

The Influence of Parent Alcohol Use During Adolescence on Adult Antisocial Behavior

A Thesis

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BY

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Dedications

First and foremost, I want to dedicate this to my husband Sean for endlessly supporting me through the process of writing this thesis, as well as through my entire Master's program. Thank you, Sean, for working so hard to support us while I chase my dream. Thank you for your unconditional love. Second, this work would truly not be possible without my mom, Shelly, who has unquestioningly showed up for me in so many ways through every up and down of this program. Third, I would not be here without my friend and mentor, Dr. Kate Gliske, who has been my academic and professional role model for many years. Fourth, I want to thank my advisor, Dr. Timothy Piehler, who has spent many hours discussing and reviewing this project with me. Finally, I want to thank my committee members, Drs. Lindsey Weiler and Sonya Brady for their insight, guidance, and dedication to helping me achieve a final product I am proud of.

Abstract

Antisocial behavior in adolescents and young adults is a serious and prevalent problem, making research into prevention of antisocial behavior critical. Parenting interventions have been identified as a promising avenue for intervention for antisocial behavior development. In this study, I use data from Project Alliance, a longitudinal study of families in the United States, to examine whether parent alcohol use frequency while their child is an adolescent (ages 16-17) is associated with the development of antisocial behavior into adulthood (ages 26-30). In addition, I examine whether parental monitoring behaviors and family conflict during adolescence mediate the relationship between parent alcohol use and future antisocial behavior. I also examine whether parental messaging about substance use abstinence moderates the relationship. Results indicated that above-average parent alcohol use during adolescence explains a small but significant proportion of variance in child antisocial behavior 10 years later. Neither parental monitoring nor family conflict mediated the relationship, and parental messaging about substance use abstinence did not moderate the relationship. This study presents preliminary evidence that parent alcohol use while their child is an adolescent may impact child development of antisocial behavior into adulthood.

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The Influence of Parental Alcohol Use During Adolescence on Adult Antisocial Behavior

Antisocial behavior in adolescents and young adults (e.g., criminal activity, violence) is a serious and prevalent problem that can result in negative consequences for those who engage in it as well as those who are impacted by it. There are many different theoretical definitions of antisocial behavior in the literature. In this paper, I will base my definition of antisocial behavior on the definition offered by Frick & Viding (2009), indicating that antisocial behaviors include “criminal and aggressive behaviors, as well as other behaviors that violate the rights of others or major societal norms” (p. 1111). Other terms are frequently used in the literature to describe youth who engage in antisocial behaviors, such as “delinquent” and “deviant.” Labeling theory suggests that using terms like these, that carry negative connotations, may reinforce adolescent meaning-making that reflects those negative labels (Kroska et al., 2017). For this reason, it is important to describe adolescent behavior rather than specifically labeling adolescents as delinquent or deviant. In this paper, I only use the terms “delinquent” or “deviant” when describing other research that employs those terms.

Understanding how to prevent antisocial behaviors is an immense and necessary undertaking. Parenting and other aspects of the family environment have been identified as promising intervention targets in preventing the development of antisocial behavior in young people (LoBraico et al., 2020; Tehrani & Yamini, 2020). While the field has made considerable progress in understanding the parenting and parental behaviors that present risk, the equifinality of pathways to antisocial behavior has prevented a solid

understanding of the concept (Hoeve et al., 2009). The developmental psychopathology-based framework for understanding antisocial behavior emphasizes the complexity of the development of non-normative behaviors, like antisocial behavior, and emphasizes the need for multiple levels of analysis in order to understand the phenomenon (Eme, 2017; Frick & Viding, 2009).

Antisocial behavior can be the result of either neurological or contextual risk factors (Frick & Viding, 2009). Neurological factors, like callous-unemotional traits are a result of deficits in temperament and a lack of response to consequences (Frick & Viding, 2009). Research has also shown that damage to the ventromedial prefrontal cortex during childhood may also be an antecedent for antisocial behaviors (Taber-Thomas et al., 2014). In these instances, parenting practices may not have any relationship with antisocial behavior development. Therefore, parenting interventions would not be an effective prevention technique. In contrast, contextual risk factors for antisocial behavior, such as parent substance use (e.g., Chassin et al., 2019; Smith et al., 2016; Straussner & Fewell, 2018) and adolescent association with peers engaging in antisocial behaviors (e.g., Gardner et al., 2008), may provide opportunities for parenting interventions that could help prevent this behavior. For these reasons, it would be impossible to identify a single risk factor for antisocial behavior that could be targeted for prevention interventions. Instead, research must break down possible antecedents to antisocial behavior, like specific parent behaviors, and study them each separately in order to gain a more complete picture in the future.

Parent Substance Use and Antisocial Behavior

Parent substance use and misuse is a common issue that families face (Chassin et al., 2019), but the relationship between parent substance use and the development of child antisocial behavior into adulthood is not well understood. Dating back to the early 1990s, research has shown a relationship between parental substance use and child perceptions of- and engagement in- their own substance use (Wills et al., 1994). In addition, there is robust evidence of a relationship between parental substance use and negative near-term child outcomes, such as externalizing and antisocial behaviors (Chassin et al., 2019; Smith et al., 2016; Straussner & Fewell, 2018). There is a paucity of research, however, examining the long-term effects of parental substance use on children's development of antisocial behavior into adulthood. Noting the gap in the research, Christoffersen & Soothill (2003) investigated the implications of parental substance use for later development. They found that, in the boys in their sample, maternal alcohol abuse was a significant predictor of later involvement in violent crime in adulthood (Christoffersen & Soothill, 2003). While this study provides evidence of an association between parental alcohol use and adult antisocial behavior, the processes underlying this relationship remain unclear. The goal of the current study is to understand whether a relationship between parental alcohol use and young adult antisocial behavior exists in a diverse, mixed-gender sample of adolescents, and if it does, to understand the mechanisms of that relationship.

Pathways from Parent Substance Use to Antisocial Behavior

By gaining a nuanced understanding of the mechanisms behind a relationship between parental alcohol use and the development of antisocial behavior in children into

adulthood, we may be able to find areas of intervention that are most critical to focus on in families dealing with these issues. Grekin and colleagues (2005) sought to understand this mechanism by examining whether family stress and child executive functioning mediated the relationship between parental alcohol use disorder (AUD) and violent and non-violent child delinquency. They found that there was a relationship between paternal (but not maternal) AUD and child delinquency, and that child executive functioning mediated the relationship, specifically for violent delinquency. They also found that family stress mediated the relationship for both types of delinquency (Grekin et al., 2005). This suggests that there is some relationship between father AUD during adolescence and adolescent antisocial behavior. It also suggests that contextual factors, like family stress, may help explain the relationship. In this study, I hope to expand on these findings to determine whether parent alcohol use is associated with antisocial behavior development beyond adolescence and into adulthood, and whether other contextual factors may also be involved in that relationship.

Parental Monitoring

One contextual factor that may contribute to a relationship between parental alcohol use and the development of antisocial behavior into adulthood is parental monitoring. Parental monitoring can be understood as being a two part process of active parental monitoring (i.e., actions parents take to understand what their children are doing outside of the home) and parental knowledge (i.e., information parents know about what their children are doing outside of the home; Augenstein et al., 2016). Parental monitoring has long been understood theoretically and empirically as a significant factor

in the development of child antisocial behavior (Flanagan et al., 2019). The impact of parent alcohol use itself on parental monitoring during adolescence is less understood. Previous research has identified associations between parent substance use and parenting style, with parents who engage in substance use being more likely to have autocratic or indifferent parenting styles (Mayes & Truman, 2002; Straussner & Fewell, 2018). These types of parenting styles may lend themselves to parents being more or less likely (respectively) to engage in monitoring behaviors, but there is a gap in the research in regards to the specific impact of parent alcohol use on parent monitoring behaviors.

Parental Messaging About Substance Use

Parental messaging about substance use may also interact with the relationship between parent alcohol use and future antisocial behavior. There is evidence that adolescents of mothers with AUD perceive their mothers as having less legitimate power to regulate their drinking (Handley & Chassin, 2013). In this study, I posit that how parents talk to their children about substance use may interact with the relationship between parent alcohol use and the development of antisocial behavior into adulthood as a function of how much parents use alcohol. If adolescents are encouraged to stay away from substances by parents who consistently use alcohol, there may be a mixed message being communicated to the adolescent that could undermine parental authority. Parents whose authority is viewed as less legitimate may impact the development of antisocial behavior.

Family Conflict

Another contextual factor that could potentially explain the relationship between parental alcohol use and child development of antisocial behavior is family conflict. Research indicates that, in families with high levels of coercion (which includes high levels of family conflict), there is a greater likelihood that adolescents may develop long-term antisocial behavior (e.g., LoBraico et al., 2020). Parental alcohol use could be a potential precursor for this relationship between family conflict and future antisocial behavior. Alcohol abuse creates significant dysfunction in families that impacts almost all aspects of family life, including family conflict (Graham et al., 1993).

While there is robust evidence for the impact of parental alcohol abuse on family dysfunction and conflict, less is known about the impact of non-clinical levels of parental alcohol use on families. Family conflict has not been previously investigated specifically as a mechanism through which parental alcohol use may contribute to the development of antisocial behavior. Given the current evidence, however, there is a possibility family conflict, explained by alcohol use, may play a role in adolescent antisocial behavior development.

The Present Study

Given the current empirical evidence and theoretical understanding of the development of antisocial behavior, it is critical to continue to develop our understanding of the impact of different parental behaviors on the development of antisocial behavior. To that end, I first examine whether there is a relationship between parental alcohol use and the development of antisocial behavior into adulthood. Second, I look at whether parental monitoring, family climate, and parental messaging about substance use have a

role to play in that relationship. I hypothesize that parent alcohol use will be associated with the development of antisocial behavior and that parent alcohol use will be associated with the development of antisocial behavior indirectly via parental monitoring and family climate. In addition, I hypothesize that clear messaging about not using substances from parents who use more alcohol will have a greater impact on the main effect than parents who provide clear messaging about not using substances and use less alcohol.

Methods

Participants and Procedures

Data for this study were collected through Project Alliance, a longitudinal study of families recruited to participate in a randomized controlled trial of the Family Check-Up (FCU) that began in 1996 (Elam et al., 2021). The FCU is a brief prevention program delivered to families with the intent of improving parenting practices in order to prevent adolescent problem behavior (Dishion & Kavanagh, 2003). Project Alliance participants were recruited from three public middle schools in the United States. All sixth-graders and their families from those middle schools were eligible to participate (Connell et al., 2007). Enrolled families ($n = 998$) were randomized to either participate in the intervention or control condition (Connell et al., 2007). The intervention condition first involved families having access to a family resource center (FRC) that gave parents access to consultations and feedback opportunities, as well as written and video-based education resources. In addition to the FRC, students received six in-class lessons focused on different life skills (Connell et al., 2007). These lessons also included parent/student activities. The overall goal of the intervention was to improve positive

parenting skills. After this phase of the intervention, families of high-risk adolescents were identified via teacher ratings and were offered the FCU (Connell et al., 2007).

Baseline data as well as eleven waves of follow-up data were collected from the enrolled families (Connell et al., 2007). For a detailed discussion of the Project Alliance intervention, see Dishon and Kavanagh (2003).

For this study, I used data from Wave 6 (child age 16-17; referred to henceforth as T1) and Wave 10 (child age 26-30; referred to henceforth as T2), and the subset of participants who provided data at both T1 and T2 were included in the analyses ($n = 551$). I used self-report assessments at T1 and T2 in which the target child (TC) and their parents completed a myriad of self-report surveys. In addition, I used observational data from a task completed at T1 in which the TC and their parents participated in videorecorded structured discussions.

Measures

Parent Alcohol Use

Parent alcohol use was measured via parent-report at T1 using a scale informed by the Alcohol Problem Scale (Skinner & Allen, 1982). Specifically, parents reported the general frequency of their alcohol use (Never tried – 3 or more drinks a day), as well as how frequently they had three or four drinks in a day and how frequently they had five or six drinks in a day (Never – Nearly every time). For a full list of questions and response options, see Appendix A.

For analysis, I converted responses from each item (general frequency, frequency of 3-4 drinks, frequency of 5-6 drinks) for mothers and fathers into separate z-scores for

each parent. Then, I created aggregate mean scores of the individual z-scored items for each parent separately. Finally, I created the parent alcohol use score by taking the mean of the aggregate mean scored z-scores for mothers and fathers. For families that had only one parent's data present, only the data from that parent was used. To address this, single-parent family status was added as a covariate to the final analyses. Due to the method of calculation, the parent alcohol use measure used in this study have to do with general frequency of alcohol use as well as the frequency of high-volume alcohol use for each parent dyad in comparison to the rest of the sample, with higher scores indicating higher alcohol use than the average parent dyad in the sample, and lower scores indicating lower alcohol use than the average parent dyad in the sample.

Antisocial Behavior

Child antisocial behavior was measured via TC self-report at both T1 and T2. Different scales were used at each timepoint in order to appropriate capture the differences in typical antisocial behavior at each developmental stage. T1 adolescent antisocial behavior was measured using a mean score of nine items where the adolescents were asked how often they engaged in specific antisocial behaviors in the last month, on a six-point scale (Never - More than 20 times). Antisocial items included actions like breaking curfew without parent permission, panhandling, lying, and hanging out with gang members. Response options were assigned numerical values (0 = Never; 5 = More than 20 times) and mean-scored for analysis. For a full list of questions and response options, see Appendix B.

I assessed the T1 antisocial behavior scale for internal reliability using Cronbach's alpha ($\alpha = 0.70$), which met the recommended threshold for Cronbach's alpha (Leary, 2016). In addition, I assessed the responses to this measure to determine if there were any extreme outliers. One extreme outlier was identified and removed from the dataset.

The T2 young adult antisocial behavior scale was measured using a mean score of sixteen items where respondents were asked how often they had engaged in certain behaviors in the last three months on a four-point scale (Never – Everyday). Items in this scale included behaviors such as lying, property destruction, intravenous drug use, prostitution, and theft. Response options were assigned numerical values (0 = Never; 3 = Everyday) and mean-scored for analysis. For a full list of items and response options, see Appendix C.

I assessed the T2 antisocial behavior scale for internal reliability using Cronbach's alpha ($\alpha = 0.70$), which met the recommended threshold for Cronbach's alpha (Leary, 2016). In addition, I assessed the responses to this measure were to determine if there were any extreme outliers. Two extreme outliers were identified and were removed from the final dataset.

Parental Monitoring

Parental monitoring was measured at T1 using TC report on a four-item subscale from the Child and Family Center Questionnaire – Child Version (CFCQC; Child and Family Center, 2001). The scale asked the adolescents to respond to questions relating to their parents' monitoring behaviors/knowledge in the three months before the assessment on a 5-point scale (Never or almost never – Always or almost always). Items assessed

parental knowledge areas related to their child's activities after school, activities during general time away from home, plans for the next day, and interests and activities.

Response options were assigned numerical values (0 = Never or almost never; 4 = Always or almost always) and mean-scored for analysis. I found that the scale was reliable using Cronbach's alpha ($\alpha = 0.84$). For a full list of items and response options for this scale, see Appendix D.

Family Interaction Task

The final two dependent variables used in this analysis, family conflict and parental messaging about substance use, came from data collected from the Family Interaction Task (FIT), which took place at T1. During the FIT, families were videorecorded discussing seven different pre-determined topics for five to eight minutes each (e.g., planning an activity, substance use expectations). The FIT recordings were then analyzed by independent coders. For each family member in the videotape, coders rated the interactions using a five-item assessment on nine-point scales applicable to the topic being discussed in the interaction. The final codes were recorded once independent coders reached an agreement above 80% (Dishion & Bullock, 2002). For a detailed description of the FIT coding process, see Dishion and Bullock (2002).

Family Conflict

Family conflict was measured using a portion of the FIT that explored aspects of family conflict during a 5-minute prompted discussion about the topic. Families were told to discuss a disagreement that took place in the last month and how it was resolved. If it was not resolved, families were asked to discuss how it might be resolved. Coders then

rated each family member on 5 aspects of conflict within the conversation on a 9-point scale for (1 = “Not at All”; 9 = “Very Much”). The five aspects of conflict considered were criticism of others, viewing others with contempt, escalating conflict, proposing solutions, and listening to others. For this analysis, I created a single score for each family by first taking the mean score from the adolescent and both parents for each item (reverse-coded where necessary), and then taking a mean score of all items. Higher scores reflect conversations that indicate higher levels of family conflict. For this scale, proposing solutions and listening to others were reverse-coded.

Parental Messaging about Substance Use

Parental messaging about substance use was measured during a portion of the FIT that consisted of an eight-minute prompted discussion between the adolescent and their parents. During this discussion, parents were asked to discuss their general beliefs about tobacco, alcohol, cannabis, and other drugs, as well as their expectations for the adolescent regarding those substances. After the parents shared this information, adolescents were asked to share their beliefs about using the same substances. Then, the coders reviewed the recorded conversations and rated each parent on a 9-point scale (1 = “Not at All”; 9 = “Very Much”) to indicate how often each parent discussed the following items: expectations around adolescent substance use, rationale for the adolescent not using substances, suggestions for remaining abstinent, and providing mixed messaging about their own substance use. For this analysis, I created a single score for each family by first taking the mean score from both parents for each item (reverse-coded where necessary), and then taking a mean score of all items. Higher scores reflect conversations

around substance use that reflect clear communication about not using substances. In this case, providing mixed messaging about substance use were reverse-coded.

Covariates

In all primary analyses, I accounted for multiple covariates when estimating the relationships between key study variables. Covariates included T1 antisocial behavior, TC gender, FCU treatment condition, and single parent status. I included T1 antisocial behavior as a covariate so that the relationship being studied reflected an increase in antisocial behavior at T2 above and beyond the antisocial behavior that was present in T1. I included TC gender (measured at baseline, when the adolescents were in 6th grade) as a covariate because gender tends to be a significant predictor of antisocial behavior (e.g., Barriga et al., 2001). I dummy coded TC gender, where 0 reflected male gender and 1 reflected female gender. There were no other genders represented in this sample, and the demographic record did not differentiate between gender and sex. I controlled for treatment condition because the data originated from a randomized control trial of the FCU, and FCU was not the focus of this analysis. Finally, I controlled for single parent status because mean parent behavior scores were utilized for two-parent families. Families with only one parent would have a score that only reflects one parent, which may make a difference in the relationship between T1 parent alcohol use and T2 antisocial behavior. By adding single parent status as a control variable in the analyses, I was able to draw final conclusions while holding single parent status constant.

Analysis Plan

I completed all analyses using IBM SPSS Statistics Version 27.0 (IBM Corp., 2020). I first used a hierarchical multiple regression to determine whether parental alcohol use at T1 predicted variance in T2 antisocial behavior, above and beyond the variance in antisocial behavior that could be explained by the covariates. I did this by adding all covariates as a predictor in step one, and then adding T2 antisocial behavior by itself in step two and examining whether there was a significant change in the r-squared value for the model. Next, I conducted three follow-up analyses using PROCESS in SPSS (Hayes, 2013). The first follow-up analysis was a mediation analysis to determine whether T1 parental monitoring mediated the relationship between T1 parent alcohol use and T2 antisocial behavior while controlling for all covariates. The second follow-up analysis was a mediation analysis to determine whether T1 family conflict mediated the relationship between T1 parent alcohol use and T2 antisocial behavior while controlling for all covariates. I evaluated the indirect effect for both mediation analyses examining the bias-corrected confidence intervals generated by PROCESS using bootstrapping. The third follow-up analysis was a moderation analysis to determine whether T1 parental messaging about substance use moderated the relationship between T1 parent alcohol use and T2 antisocial behavior while controlling for all covariates. I examined the interaction term generated by PROCESS to evaluate the moderation model.

Assumptions and Missing Data

All four analyses required meeting assumptions related to multiple regression. I tested normality assumptions using data visualization (e.g., histograms and boxplots) as well as by assessing skewness and kurtosis of each item. Multiple regression analyses are

generally robust against data that are mild to moderately skewed, so some skewness in the data was tolerated. I used listwise deletion (e.g., Acock, 2005) was used to handle missing data, as PROCESS requires complete data to run analyses (Hayes, 2013).

Results

Sample Characteristics

Basic Demographics

The final sample for this analysis consisted of 551 parent/child pairs. A plurality of the children in the sample were white (47.4%) and a majority were female (53%). Most families represented came from dual-parent households (83.1%). See Table 1 for a more detailed demographic breakdown.

Table 1. Sample Characteristics

	n	%
TC Race		
European American	261	47.4
African American	175	31.8
European-African American	21	3.8
Native American	10	1.8
Hispanic or Latino	27	4.9
Asian American	12	2.2
Pacific Islander	3	0.5
Other	42	7.6
TC Gender		
Female	292	53
Male	259	47
Single Parent Status		
Not a Single Parent	458	83.1
Single Mother	85	15.4
Single Father	8	1.5

Attrition Analysis

The final sample used in this analysis was only part of the full sample of Project Alliance participants due to the use of listwise deletion to manage missing data. For this reason, I conducted an attrition analysis to determine whether there were any significant demographic differences between those who were included in the sample and those who were not. I found no significant difference in terms of membership in the intervention versus control group assigned to participants ($\chi^2(1, N = 997) = 0.87, p = 0.35$). There was also no significant difference in terms of single parent status ($\chi^2(1, N = 999) = 2.64, p = 0.11$). I did find significant differences between the included participants and the excluded participants in terms of TC race ($\chi^2(1, N = 999) = 12.71, p < 0.001$) and gender ($\chi^2(1, N = 997) = 16.36, p < 0.001$). Based on expected versus actual values, there were a disproportionate number of white and female children included in the analyses relative to those excluded from the sample due to missing data or attrition from the study.

Parent Alcohol Use

The measure of parent alcohol use in this study relies on z-scores indicating how extreme parents' drinking behaviors are in comparison to the average parents in the sample. For that reason, it is important to describe what the average parents' drinking looks like for our sample. In this case, the average parents indicated that they drank about once a month ($M = 4.21, SD = 2.34$), where 0 indicates never having tried alcohol and 11 indicates drinking alcohol three or more times a day. Parents also indicated that when they drank, they almost never had three to four drinks ($M = 1.38; SD = 0.71$) and infrequently had five to six drinks ($M = 1.73; SD = 0.81$), where 1 indicates never

drinking to the specified frequency, and 5 indicates drinking to the specified frequency nearly every time.

Preliminary Correlations

Before running the primary analyses, a correlation table was created to determine which variables used in the analyses were correlated with each other. Notably, T2 antisocial behavior, the dependent variable in the following analyses, was significantly correlated with TC male gender ($r = -0.18; p < 0.001$), T1 antisocial behavior ($r = 0.24; p < 0.001$), and T1 parental monitoring ($r = -0.15; p < 0.001$). For a full breakdown of correlations for all variables included in the analyses, see Table 2.

Table 2. Variable Correlations

	V2	V3	V4	V5	V6	V7	V8	V9	V10
V1. % Female	-0.03	0.06	-0.06	-0.09*	-0.02	0.10*	0.03	-0.02	-0.18***
V2. Treatment Group		-0.08	-0.00	-0.01	0.03	-0.06	-0.05	0.02	0.02
V3. Single Parent Status			-0.18***	0.05	-0.04	-0.06	0.05	0.08	-0.02
V4. % White				0.03	0.17***	0.04	0.00	0.04	0.07
V5. T1 Antisocial Behavior					0.00	-0.42***	0.02	0.16***	0.24***
V6. T1 Parent Alcohol Use						0.05	-0.17***	-0.02	0.10*
V7. T1 Parental Monitoring							0.03	-0.13**	-0.15***
V8. T1 Substance Use Messaging								0.06	0.02
V9. T1 Family Conflict									0.06
V10. T2 Antisocial Behavior									

Note. * $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$

Main Effect: The Association Between Parent Alcohol Use on Child Antisocial Behavior

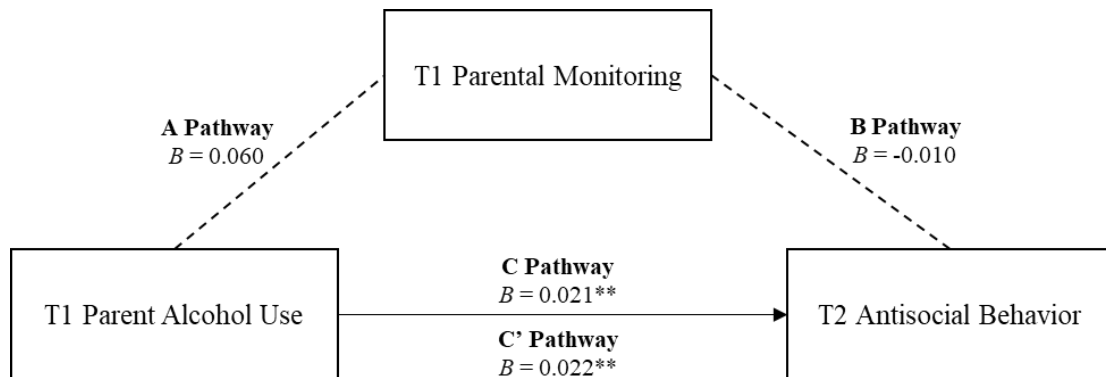
To determine whether T1 parent alcohol use predicted T2 antisocial behavior, I conducted a hierarchical multiple regression. In the first step, I regressed T2 antisocial behavior onto the covariates. There was a significant relationship between gender ($\beta = -0.157; p < 0.001$) and T1 antisocial behavior ($\beta = 0.225; p < 0.001$). FCU treatment group and single parent status were not significantly related to T2 antisocial behavior. The full step one model was also significant ($R^2 = 0.082; p < 0.001$), with the covariates explaining 8.2% of the variance in T2 antisocial behavior. When I added T1 parent alcohol use to the model in step two, it explained a significant amount of additional variance in T2 antisocial behavior ($\beta = 0.092; \Delta R^2 = 0.009; p = 0.024$). Therefore, I was able to conclude that, when controlling for TC gender, T1 antisocial behavior, FCU treatment group, and single parent status, T1 parental alcohol use explains about 1% of the variance in T2 antisocial behavior. In other words, elevated parental alcohol use at T1 predicted an increase in TC antisocial behavior at T2, above and beyond the antisocial behavior that was already present at T1.

Mediation Analysis: Parental Monitoring

In order to further investigate the relationship between T1 parental alcohol use and increased TC antisocial behavior at T2, I conducted additional mediation and moderation analyses. In the first analysis, I sought to determine whether parental monitoring at T1 mediated the relationship between T1 parental alcohol use and T2 antisocial behavior. The results of the mediation analysis reenforced the relationship

between T1 parental alcohol use and T2 antisocial behavior. The total effect of T1 parental alcohol use on T2 antisocial behavior was significant ($B = 0.021$; $p = 0.024$; C Pathway), as was the direct effect ($B = 0.022$; $p = 0.021$; C' Pathway). The indirect effect, however, was not significant, indicating that there was no indirect relationship of T1 parental alcohol use on T2 antisocial behavior via T1 parental monitoring. In this model, T1 parental alcohol use was not significantly related to T1 parental monitoring ($B = 0.060$; $p = 0.177$; A Pathway). In addition, T1 parental monitoring was not significantly related to T2 antisocial behavior ($B = -0.01$; $p = 0.267$; B Pathway). Therefore, I cannot conclude that T1 parental monitoring mediates the relationship between T1 parental alcohol use and T2 antisocial behavior. In this model, two covariates had a significant effect on T2 antisocial behavior: TC gender ($B = -0.059$; $p < 0.001$) and T1 antisocial behavior ($B = 0.109$; $p < 0.001$). To see a full illustration of this model, see Figure 1.

Figure 1. Parental Monitoring Mediation Model



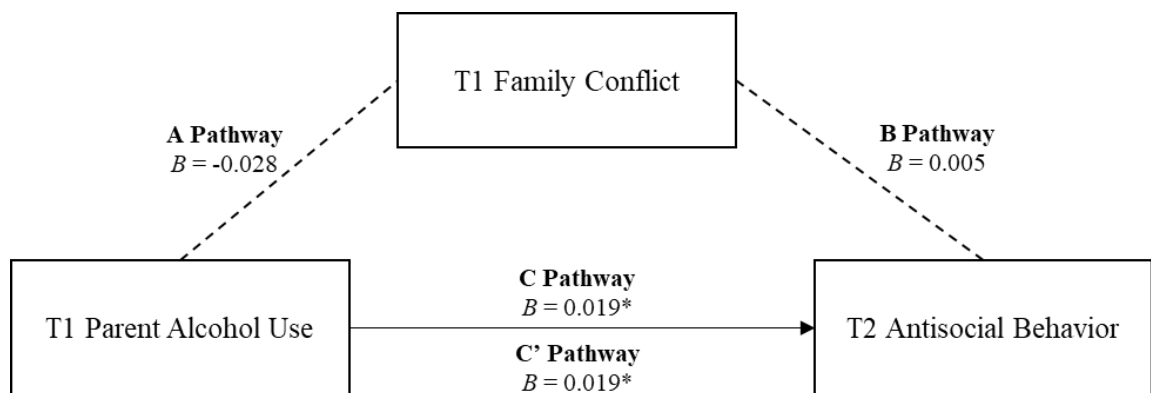
Note. * $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$

Mediation Analysis: Family Conflict

Next, I examined whether the relationship between T1 parent alcohol use and T2 antisocial behavior was mediated by T1 family conflict. Like the other mediation

analysis, this analysis also supported the relationship between T1 parent alcohol use and T2 antisocial behavior that was seen in the original regression analysis. The total effect of T1 parent alcohol use on T2 antisocial behavior was significant ($B = 0.019$; $p = 0.052$; C Pathway), as was the direct effect ($B = 0.019$; $p = 0.051$; C' Pathway). However, T1 family conflict did not mediate the relationship between T1 parent alcohol use and T2 antisocial behavior. The relationship between T1 parent alcohol use and T1 family conflict was not significant ($B = -0.028$; $p = 0.634$; A Pathway), nor was the relationship between T1 family conflict and T2 antisocial behavior ($B = 0.005$; $p = 0.469$; B Pathway). Therefore, I cannot conclude that T1 family conflict mediates the relationship between T1 parental alcohol use and T2 antisocial behavior. In this model, two covariates had a significant effect on T2 antisocial behavior: TC gender ($B = -0.067$; $p < 0.001$) and T1 antisocial behavior ($B = 0.125$; $p < 0.001$). To see a full illustration of this model, see Figure 2.

Figure 2. Family Conflict Mediation Model

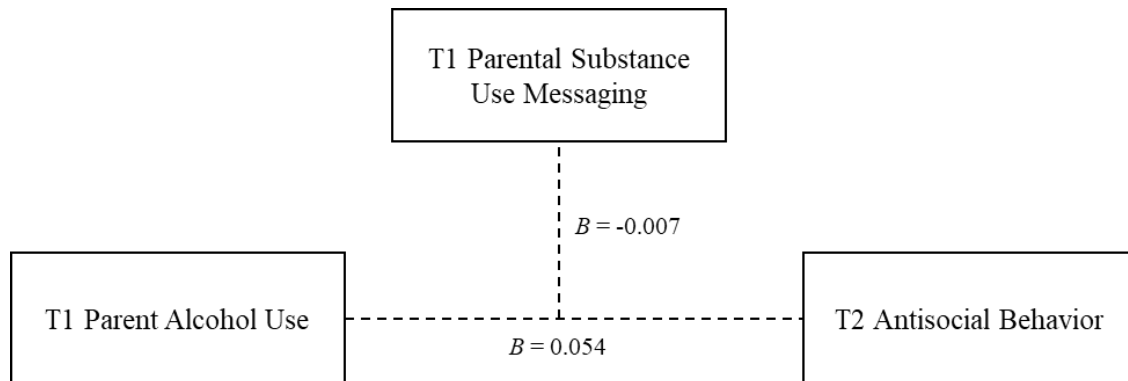


Note. * $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$

Moderation Analysis: Parental Messaging about Substance Use

Finally, I hypothesized that T1 parental substance use messaging use would moderate the relationship between T1 parent alcohol use and T2 antisocial behavior. This hypothesis was not affirmed by the data, however. The interaction between T1 parental substance use messaging and the relationship between T1 parent alcohol use and T2 antisocial behavior was found to be nonsignificant ($B = -0.007; p = 0.333$). In the presence of the interaction term, the relationship between T1 parental substance use and T2 antisocial behavior was found to be nonsignificant ($B = 0.053; p = 0.136$). Figure 2 includes a full illustration of this model. In this model, the only two variables found to have a significant effect on T2 antisocial behavior were TC gender ($B = -0.068; p < 0.001$) and T1 antisocial behavior ($B = 0.126; p < 0.001$).

Figure 3. Parental Messaging about Substance Use Moderation Model



Note. * $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$

Discussion

Results of this study indicate that above-average parent alcohol use at T1, characterized in this sample as parents drinking more than 3-4 drinks more than once per month, explains a small but significant proportion of variance in adult-child antisocial behavior 10 years later. Further analyses sought to examine possible mechanisms that

would explain this relationship. First, I ran models to test whether parental monitoring or family conflict mediated the relationship between parent alcohol use and later child antisocial behavior. Both models affirmed the relationship between T1 parental alcohol use and T2 child antisocial behavior, but neither showed significant mediation pathways to explain the relationship. I ran another model to test if parental messaging to adolescents about not using substances moderated the relationship. This model indicated that parental messaging about substance use did not strengthen or weaken the relationship.

Parent Alcohol Use and Child Antisocial Behavior

In alignment with studies examining the impact of parent alcohol abuse on near-term adolescent antisocial behavior outcomes (e.g., Chassin et al., 2019; Smith et al., 2016; Straussner & Fewell, 2018), I found that parent alcohol use during adolescence is associated with increases in adolescent antisocial behavior in the 10 years between adolescence and young adulthood. By controlling for T1 antisocial behavior in my analysis, I was able to specifically examine changes in antisocial behaviors from T1 to T2. Therefore, it is possible to draw the conclusion that parent alcohol use during the adolescent years is associated with observed increases in antisocial behavior 10 years later.

These results suggest that choices parents make about alcohol use while their children are adolescents may impact their children's behavior choices for many years to come. In addition, this analysis was conducted using data from a general population, not a population of families with parents who have diagnosed substance use disorders. The

result of this analysis shows that it is possible for certain degrees of parent alcohol use that are not explicitly classified as “abuse” may impact child development. This analysis suggests that parents should be mindful about the volume and frequency of their alcohol use while their children are adolescents, even if they are not diagnosed with AUD or another substance use disorder.

Parental Monitoring

There is robust historical evidence in the literature that parental monitoring behaviors are related to antisocial behavior (e.g., Gottfredson & Hirschi, 1990; Lahey et al., 2008; Patterson & Dishion, 1985), which is why parental monitoring was selected as a possible mediator between T1 parent alcohol use and T2 child antisocial behavior in this study. The hypothesized mediation of T1 parental monitoring was not confirmed in this study, but there were some interesting aspects of the analysis that are worth noting. Aligning with previous research, there was a significant negative correlation between T1 parental monitoring activities and T1 and T2 child antisocial behavior. However, the mediation analysis revealed that parental monitoring did not mediate the relationship between T1 parental alcohol use and T2 antisocial behavior, nor was it directly related to T1 parental alcohol use or T2 antisocial behavior.

Family Conflict

Parent alcohol abuse has significant impacts on family life and can lead to family conflict (Graham et al., 1993; Iacopetti et al., 2021). In this study, I hypothesized that general parent alcohol use (not confined to definitions of normal or abnormal use) could also have an impact on the level of conflict reported by families. In turn, I hypothesized

that the reported family conflict may partially explain the relationship between T1 parent alcohol use and T2 child antisocial behavior. However, the results of this study indicate that this is not the case. There was no correlation between T1 family conflict and T1 parent alcohol use or T2 antisocial behavior (though T1 antisocial behavior was significantly positively correlated with T1 family conflict). In addition, the mediation model indicated that T1 family conflict did not mediate the observed relationship between T1 parent alcohol use and T2 child antisocial behavior. These results suggest that the impact of parent alcohol abuse on family conflict outlined in the literature may not translate to general parent alcohol use, and that there is likely some other explanation for the relationship between parent alcohol use during adolescence and the adult-child's development of antisocial behavior into their late twenties.

Parent Messaging about Substance Use

The final hypotheses related to the relationship between T1 parent alcohol use and T2 antisocial behavior was that how parents communicate about abstaining from substance use at T1 might strengthen or weaken the relationship, depending on the type of messaging presented to adolescents and the level of alcohol use parents engage in. As with the other hypothesized models in this study, this was not supported. T1 parent alcohol use was significantly negatively correlated with T1 parental messaging about substance use, indicating that the more parents used alcohol, the less likely they were to discourage adolescent substance use. It was not correlated with T2 antisocial behavior, however.

The moderation model showed no interaction between T1 parental alcohol use and T1 parental messaging about substance use in predicting T2 child antisocial behavior. In addition, unlike every other analysis in this study, in the context of the interaction term in the moderation model, T1 parent alcohol use was no longer a significant predictor of T2 child antisocial behavior. This is likely due to shared variance between T1 parent alcohol use and T1 parental messaging about substance use, which is a common problem with moderation models (McClelland & Judd, 1993).

Strengths and Limitations

This study suggests that there is a relationship between parent alcohol use in adolescence and the development of antisocial behavior into adulthood, up to 10 years later. The key strength of this study is that this is the first study, to my knowledge, to show a relationship between parent alcohol use while their child is an adolescent and the development of antisocial behavior for those children over the following ten years. This highlights the years-long impact that parent choices about their own alcohol use could have on their children. Other strengths of this study include that the data came from an ethnically diverse sample and employed data from multiple different sources (child self-report, parent self-report, and observational data).

While there are multiple notable strengths from this study, there are also a few key limitations. First, much of the rationale for the chosen models was based on parent substance abuse literature. However, the parent population in this sample demonstrated relatively low levels of alcohol use. Because study hypotheses were generated based on findings from populations with heavier use patterns, the relatively few significant results

in the current study may be in part due to the more modest levels of alcohol use in this sample.

Second, as this study was a secondary data analysis, the measures used to conduct the analyses were not as specific to the research question as they otherwise might have been. The antisocial behavior measures used for T1 and T2 contained different timeframes for response as well as different response options. The different response options reflected in the measures were a result of the use of different measures to correspond with the different stages of development that the participants were in during the two assessment periods (adolescence at T1 and adulthood at T2). In addition, the T1 measure asked adolescents to report on their behaviors in the last month, while the T2 measure asked them to report on their behaviors in the last three months. Future research geared specifically towards this work should aim to have antisocial behavior measures that are as equivalent as possible while making sure they are also appropriate for the two different developmental periods being assessed.

A third limitation for this study is the missing data technique that was used. The program used for analyzing the mediation and moderation models, PROCESS for IBM SPSS Statistics (Hayes, 2013), exclusively uses listwise deletion to handle missing data. Listwise deletion introduces bias into the analysis, as it eliminates data from any participant who does not have fully complete data to run the analysis (Newman, 2014). In addition, the use of listwise deletion in this study greatly reduced the sample size, which reduced the amount of power accessible to detect smaller effects (Cohen, 1992).

Implications and Future Directions

The results of this study suggest that there is some relationship between the amount of alcohol that parents consume while their children are adolescents and the likelihood that their children will develop increased antisocial behavior into adulthood. Parenting interventions aimed at reducing antisocial behavior should consider parent alcohol use frequency as a possible area of change that could impact child behavior.

This study was not able to fully elucidate the reasons why parent alcohol use frequency impacts the development of antisocial behavior, but future studies should continue to explore this relationship. Perhaps samples with more substantial levels of alcohol use could illuminate some pathways from parent alcohol use to increased antisocial behavior. Or perhaps other mechanisms, such as family coercion processes, parental warmth, or parental mental health issues have a role to play in this relationship. Alternatively, perhaps more complex statistical analyses that are able to evaluate more complex relationships would aid in understanding this relationship.

In addition, given that substance use and antisocial behavior are highly correlated during adolescence and young adulthood (Colder et al., 2013), future research should examine both child antisocial behavior and child substance use as outcome variables. It is possible that increased parent alcohol use truly increases antisocial behavior directly, but it is also possible that increased parent alcohol use leads to increased child substance use, which correlates with increased antisocial behavior. Understanding what specifically parent alcohol use is impacting within the parent-child dynamic to create an environment where children are more likely to develop antisocial behaviors could help us to

understand how to educate parents about safe alcohol use around their adolescents with the hope of preventing that relationship.

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Appendices

Appendix A.

Parent Alcohol Use Questions

1. In general, how often do you have any drink containing alcohol, whether it is wine, beer, hard liquor, or any other alcoholic beverage? *Fill in one circle – if there is not a choice that fits for you, please choose the answer that is the closest to your current use.*
 - Never tried
 - Tried only once or twice
 - Less than once a year
 - Less than once a month, but at least once a year
 - About once a month
 - Two or three times a month
 - 1 or 2 times a week
 - 3 or 4 times a week
 - Nearly every day
 - Once a day
 - 2 times a day
 - 3 or more times a day

The following questions are about how much alcohol you consume during each drinking occasion. By one drink, we mean one 12-ounce bottle of beer, one standard cocktail, or one 4-ounce glass of wine. Think of all the times you have been drinking in the recent past. *Fill in only one circle for each question.*

2. When drinking, how often do you have as many as five or six drinks?
 - Never
 - Once in a while
 - Less than half the time
 - More than half the time
 - Nearly every time
3. When drinking, how often do you have three or four drinks?
 - Never
 - Once in a while
 - Less than half the time
 - More than half the time
 - Nearly every time

Appendix B.

T1 Antisocial Behavior

Please mark how many times you have done each of the following in the LAST MONTH.

1. Lied to your parents about where you have been or who you were with?
 - Never
 - Once or twice
 - 3-5 times
 - 6-10 times
 - 11-20 times
 - More than 20 times
2. Stayed out all night without your parents' permission
 - Never
 - Once or twice
 - 3-5 times
 - 6-10 times
 - 11-20 times
 - More than 20 times
3. Intentionally hit or threatened to hit someone at school?
 - Never
 - Once or twice
 - 3-5 times
 - 6-10 times
 - 11-20 times
 - More than 20 times
4. Skipped school without an excuse?
 - Never
 - Once or twice
 - 3-5 times
 - 6-10 times
 - 11-20 times
 - More than 20 times
5. Stolen or tried to steal things worth \$5.00 or more?
 - Never
 - Once or twice
 - 3-5 times
 - 6-10 times
 - 11-20 times
 - More than 20 times
6. Purposely damaged or tried to damage property?
 - Never
 - Once or twice
 - 3-5 times
 - 6-10 times
 - 11-20 times
 - More than 20 times
7. Panhandled (asked a stranger for money)?

- Never
 - Once or twice
 - 3-5 times
 - 6-10 times
 - 11-20 times
 - More than 20 times
8. Carried or handled a weapon, such as a gun or knife?
- Never
 - Once or twice
 - 3-5 times
 - 6-10 times
 - 11-20 times
 - More than 20 times
9. Spend time with gang members as friends?
- Never
 - Once or twice
 - 3-5 times
 - 6-10 times
 - 11-20 times
 - More than 20 times

Appendix C.

T2 Antisocial Behavior

The questions below ask about activities in which you may be participated. Please answer these questions thinking about your activities over the LAST 3 MONTHS.

In the LAST 3 MONTHS did you...

1. Break a rule of a supervisor or teacher?
 - Never or N/A
 - Once or twice a month
 - Weekly
 - Everyday
2. Miss class or work without an excuse?
 - Never or N/A
 - Once or twice a month
 - Weekly
 - Everyday
3. Physically fight with someone outside the family?
 - Never or N/A
 - Once or twice a month
 - Weekly
 - Everyday
4. Physically fight with someone inside the family?

- Never or N/A
 - Once or twice a month
 - Weekly
 - Everyday
5. Tell a lie?
- Never or N/A
 - Once or twice a month
 - Weekly
 - Everyday
6. Steal something worth less than \$50?
- Never or N/A
 - Once or twice a month
 - Weekly
 - Everyday
7. Destroy another's property?
- Never or N/A
 - Once or twice a month
 - Weekly
 - Everyday
8. Tease or bully another person?
- Never or N/A
 - Once or twice a month
 - Weekly
 - Everyday
9. Carry a weapon such as a hand gun?
- Never or N/A
 - Once or twice a month
 - Weekly
 - Everyday
10. Spend time with friends who use marijuana?
- Never or N/A
 - Once or twice a month
 - Weekly
 - Everyday
11. Spend time with friends who drink regularly?
- Never or N/A
 - Once or twice a month
 - Weekly
 - Everyday
12. Spend time with friends who sell drugs?
- Never or N/A
 - Once or twice a month
 - Weekly
 - Everyday

13. Sell drugs?
- Never or N/A
 - Once or twice a month
 - Weekly
 - Everyday
14. Get arrested for any offense?
- Never or N/A
 - Once or twice a month
 - Weekly
 - Everyday
15. Receive any moving traffic violations?
- Never or N/A
 - Once or twice a month
 - Weekly
 - Everyday
16. Steal something worth more than \$50?
- Never or N/A
 - Once or twice a month
 - Weekly
 - Everyday

Appendix D.

T1 Parental Monitoring – TC Report

The following questions ask about yourself, your experiences, and your relationship with your parents and your friends during the past three months.

In the past 3 months, how often did at least one of your parents...

1. Know what you were doing when you were away from home
 - Never or almost never
 - Sometimes
 - About half the time
 - Often
 - Always or almost always
2. Know where you were after school
 - Never or almost never
 - Sometimes
 - About half the time
 - Often
 - Always or almost always
3. Know about your plans for the coming day
 - Never or almost never
 - Sometimes
 - About half the time

- Often
- Always or almost always
- 4. Have a pretty good idea about your interests and activities
 - Never or almost never
 - Sometimes
 - About half the time
 - Often
 - Always or almost always