parent-child relationship, yet most research has focused on parenting skills as predictors of risk, not as an outcome of risk behavior. To date, there has been little published on how adolescents' alcohol and marijuana use over time impacts the quality of their relationships with parents in young adulthood, despite a robust literature suggesting that child behavior impacts parenting. For example, temperament and problem behavior impact parenting skills, which in turn predict child behavior over time (Wills & Dishion, 2010) and high-risk sexual behavior in adolescence predicts a decline in parent-child relationship quality (Henrich et al., 2006). Parents play a significant role in their young adult children's lives and learning more about the impact of adolescent and young adult alcohol and marijuana use on parent-young adult relationships may inform family-centered intervention development, timing, and implementation from adolescence through early adulthood.

### This Study

Study aims were to examine latent classes of growth in marijuana and alcohol use during the middle school years and examine differences in young adult alcohol and marijuana use and parent-young adult relationship quality by class. We analyzed longitudinal data collected over six years with a diverse community sample of 593 families. We hypothesized that adolescent alcohol and marijuana use would predict young adult use and parent-young adult relationship quality, and that early adult alcohol and marijuana use would be associated with poorer parent-young adult relationship quality. We examined gender and race in our model given extant research showing gender and racial differences in substance use trajectories.

## Method

### Participants

Project Alliance 2 (DA 018374; HD 075150) was initially funded in March 2005 by the National Institute on Drug Abuse to conduct a school-based, family-centered intervention for substance use prevention during the middle school years. A total of 593 ethnically and socioeconomically diverse sixth grade children (*M* age = 11 years, 10 months) and their

caregivers were recruited from three middle schools and randomly assigned at the individual level to the intervention ($n = 386$) or control ($n = 207$) experimental conditions. Intervention families received a family-centered, school-based intervention during the middle school years that is described elsewhere (e.g., Stormshak et al., 2011). All participants lived in Oregon, which legalized medical cannabis use in 1998 and recreational cannabis use in 2014.

All three middle schools served an at-risk population, with 35%, 89%, and 39% of families across the three schools receiving free or reduced-price lunches. All schools were Title 1 schools, and approximately 20% of the combined school population qualified for special education services. Parents of all sixth grade students in two cohorts were approached for participation and 80% consented. Youth and their families were followed for four years starting in sixth grade and through the transition to high school (ninth grade), with 83% participant retention. All participants were contacted again approximately 1 year after completing high school ($M$ age = 20 years) and asked to participate in an ecological assessment that included questionnaires and videotaped discussions between parents and their children.

We examined data across five waves, when youth were on average 12, 13, 14, 15, and 20 years old. The sample comprised 51% males participants identified racially as: 36% European American, 18% Hispanic/Latino, 15% African American, 7% Asian American, 19% biracial/mixed identity, 2% Native American, and 2% Pacific Islander. The sample continued to be at risk from middle school through the young adult years, with an average household income of $45,000 per year (for a household of four). At age 20, 54% of young adults were living with their parents, 24% attending college, and 14% did not have a high school degree. Daily use of marijuana was reported by 22% of the sample, well above the national average of 4.6% (SAMHSA, 2014) and 48% reported multiple binge drinking episodes or 5+ drinks in a row.

### Procedures

All study methods were approved by our Institutional Review Board. Participants provided written consent. At age 20, young adults completed surveys measuring an array of outcomes. Young adults and parents received $100 for completing study questionnaires and each received $50 for participating in the videotaped observation task. All families in the intervention and control conditions were invited to complete the Family Assessment Task (FAST; Dishion, Kavanagh, & Schneiger, 2002) during young adulthood, an observational assessment adapted for this study. Each FAST follows standardized scripts and is conducted in families' homes or the research office, depending on family preference. The observation protocol includes six tasks. For each task, families were given prompts to encourage a timed discussion about a designated topic. Topics included goals, living situation and support, romantic relationships, risky behaviors, problem solving, and strengths and goals. Each discussion lasted five to eight minutes.

A team of coders, under the supervision of a lead coder, coded these observations using the FAST Coder Impressions (COIMP; Dishion et al., 2017). To ensure coding consistency, 23% of the videos were randomly assigned to be coded by two randomly paired coders who did

not know about the reliability check. All codes were rated on a scale ranging from 1 (*not at all*) to 9 (*very much*) and are summarized later in this article. Percent agreement was computed for each coder in comparison with all other coders; average agreement was 81.5% across all codes.

### Measures

**Covariates**—We examined gender and race as covariates based on research showing gender and racial differences in substance use risk (Banks, Rowe, Mpofu, & Zapolski, 2017; Cheng & Anthony, 2018), coded 1 (*boy*) 0 (*girl*) and 1 (*minority*) 0 (*nonminority*).

**Adolescent substance use (ages 12–15)**—Each year, from sixth to ninth grade, participants were asked, "In the last month, how many drinks of alcohol have you had?" and "In the last month, how many times did you smoke marijuana or hashish?" Participants indicated their use frequency on a Likert-type scale ranging from 1 (*none*) to 14 (*41 or more*).

**Young adult substance use (age 20)**—In early adulthood, participants were asked, "How often did you drink beer in the last three months?" and "When you drank beer in the last three months, how much did you usually drink?" Response options to the first question ranged from 0 (*never*) to 8 (*2–3 times a day*). Response options to the second question ranged from 0 (*less than one can*) to 5 (*six cans or more*). Participants were also asked parallel questions about wine/wine coolers/malt liquor and hard liquor. Responses to these six items were rescaled for a "young adult alcohol use" score. Young adults also were asked, "How often did you use marijuana in the last three months?" and "When using marijuana, how much did you usually smoke?" Response options to the first question ranged from 0 (*never*) to 7 (*2–3 times a day or more*). Response options to the second question ranged from 1 (*1–2 hits*) to 6 (*more than 2 bowls or joints*). Responses to these two items were rescaled to arrive at a "young adult marijuana use" score.

### Parent–Young Adult Relationship Quality

The parent–young adult relationship quality construct was created using multimethod and multi-rater data and comprised the following factors.

**Goals**—The goals construct was based on responses to four coded observation scales obtained during the FAST: parent support of young adult goals, parent encouragement of young adult goals, young adult positive behavior toward parent, and parent positive behavior toward the young adult. Using the COIMP, the caregiver's support for the young adult's plans and goals was evaluated with nine items, each rated on a scale ranging from 1 (*not at all*) to 9 (*very much*); Cronbach's alpha for the scale was 0.826. Sample items include, "Does the caregiver provide structure, scaffolding, instruction, advice, and/or coaching toward stated goal?" and "Does the caregiver engage in behaviors that support the child's goals (emotionally, financially, or instrumentally)?" The caregiver's encouragement of the young adult's future was evaluated with eight items, each rated on a scale from 1 (*not at all*) to 9 (*very much*); Cronbach's alpha for the scale was 0.90. Sample items include, "Does the

caregiver effectively use praise and/or encouragement with the child?" and "Does the caregiver seem to support the child's goals?"

The third and fourth indicators that comprised measurement of goals included direct observation and coding of youth-to-parent positive interaction and parent-to-youth positive interaction. Youth-to-parent positive interaction was evaluated with five items, each rated on a scale ranging from 1 (*not at all*) to 9 (*a lot*); Cronbach's alpha for the scale was .688. Sample items include "acknowledging or responding to ideas" and "nonverbal expressions of engagements (smiles, leaning in, nodding, etc.)." Parent-to-youth positive interaction was evaluated with the same five items; Cronbach's alpha for the scale was .742.

**Conflict**—Family conflict was measured using the young adults' and parents' reports of family conflict and the young adult's report of parent intrusiveness. The young adult's perception of family conflict during the past 3 months was assessed with four items, each rated on a five-point scale ranging from 0 (*never*) to 4 (*always*). Sample items include, "We got angry at each other" and "We argued or had a disagreement (over the telephone, email, or in person)." Young adults reported about their relationship with each parent separately, resulting in two scores. Cronbach's alphas for the scale was 0.749 when young adults reported about their mother and 0.713 when reporting about their father. The mean of the two young-adult scores was used to create a global young adult report of family conflict. The parent's perception of family conflict during the past 3 months was assessed with the same four items. Cronbach's alpha for the parent report scale was 0.786. The young adult's perception of intrusive parenting during the past 3 months was assessed for each parent with seven items, each rated on a scale from 1 (*not at all*) to 5 (*very much*). Sample items include "(My mother) tried to control my behavior or plans" and "(My father) imposed his ideas and values on me." Cronbach's alphas for the scale was 0.771 when reporting about mother and 0.809 when reporting about father. The mean of the two parent scores was used for a global young-adult report of intrusive parenting.

**Dyadic interactions**—Positive and negative interactions among parent–young adult dyads were measured using coded observations of parents and young adults during the FAST. In addition to the COIMP described earlier, all parent-young adult interaction tasks were coded using the Relationship Affect Coding System (RACS; Peterson, Winter, Jabson, & Dishion, 2008; Dishion, Mun, Tein, Kim, Shaw, Gardner,... Peterson, 2017), a microsocial coding system that captures the topography of relationship behaviors and the affect within parent–young adult interactions (i.e., emotional displays, lack thereof). The RACS reflects three dimensions of behavior for each participant: verbal behaviors, physical behaviors, and affect. Verbal codes reflect two types of events: general conversation (positive, negative, or neutral) and attempts at changing the behavior of another (directives, negative directive, positive structure). Physical behaviors are those that involve a physical interaction (positive physical contact, negative physical contact, neutral physical contact). Affect codes reflect the general affect displayed by parent and young adult in an interaction (anger/disgust, validation, distress, positive affect, ignore). The cues used for code selection are based on facial expression, vocal tone, and nonverbal cues such as body posture. At any interaction moment, the parent and young adult can have one code (or event or state) recorded from each of these

three data streams. For our study we used the dyad positive and negative proportion scores. Reliability coefficients were in the "good" to "excellent" range, with an overall kappa score of .916 and average RACS agreement of 92.3%. Kappa coefficients are based on the duration and sequencing of coded behavior. Overall, 23% of interactions were double coded to evaluate reliability.

**Cohesion—**Cohesion was measured using parent and young-adult self-reports of family togetherness over the past 3 months. Four items were used with response options ranging from 0 (*never*) to 4 (*always*). Sample items include, "There was a feeling of closeness in our family" and "Family members backed each other up." A Cronbach's alpha of 0.862 was calculated.

## Data Analyses

### Attrition and Missing Values Analysis

Means, standard deviations, and sample sizes for the longitudinal data are presented in Table 1. For the first stage of analysis estimating substance use growth mixture modeling (GMM) trajectories, we examined missingness over time for the dependent response variables. Little's missing completely at random (MCAR; Little, 1988) test revealed the substance use data were MCAR from sixth grade to ninth grade, $\chi^2(23) = 18.79$, $p = .71$ and ranged from .2 to 17% missing overtime for marijuana and alcohol use. We then tested the missing data patterns for the hypothesized prediction models, including all controls, predictors, and outcomes in subsequent analyses. Among the remaining covariates and parent-youth relationship variables, missing data ranged from a low of 30% at the young adult follow up for self-reported substance use to a high of 64% of observational data of parent-youth interaction. However, Little's test indicated the covariate predictors and response variables were MCAR as well, $\chi^2(65) = 41.26$, $p = .99$.

In total, 441 families provided youth report, parent report, or family interaction observation data (74%) at the age 20 young adult assessment (415 youth [70%] provided report data, 323 parents [55%] provided reports, and 265 families [45%] provided observation data). An attrition analysis conducted on all sixth grade through ninth grade variables comparing young adults' families retained versus those who dropped out revealed no group differences on variable predictors. Provided that data among young adult participants were missing at random, analyses were conducted using full information maximum likelihood (FIML), which uses all available information from observed participants (Jeli i , Phelps, & Lerner, 2009).

### Main Study Analyses

The main study analyses were conducted in three stages. The conceptual and analytic model is shown in Figure 1. The first stage focused on characterizing heterogeneity in adolescent substance use over time and examining the hypothesized classification of risk subgroups using growth mixture models (GMM). The second stage focused on constructing parent-young adult relationship quality as a higher order latent construct, and the third stage focused on testing hypothesized effects of risk on parent-young adult relationship quality.

The dashed lines represent latent class variance in path effects. We controlled for gender, minority, and intervention status. We have found intervention effects on young adult risk behavior (Stormshak, DeGarmo, Chronister, & Caruthers, 2018) but, to date, we have found none on parent-child relationship characteristics during the young adult years.

All analyses were conducted using structural equation modeling (SEM) in Mplus 8.2 (Muthén & Muthén, 2018). Poisson count and zero-inflated Poisson (ZIP) models were evaluated for the frequency counts of substance use during middle school. Normative and at-risk prevention samples are characterized by low base rate initiation with increasing variance over time (DeGarmo, Eddy, Reid, & Fetrow, 2009). In general, GMMs combine continuous latent variable trajectory analysis with categorical or mixture analysis (Jung & Wickrama, 2008; Muthén, 2004) and allow for differences in growth parameters across unobserved subpopulations in the form of estimated latent classes with unique growth for each class.

The second stage of analyses used prediction of young adult substance use and parent–child relationship quality measured as a higher order latent variable construct (Kline, 2010). A higher order latent variable is measured by indicators that are themselves latent variables. The advantage of the higher order construct is the ability to estimate communality across separate reporters, thus parceling out measurement error related to potential mono-method reporting bias. Using further data reduction of the criterion outcomes and prediction of a higher order construct is also a more theoretically parsimonious test of the central hypothesis than are separate tests of multiple reporters or methods. Finally, we employed the BCH method for estimating latent class differences in the dependent variables and for estimating variance in prediction paths, or the latent classes as moderators of the hypothesized paths (as dashed lines in Figure 1). The BCH method is recommended for distal continuous outcomes (Aspirouhov & Muthén, 2018).

## Results

In the first step of the GMM analysis, we evaluated the optimal pattern of change for the sample specifying unconditional latent growth models. The intercept-only model obtained extremely poor fit [$\chi^2_{(8)}$ = 547.01, $p$ = .00; comparative fit index (CFI) = .039; root mean square error of approximation (RMSEA) = .36; standardized root mean square error of approximation (SRMR) = .50], the linear model obtained better fit [$\chi^2_{(5)}$ = 171.04, $p$ = .00; CFI = .704; RMSEA = .25; SRMR = .11], and the quadratic model provided the best-fitting model [$\chi^2_{(1)}$ = 20.87, $p$ = .00; CFI = .97; RMSEA = .20; SRMR = .04]. The quadratic model provided adequate fit for the chi-square minimization $p$ value and the RMSEA greater than .08, but the CFI was close to 1.0 and the SRMR, a relative fit index, was less than the recommended .08 (Hu & Bentler, 1998).

### Latent Class Trajectories of Adolescent Substance Use

The next analytic step was to evaluate the optimal number of latent classes using evaluation criteria for GMM. A set of sequential models was evaluated to compare one versus two classes, two versus three, and so on until adding an additional class no longer becomes a significant improvement in the model fit in the nested model comparison, known as the $k$ - 1 Vuong-Lo-Mendell-Rubin Likelihood Ratio Test (VLMR) (Jung & Wickrama, 2008;

Muthén, 2004). Other criteria included relatively lower Bayesian information criterion (BIC), sample-size adjusted BIC, Akaike's information criterion, and classification accuracy evaluated by using the entropy value ranging between 0 and 1, with higher values indicating greater accuracy, generally, .60 or lower is considered low. The GMMs revealed that the quadratic ZIP three-class model provided optimal fit for both alcohol and marijuana use with evidence for "no-risk abstainers," "normative initiation risk," and "high-risk early starters" group trajectories (Alcohol 3 classes better than 2: $k-1$ VLMR $p < .001$, BIC = 1623.08, AIC, 1561.69, entropy = .75, and Marijuana 3 class better than 2: $k-1$ VLMR $p < .000$, BIC = 2528.87, ABIC, 2590.26, entropy = .72).

A total of 79% of the sample followed a "no-risk abstainer" trajectory ($n = 467$) of alcohol use, 17% showed "normative initiation" ($n = 101$), and 4% showed high-risk use ($n = 25$). For marijuana use, 85% followed a "no-risk abstainer" trajectory ($n = 509$), 8% showed "normative initiation" ($n = 47$), and 6% showed high-risk use ($n = 37$). The estimated latent classes of low- to high-risk marijuana and alcohol use are shown in Figure 2, panels A and B. Point-biserial correlations indicated the risk groups were moderately correlated (no-risk group $r = .48$, low-risk group $r = .32$, high-risk group $r = .50$, off groupings $r$ ranged .09 to .10). The estimated means and standard errors for the best-fitting latent class models for alcohol and marijuana intercept, linear slope, and quadratic latent growth factors are presented in Table 2 for each respective risk class, as are the inflation factor means and standard errors.

### Parent–Young Adult Relationship Quality

In the next step of the analyses we specified a higher order confirmatory factor analysis (CFA) to estimate the multiple-method measurement model for parent–young adult relationship quality at the young adult assessment. Candidate variables focused on the social and relational interaction quality between parents and their young adult youth. Four latent variable indicators measured the family construct: *goals,* four observation scales in the interaction task during which the young adult's life goals were discussed; *conflict,* three indicators reported by both parents and youth about conflict and parent intrusiveness; *dyadic adjustment*, measured as frequency proportion of positive and negative interaction observed; and *cohesion*, parent- and youth-reported togetherness and positivity scales. Results of the higher order CFA model are presented in Figure 3 in the form of standardized factor loadings. The model provided good fit to the data [model fit $\chi^2(40) = 78.21$, $p = .001$; $\chi^2/df = 1.95$, CFI = .94, RMSEA = .05].

### Risk Trajectories of Substance Use and Relationship Quality

To test differences in distal outcomes by the latent classes, the BCH method provides a series of mean comparisons across latent classes. These are represented by the main effect or direct paths in Figure 1 from the latent risk classes to young adult variables. The means, standard errors, and mean comparisons from the BCH models are in Table 3. As expected there were observed differences in young adult substance use and relationship quality. For alcohol and marijuana use, the low- and high-risk groups were significantly higher in alcohol use and marijuana use in young adulthood than was the no-risk group in middle school. But, the high-risk group was not significantly different than the low risk group.

High-risk alcohol and marijuana users had significantly lower parent-young adult relationship quality than did low-risk users. Among the specific factor indicators, high-risk alcohol and marijuana use was associated with lower family cohesion and high-risk marijuana use was uniquely associated with greater conflict.

The final models tested the latent classes as moderators of the effects of young adult substance use on parent-young adult relationship quality, represented by dashed paths in Figure 1. For clarity, models were run separately for middle school risk classes for alcohol and marijuana use. Results for the alcohol risk classes (Figure 4) are estimated as class specific effects and represented as multiple groups parameters. Intervention status was not associated with young adult alcohol use but was marginally associated with better relationship quality for the low-risk alcohol group ($\beta = .20$, $p < .10$) and lower relationship quality for the high-risk alcohol group ($\beta = -.48$, $p < .001$). Boys were associated with higher young adult marijuana use compared to girls in the no-risk and low-risk classes ($\beta = .21$, $p < .001$ and $\beta = .47$, $p < .001$, respectively). Minority youth in the no-risk group were associated with less young adult alcohol use. However, minority youth in all three classes were associated with lower relationship quality compared to European American counterparts ($\beta = -.18$, $-.38$, and $-.29$, $p < .05$, respectively).

Young adult drinking was not associated with parent-young adult relationship quality for no- and low-risk alcohol users; however, counter to expectations, high-risk drinkers were associated with better parent-young adult relationship quality ($\beta = .40$, $p < .001$). Similarly, marijuana use for the high-risk drinking class was associated with better relationship quality ($\beta = .24$, $p < .05$), while the no-risk alcohol group was most vulnerable to initiating marijuana use by young adulthood that was, in turn, associated with lower relationship quality ($\beta = -.26$, $p < .01$).

Results for the marijuana risk groups are shown in Figure 5. For marijuana classes, intervention status was not associated with any distal outcomes. As with the alcohol classes, boys were associated with higher marijuana use than girls in the no-risk group ($\beta = .20$, $p < .01$) and marginally so in the low-risk group ($\beta = .41$, $p < .10$). Minority youth were associated with lower drinking in young adulthood ($\beta = -.25$, $p < .001$) and lower relationship quality in the no-risk group ($\beta = -.27$, $p < .001$), but not in the low- or high-risk groups.

In sum, data supported our hypothesis that prior substance use was a risk factor associated with substance use during the transition to young adulthood as evidenced by the mean differences in young adult substance use shown in Table 3 and the lower parent-young adult relationship quality for the high-risk groups. The data partially supported our hypothesis that only marijuana use during young adulthood was associated with poorer parent–young adult relationship quality. That is, only the no-risk group during middle school who later used marijuana was associated with lower parent-young adult relationship quality. Minority youth, no-risk users were less likely to drink in young adulthood, but for drinking risk groups in particular, they were vulnerable to having poorer relationships with their parents during young adulthood.

## Discussion

Researchers, to date, have focused almost exclusively on the impact of parent substance use and parenting on adolescent and young adult substance use. Few researchers have studied the longitudinal impact of adolescent alcohol and marijuana use on the quality of parent-child relationships during young adulthood. Present study findings show that growth in alcohol and marijuana use during middle school placed youth at greater risk for use in young adulthood, and that high-risk use during the middle school years negatively impacted the quality of participants' relationships with their parents in young adulthood. We also found that initiation of marijuana use in young adulthood was associated with decreased parent-young adult relationship quality.

The consequences of sustained alcohol and marijuana use are serious. Alcohol remains a leading factor in youth death and injury (Sudhinaraset, Wigglesworth, & Takeuchi, 2016) and a is associated with youth's social and academic problems, cognitive impairments, risky sexual behavior, and violence (SAMHSA, 2014). Similarly, sustained marijuana use is associated with impairments in youth's cognitive skills, motor coordination, educational outcomes, and altered brain development (Volkow, Baler, Compton, & Weiss, 2014). These impairments make it more difficult to form positive parent-young adult relationships. For present study participants, high-risk alcohol use was associated, specifically, with lower family cohesion in young adulthood, and high-risk marijuana use was associated with greater conflict with parents.

For minority youth, alcohol use at all risk levels was associated with lower parent-young adult relationship quality. Our findings are consistent with research highlighting racial differences in adolescent alcohol and marijuana use (e.g., Banks, Rowe, Mpofu, & Zapolski, 2017; Patton et al., 2007; Tucker, Ellickson, Orlando, Martino, & Klein, 2005), but the first study to identify racial differences in the impact of alcohol use on the parent-young adult relationship. It is possible that social and family norms concerning adolescent alcohol use were different (i.e., less acceptable, less normative) for racial minority participants, and as such minority youth alcohol use at any level had negative effects on the parent-young adult relationship. It is also feasible that the quality of minority youth-parent relationships were strained during adolescence and continued to be strained. Minority families deal uniquely with racism, xenophobia, language barriers, etc. and these stressors strain parent-child relationships and place minority youth at risk (e.g., Brody & Ge, 2001; Brody, Kogan, & Chen, 2012).

We also found that initiation of marijuana use in young adulthood was associated with poorer quality parent-young adult relationships. It is important to consider that participants reported very high levels of marijuana use during young adulthood (i.e., 22% reporting daily use) and live in a state in which marijuana medical and recreational cannabis use are legal. The national average for daily marijuana use is 4.6% (SAMHSA, 2014). This high level of young adult marijuana use no doubt stressed the parent-young adult relationship. We did not find the same for young adult alcohol use although participants reported high levels of binge drinking (48% reported multiple binge drinking episodes). It is possible that the social acceptability or norm of alcohol use during young adulthood played a role in how

participants' alcohol use affected, or did not affect, the parent-young adult relationship (Adger & Saha, 2013). Our observations of parent-young adult conversations during the FAST substance use task, for example, revealed that many parents reminisced and laughed about their alcohol use when talking with their young adult children. These discussions seemed to be a point of positive connection for young adults and their parents, and may have been a factor for results showing improved relationship quality for high-risk alcohol users. Similar to observed deviant peer relationship conversations and dynamics (Dishion & Dodge, 2005; Granic & Dishion, 2003), high-risk young adult alcohol use may be ignored or reinforced by parents who do not perceive alcohol use during these developmental periods as problematic.

The parent-young adult relationship is a critical context that may protect young adults from substance use or increase their risk. Our findings suggest a need to devote more attention on identifying how adapted interventions for varying levels of adolescent and young adult alcohol and marijuana use, which our data show affect different parent-young adult interactions and qualities. These interactions may be useful to target for family-centered substance use preventive interventions during this developmental period. Interrupting the deleterious effects of adolescent substance use on young adult substance use and the parent-young adult relationship is critical to young adults' positive adjustment. Parent attitudes and behaviors, for example, influence young adult alcohol use (Brody, Yu, Chen et al., 2010; Madkour, et al., 2017; Patock-Peckham & Morgan-Lopez, 2009), and as social attitudes about marijuana use change, the parent–child relationship may moderate the influence of such changes well into adulthood.

### Study Strengths and Limitations

There are several study strengths as well as limitations. First, the present study is one of the first to document a longitudinal association between high-risk alcohol and marijuana use on parent-young adult relationship quality, and gender and racial differences in the longitudinal associations between adolescent alcohol and marijuana use and parent-young adult relationship quality. Second, our robust measurement of parent–young adult relationship quality using self-report and observational data is a significant study strength. We coded positive verbal expressions and encouragement while parents and young adults discussed the young adult's career-related goals. Third, we measured conflict, positive dyadic interactions, and cohesion between parents and their young adult children. We did not assume that conflict and positive relationship qualities occur along one continuum, but rather are measured as orthogonal dimensions of the parent–young adult relationship (Deater-Deckard, Dodge, Bates, & Pettit, 1996; Madkour et al., 2017; Qu, Fuligni, Galván, & Telzer, 2015; Taber-Thomas & Perez-Edgard, 2015). Study limitations include our inability to enter adolescent-parent relationship quality and other important variables as predictors in our model. We employed growth mixture models for examining unique subgroups in the population which is an advantage of defining risk groups. Typically, however, mixture classes for growth are defined by both differences in initial status starting points and patterns or shapes of change. Our sample was limited in initial status differences as middle school samples are limited in mainly discriminating among a small percentage of early starters, followed by non-constant increasing variance (DeGarmo et al., 2009).

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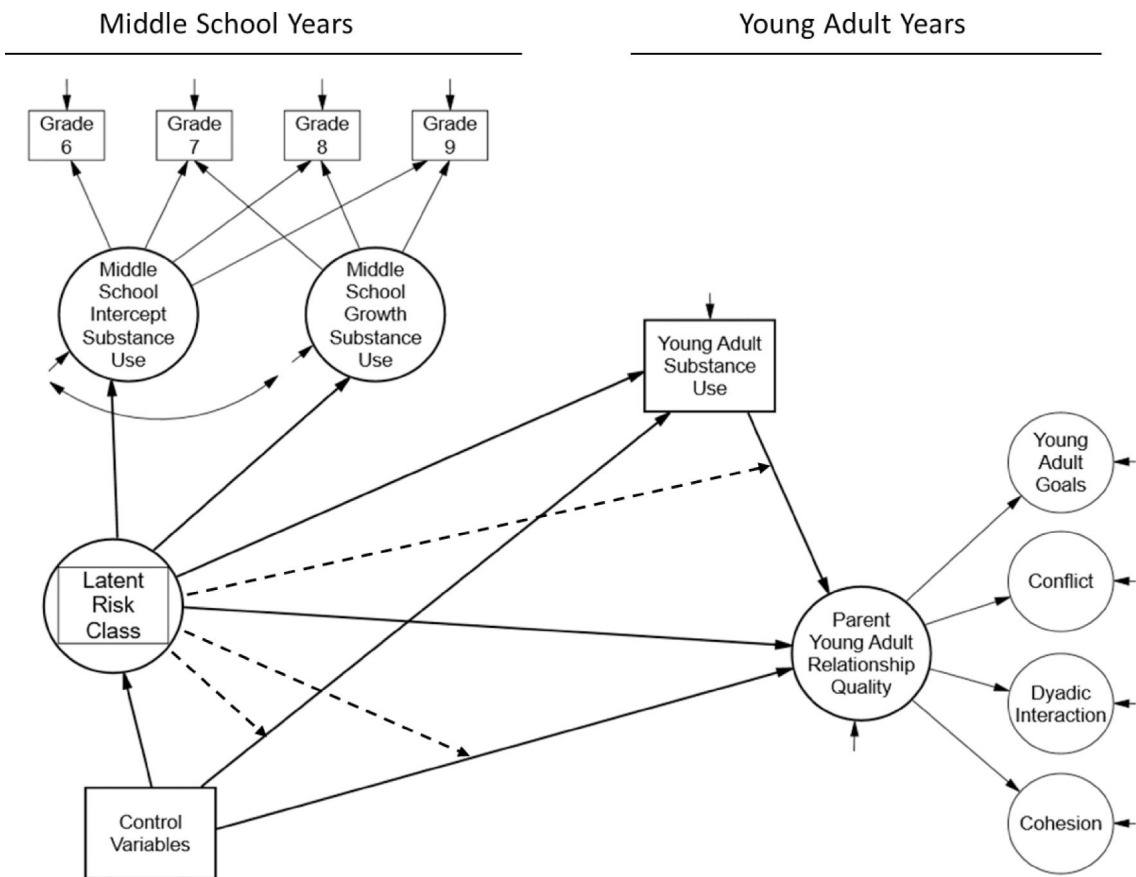
**Figure 1.**
Conceptual and analytical model hypothesizing latent risk classification estimated by growth in middle school substance use. Latent classification is hypothesized to predict young adult substance use and latent parent-youth relationship quality. Dashed lines represent between class variation in path effect or moderation by latent risk class.
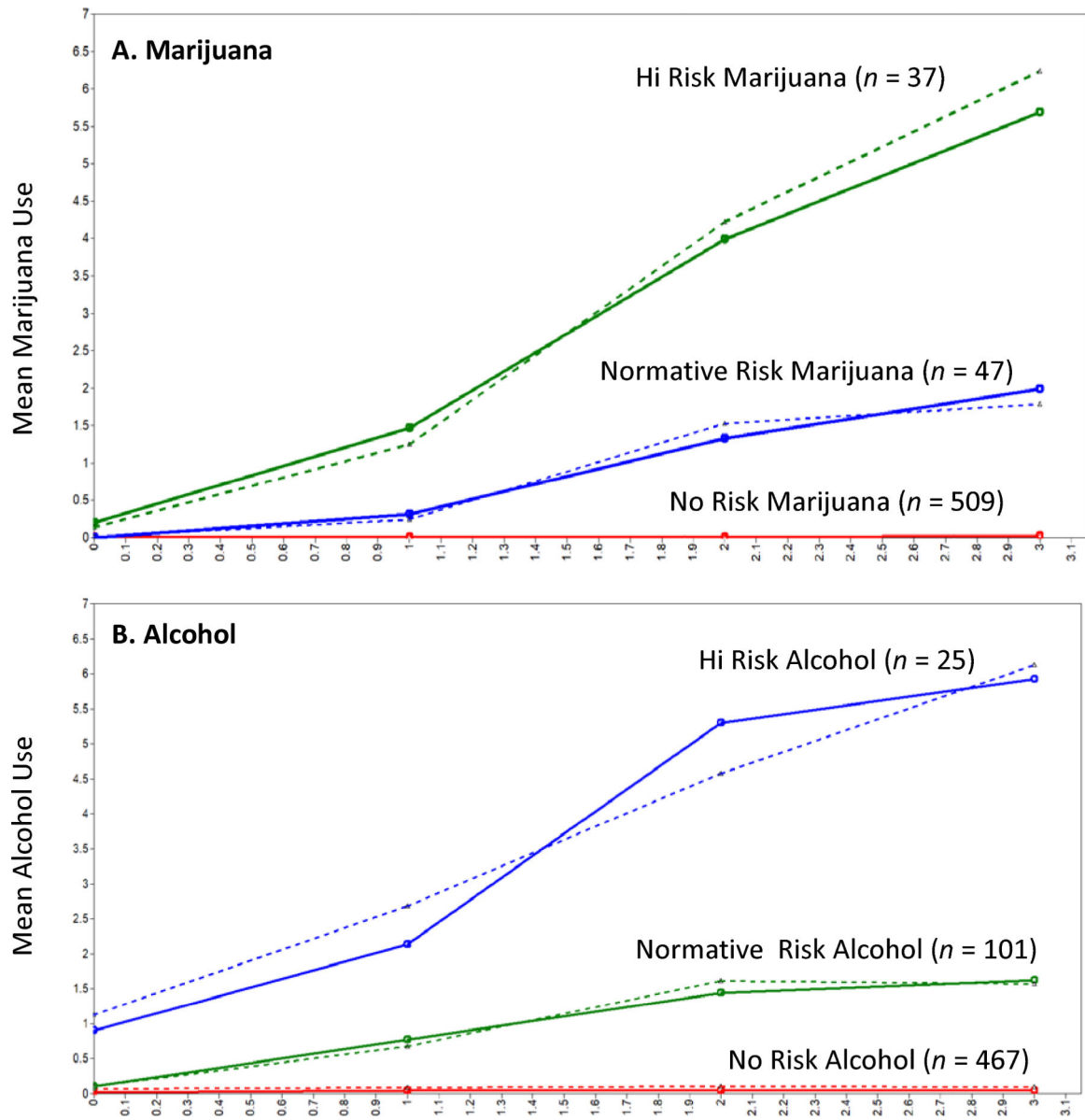
**Figure 2.**
Estimated and observed mean trajectory of marijuana use and alcohol use for best fitting latent class growth mixture model. Marijuana use shown in Panel A, alcohol use in Panel B. Observed means are solid line trajectories and estimated means are dashed line trajectories. Classification fit estimates for latent class risk groups are provided in Table 3.
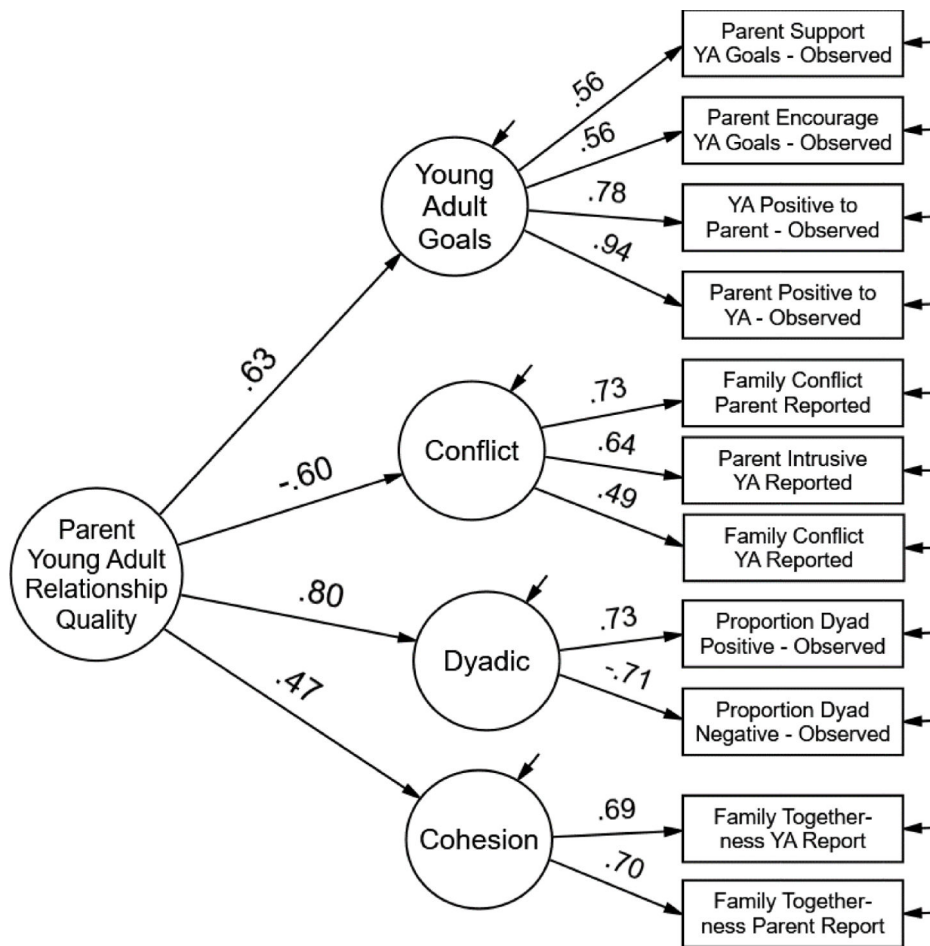
**Figure 3.**
Confirmatory factor analysis of higher order latent construct measurement of parent–child relationship quality during young adult transition. Paths are standardized estimates. Model fit $\chi^2(40) = 78.21$, $\chi^2/df = 1.95$, CFI = .94, RMSEA = .05.
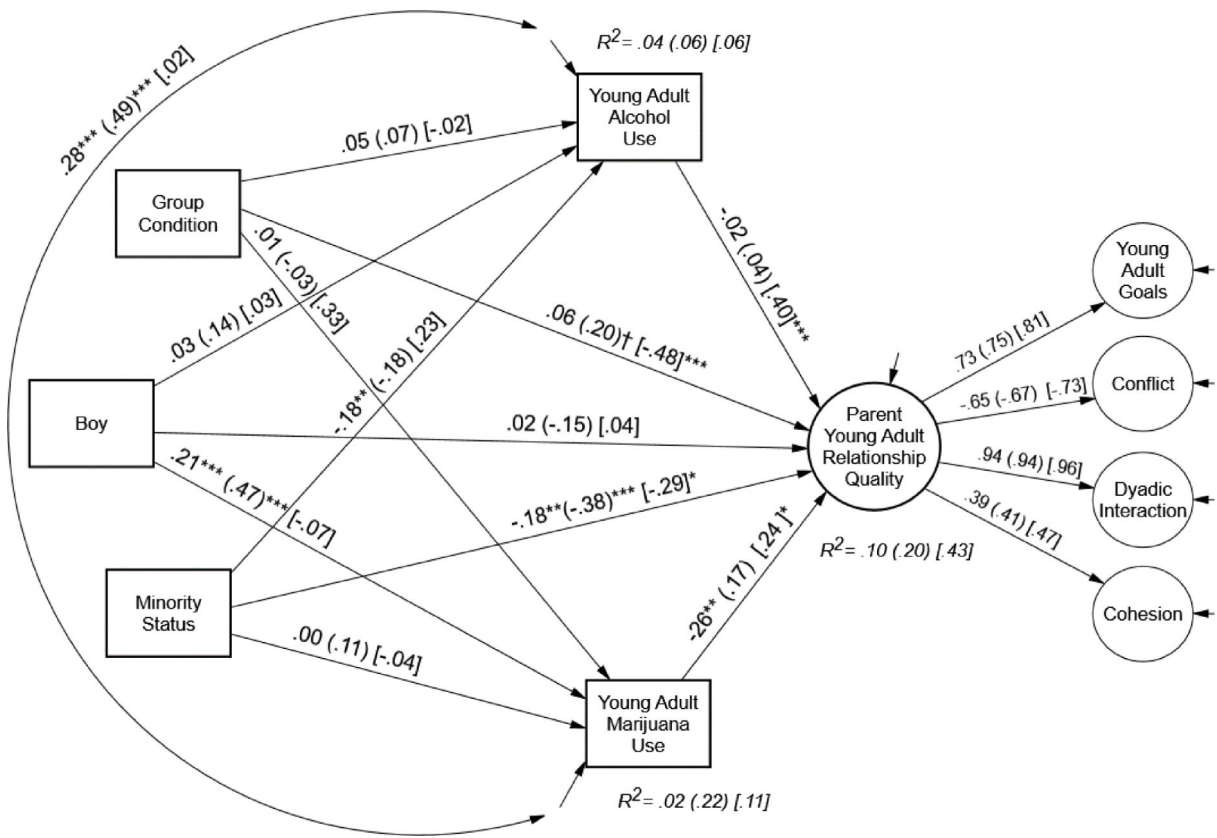
**Figure 4.**
Alcohol Risk Latent Class Trajectories as predictors of young adult substance use and parent-child relationship quality. Paths are standardized estimates. Respectively, parameters are for No Risk Alcohol Growth, (Low Risk Alcohol Growth), and [High Risk Alcohol Growth]. ***$p < .001$;**$p < .01$; *$p < .05$, †$p < .10$.
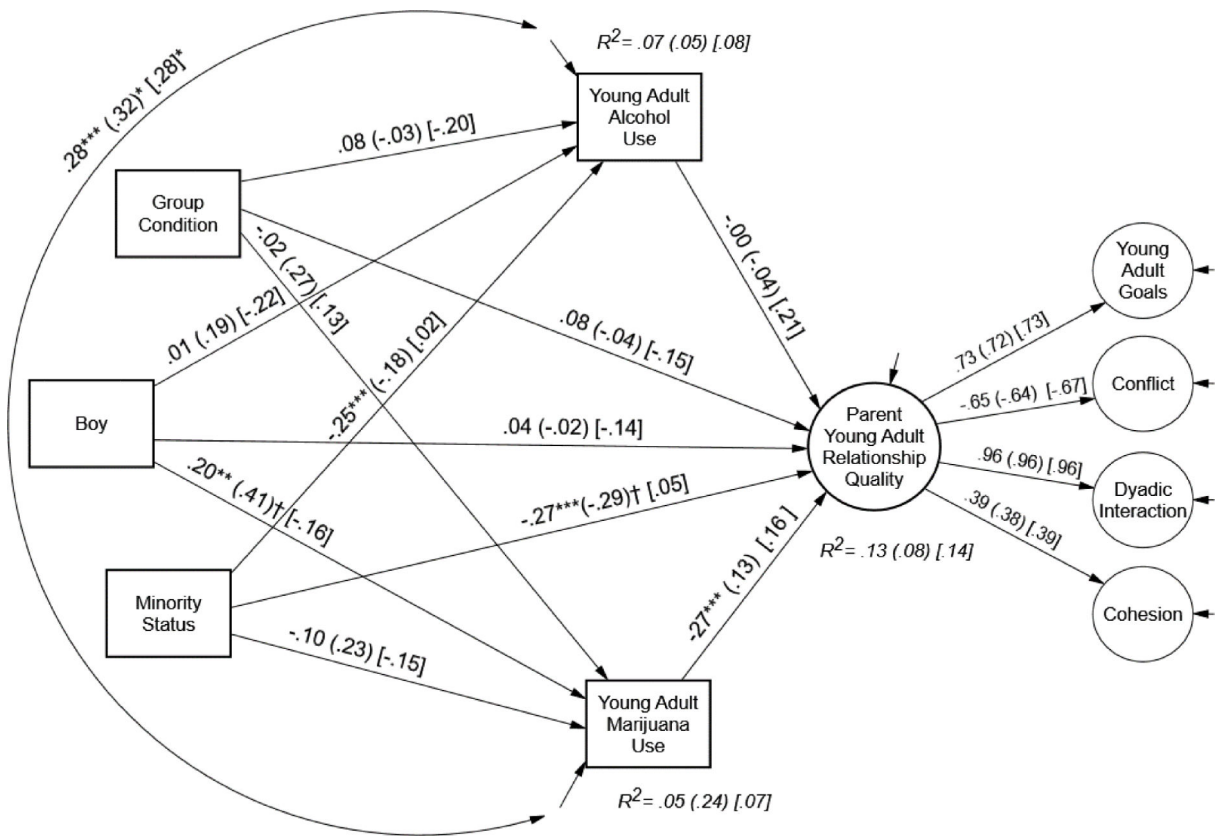
**Figure 5.**
Marijuana Risk Latent Class Trajectories as predictors of young adult substance use and parent-child relationship quality. Paths are standardized estimates. Respectively, parameters are for No Risk Marijuana Growth, (Low Risk Marijuana Growth), and [High Risk Marijuana Growth]. ***$p < .001$;**$p < .01$; *$p < .05$, †$p < .10$.

**Table 1.**

Sample N, Means, and Standard Deviations for Longitudinal Study Variables

| Middle School Assessment (MS) | *N* | *M* | *SD* |
|---|---|---|---|
| Boy Grade 6 | 593 | .51 | .50 |
| Minority | 592 | .64 | .48 |
| Alcohol Grade 6 | 592 | .09 | .62 |
| Alcohol Grade 7 | 523 | .31 | 1.12 |
| Alcohol Grade 8 | 509 | .63 | 1.93 |
| Alcohol Grade 9 | 491 | .74 | 2.11 |
| Marijuana Grade 6 | 592 | .03 | .34 |
| Marijuana Grade 7 | 524 | .17 | 1.12 |
| Marijuana Grade 8 | 509 | .49 | 2.01 |
| Marijuana Grade 9 | 492 | .74 | 2.39 |
| Young Adult Assessment (YA) | | | |
| Alcohol YA | 415 | 5.26 | 5.16 |
| Marijuana YA | 409 | 3.12 | 4.91 |
| Parent support goals observed YA | 209 | 6.19 | 1.13 |
| Parent encourage goals observed YA | 209 | 6.61 | 1.41 |
| Youth positive to parent observed YA | 209 | 5.86 | 1.25 |
| Parent positive to youth observed YA | 209 | 6.28 | 1.18 |
| Parent conflict youth reported YA | 409 | .55 | .55 |
| Parent intrusive youth reported YA | 409 | 1.57 | .75 |
| Family conflict parent reported YA | 321 | .54 | .57 |
| Proportion dyad positive observed YA | 209 | .54 | .23 |
| Proportion dyad negative observed YA | 209 | .02 | .04 |
| Family togetherness parent reported YA | 321 | 2.65 | .95 |
| Family togetherness youth reported YA | 409 | 2.48 | .84 |

**Table 2.**

Estimated Means and Standard Errors for BCH Latent Risk Classes

| Alcohol Latent Risk Classes | | | Marijuana Latent Risk Classes | | |
|---|---|---|---|---|---|
| **No Risk Class** | ***M*** | ***SE*** | **No Risk Class** | ***M*** | ***SE*** |
| Intercept | −2.53 | .57 | Intercept | −.95 | 1.61 |
| Linear Slope | .30 | .73 | Linear Slope | −2.87 | 1.75 |
| Quadratic | −.10 | .22 | Quadratic | .71 | .45 |
| Low Risk Class | | | Low Risk Class | | |
| Intercept | −.84 | .30 | Intercept | −1.67 | 1.06 |
| Linear Slope | 1.70 | .32 | Linear Slope | 2.61 | .96 |
| Quadratic | −.32 | .08 | Quadratic | −.57 | .21 |
| High Risk Class | | | High Risk Class | | |
| Intercept | 1.52 | .38 | Intercept | 1.49 | .25 |
| Linear Slope | .40 | .39 | Linear Slope | .68 | .22 |
| Quadratic | −.04 | .10 | Quadratic | −.13 | .05 |
| Zero Inflation Factors | | | Zero Inflation Factors | | |
| Intercept | .00 | .00 | Intercept | .00 | .00 |
| Linear Slope | −2.09 | .96 | Linear Slope | −.89 | .49 |
| Quadratic | .27 | .23 | Quadratic | .13 | .14 |

**Table 3.**

Estimated Means, Standard Errors, and Mean Differences for Young Adult Outcomes by Latent Classes

| | (1) No Risk Alcohol | | (2) Low Risk Alcohol | | (3) High Risk Alcohol | | Significant BCH mean comparisons |
|---|---|---|---|---|---|---|---|
| | M | SE | M | SE | M | SE | |
| Alcohol use | 4.26 | .33 | 7.40 | .65 | 9.12 | 1.22 | 1 < 2, 3 |
| Marijuana use | 2.32 | .30 | 5.05 | .72 | 5.11 | 1.40 | 1 < 2, 3 |
| Goals Factor Score | -.02 | .03 | .07 | .06 | -.09 | .15 | n.s. |
| Conflict Factor Score | .01 | .02 | -.05 | .04 | .08 | .07 | n.s. |
| Positive Interaction Factor Score | -.00 | .01 | .02 | .01 | -.03 | .02 | n.s. |
| Cohesion Factor Score | .00 | .04 | .07 | .07 | -.35 | .15 | 1, 2 > 3 |
| Quality Higher Order Factor Score | .00 | .02 | .06 | .04 | -.09 | .07 | 2 > 3 |
| | (1) No Risk Marijuana | | (2) Low Risk Marijuana | | (3) High Risk Marijuana | | |
| Alcohol use | 4.57 | .31 | 7.89 | .93 | 7.34 | 1.03 | 1 < 2, 3 |
| Marijuana use | 2.07 | .28 | 7.21 | 1.08 | 6.43 | 1.20 | 1 < 2, 3 |
| Goals Factor Score | -.01 | .03 | .09 | .07 | -.03 | .09 | n.s. |
| Conflict Factor Score | .01 | .02 | -.10 | .04 | .10 | .06 | 1 < 2 < 3 |
| Positive Interaction Factor Score | .00 | .01 | .02 | .02 | -.04 | .03 | n.s. |
| Cohesion Factor Score | .02 | .04 | .05 | .08 | -.20 | .13 | 1 > 3 |
| Quality Higher Order Factor Score | -.01 | .02 | .05 | .03 | -.08 | .07 | 2 > 3 |