

Developmental Pathways to Substance Use across European American
and Asian American Youth

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Abstract

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As one of the fastest growing ethnic minority groups in the United States, alcohol and drug use in Asian Americans has increasingly been recognized as a public health problem. Emerging research has documented biological, psychosocial, and cultural factors that are associated with alcohol use in Asian American youth adults (Hendershot et al., 2005). However, existing studies have neither adopted a developmental perspective to study the emergence of alcohol use and problems in Asian American during late adolescence, nor have they tested whether prior findings can be generalized to predict drug use. Concurrently, research has suggested that effects of parenting are often different across Asian and European American youth. Numerous studies, for example, have suggested that authoritarian parenting style has beneficial effects in Asian American youth, but detrimental effects in European American youth on outcomes such as

academic performance and socio-emotional competence. Subsequent research has indicated that parental constructs such as warmth and psychological control may also have differential effects across Asian and European American youth (e.g., Chao & Tseng, 2002). Despite these findings, no published study has documented differential effects of parenting on alcohol and drug use across Asian and European American youth. The overarching goal of this study was to examine moderation effects by ethnicity on the association between parenting and alcohol and drug use outcomes in a longitudinal sample of Asian and European American youth. Data were drawn from 97 Asian American and 255 European American youth who participated in the Developmental Pathway Project. The current study first tested measurement invariance of three parenting constructs: parental warmth, parental psychological control, and parental knowledge. Configural invariance was found for mother and father parental warmth and knowledge. However, the item “always tries to change how I feel or think about things” was not a significant indicator for the mother psychological control latent factor and was excluded from subsequent analyses. Metric invariance was found for mother and father parenting, whereas scalar invariance was established for father but not mother parenting. Other types of measurement invariance were also evaluated and there was little evidence of systematic measurement non-invariance of parenting constructs. Examination of direct effects revealed that mother psychological control was a risk factor for alcohol use and problems in grade 9 among both European Americans and Asian Americans. Father knowledge also had a significant main, protective effect on three substance use outcomes, including alcohol problems in grade 9, alcohol problems in grade 12, and alcohol dependence in grade 12, for the entire sample. Path analyses indicated a total of six moderated mediation effects. Specifically, for European Americans only, mother knowledge at baseline predicted fewer alcohol problems in grades 9 and 12 via fewer externalizing problems in

grade 8. Similarly, for European Americans only, father warmth at baseline predicted alcohol problems in grade 9, alcohol problems, alcohol dependence, and marijuana dependence at grade 12 via better academic achievement. Overall, the direct effects of parenting on substance use outcomes were not moderated by ethnicity, but several indirect effects were. The pattern of associations also differed by dimension of parenting and the gender of the parent. The current study is the first to illustrate moderated mediation effects of parenting on substance use outcomes across European Americans and Asian Americans with the use of a longitudinal sample. Future research should extend this work by testing how cultural factors might moderate these associations among a larger and more diverse Asian American sample.

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Chapter 1: Introduction

Asian Americans represent one of the fastest growing ethnicity minority groups in the United States. The percentage of Asian Americans in the population is projected to rise from 5.3% in 2010 to 9.2% in 2050 (U.S. Census Bureau, 2008). Moreover, the proportion of second generation Asian Americans, in which alcohol and drug use are more prevalent, will increase relative to foreign-born Asian Americans (Pew Research Center, 2008). As the makeup of the U.S. population becomes more diverse, it is increasingly important to recognize that a “one-size-fits-all” approach in mental health services, including substance use treatment and prevention, may be inadequate, and that the development of culturally sensitive approaches is urgently needed.

The development of culturally sensitive interventions for substance use hinges upon strong etiological theories of substance use across cultures. National data on alcohol and drug use in White, Black and Hispanic youth are readily available in datasets such as *Monitoring the Future* and *Youth Risk Behavior Survey*. By contrast, there is a paucity of data on alcohol and drug use in Asian youth because they are often collapsed into the “other” category in these national surveys. Although far from complete, an increased number of regional studies have provided a better picture of alcohol and drug use in Asian American youth. The current research would add to this literature by examining the development of alcohol and marijuana use in a longitudinal sample of Asian and European American youth in Seattle. Three dimensions of parenting (warmth, psychological control and knowledge) were examined as distal factors that contribute to the development of alcohol and marijuana use. Guided by etiological models of substance use developmental (Dodge et al., 2009; Sher, 1991), school achievement and externalizing problems were tested as putative mediators. Understanding pathways to substance

use among Asian American youth may inform culturally sensitive prevention and intervention efforts in this growing population.

1.1. Alcohol and Drug Use in Asian Americans as a Public Health Problem

Historically, alcohol and drug use in Asian and Pacific Islanders has not been recognized as a critical public health problem because of its low prevalence relative to European Americans. However, subsequent research has challenged the “model minority stereotype” (Sue, Sue, Sue, & Takeuchi, 1995), suggesting that problem behaviors in Asian American youth are not as low as many researchers expected (Choi & Lahey, 2006). Emerging research indicates that there is substantial heterogeneity in the prevalence of substance use among Asian subgroups (Wong, Klinge, & Price, 2004), such that some Asian subgroups are at substantially higher risks for substance use than youth in other Asian subgroups (Harachi, Catalano, Kim, & Choi, 2001). Because the overall low prevalence in substance use may be driven by very low prevalence in a few Asian subgroups, it is possible that youth in other Asian subgroups are at elevated risks for substance use, suggesting that some Asian youth may represent a “hidden risk group” that may be under-targeted for intervention.

Data from the 2008 National Survey on Drug Use and Health (SAMHSA, 2009) support this notion of hidden populations of at-risk Asian Americans. In adults, the overall prevalence of past month alcohol use was 39.8% among Asian American compared to 55.2% among all U.S. adults. The overall low prevalence seems to have been driven by Asian subgroups such as Chinese (41.3%), Vietnamese (38.7%), Filipino (38.1%), and Indian Americans (32.1%). The prevalence rates of past month alcohol use were 51.9% among Korean Americans and 48.3% among Japanese Americans, approaching the national average (SAMHSA, 2009). In adolescents aged 12 to 20, it is estimated that 17.2% of Asian Americans drank in the past month, 9.4%

engaged in binge drinking in the past month, 2.1% engaged in heavy alcohol use in the past month, and 3.6% used illicit drugs in the past month (SAMHSA, 2009). Similar to the adult literature, although the overall prevalence rates of substance use are lower in Asian than European American youth, numerous studies suggest substantial heterogeneity in prevalence (Choi, 2008; Nagasawa, Qian, & Wong, 2000; Otsuki, 2003; Tosh & Simmons, 2007; Yang & Solis, 2002). These studies highlight the need to monitor risks for substance use and problems in Asian subgroups, and more generally, the importance of identifying correlates of alcohol and drug use in Asian American youth to guide prevention and intervention efforts.

Emerging research has examined biological, psychosocial, and cultural factors that contribute to alcohol use and problems in Asian Americans, particularly in college students (Hendershot, MacPherson, Myers, Carr, & Wall, 2005). It is known that the *ALDH2* genotype status (Hendershot, Collins et al., 2009), parental alcohol use (Hendershot, et al., 2005), social context and alcohol expectancy (Hendershot, Neighbors et al., 2009; O'Hare, 1995), as well as acculturation (Hendershot, Dillworth, Neighbors, & George, 2008) are important factors that are linked to alcohol outcomes. The effects of some of these correlates such as acculturation and parental alcohol use can be generalized to the Asian adolescent population (Kim & McCarthy, 2006; Le, Goebert, & Wallen, 2009; Shrake & Rhee, 2004). However, despite a growing body of literature on the correlates of alcohol use in Asian Americans, few studies have adopted a developmental perspective or have tested the generalizability of these effects to predict drug use in Asian American youth. Moreover, potential mediators are rarely examined. The present study is designed to address these gaps in existing literature.

1.2. Generalizability of Parenting Effects on Substance Use among Asian American Youth

Parenting is a potentially modifiable construct that is related to the development of alcohol and drug use across adolescence (e.g., Barnes & Farrell, 1992; Barnes et al., 2000; Baumrind, 1991). Based on Baumrind's seminal work on parenting styles (Baumrind, 1967), authoritative and authoritarian parenting styles are two prototypical patterns of parenting that have differential effects on child development. Generally, authoritative parenting style involves a constellation of positive parenting attributes including bidirectional communication, warmth, appropriate autonomy granting, and high standards (Darling & Steinberg, 1993). By contrast, authoritarian parents control the child's behaviors according to a set of absolute standards, restrict the child's autonomy, and value obedience and submission as virtues. In theory, authoritative parenting style is predictive of positive child outcomes, while authoritarian parenting style is linked to negative outcomes. Subsequent cross-cultural research, however, indicates that these patterns may only hold true for European Americans. Specifically, the authoritarian parenting style was found to exert beneficial effects on academic achievement in Asian Americans (Leung, Lau, & Lam, 1998), whereas the positive effects of authoritative parenting on academic achievement appear to be less evident in Asian Americans than in European Americans (Kim & Rohner, 2002).

Cross-cultural differences in the effects of parenting styles suggest that European and Asian American youth may have different interpretations of two dimensions of parenting that are core to parenting styles: warmth and psychological control (Russell, Crockett, & Chao, 2010). Prior research suggested that emotions are often suppressed in most Asian cultures, with love and affection expressed indirectly through actions or the fulfillment of mutual obligation (Hsu, 1983). **Parental warmth**, characterized by direct demonstration of affection and care, as well as

expression of interests and priase, may therefore be valued less and may serve as a weaker protective factor in Asian American youth as compared to European American youth. By contrast, Asian parents are more strict and restrictive in their parenting (Chao & Tseng, 2002), and Asian American children are generally more ready to accept parental control relative to European American children (Chao, 1994; Chao & Aque, 2009). Specifically, Asian American youth may interpret **parental psychological control**, characterized by strictness, intrusiveness, overprotectiveness, and little encouragement of autonomy, as an expression of parents' concern and care (Chao & Sue, 1996). As such, parental psychological control may have some beneficial effects in Asian American youth but negative effects in European American youth. Indeed, high paternal control was correlated with psychological maladjustment in western but not eastern countries in a recent cross-national study of nine countries (Dwairy & Achoui, 2010).

Parental knowledge is a well-established protective factor against adolescent substance use (Hawkins, Catalano, & Miller, 1992). Unlike parental warmth and psychological control, there is little research on ethnic differences in **parental knowledge**, which is traditionally defined as parents' tracking, surveillance and knowledge of children's daily activities (Dishion & McMahon, 1998). Among the few studies, one suggested that the mean level of parental knowledge was lower in African American as compared to White youth (Hurley et al., 2008). In another study, Asian youth reported lower parental knowledge than Hispanic/Latino youth and that parental monitoring was found to be unrelated to smoking in Asian youth (Shakib et al., 2003). Given the general lack of research on parental knowledge across ethnic groups, it is of interest to examine whether its well-established protective effects against adolescent alcohol and drug use can be generalized to Asian American youth.

Empirical evidence is equivocal regarding the extent to which parenting affects alcohol and drug use in Asian American youth. Existing studies usually examine parenting as a part of psychosocial or family influence, and the measurement of parenting varies greatly across studies. For example, Keefe and Newcomb (1996) suggested that lower level of alcohol use in Asian American youth relative to European Americans was attributable to differential exposure to psychosocial risk factors. Specifically, Asian Americans reported fewer drinking models, perceived more negativity from their parents and friends toward their drinking, and expected more costs and fewer benefits from drinking than did European Americans. Collectively, such psychosocial vulnerability, measured as a single latent construct, was associated with lower level of alcohol use in Asian American youth. In another study, Au and Donaldson (2000) found that intact family structure and fewer substance-using adult or peer models were linked to lower substance use in Asian American youth compared to European American youth. Similarly, Nakashima and Wong (2000) measured the effects of parenting as a part of social influence, and found that individual factors such as depression, self-esteem, and perceived prejudice explained additional variance in alcohol use beyond peer and family influences (including variables such as “living with both parents” and “family would strongly stop respondent from getting drunk”) in White Americans but not in Korean Americans. However, none of these studies examined the relative contributions of different psychosocial influences (e.g., parent vs. peer) or the effects of different aspects of parenting.

In a more recent national study, Bersamin, Paschall and Flewelling (2005) explored ethnic differences in 39 risk factors for adolescent binge drinking in the past 30 days. They reported that 17 of them (43%) differed across ethnic groups. In multivariate analysis, all risk factors together accounted for 27% and 39% of variance in binge drinking among White and

Asian youth respectively. Yet, unlike the above studies, only residential instability, one out of eight variables in the family domain, was found to be protective against binge drinking in Asian American youth. Other variables such as conflict with parents, communication with parents about drugs, and parental indifferences about substance use were unrelated to binge drinking in Asian Americans, even though these variables are often risk factors in Whites. Moreover, poor family management was a risk factor for binge drinking in Whites, but a protective factor in Asian Americans. Building on previous studies showing ethnic differences in psychosocial correlates of adolescent alcohol and drug use, the **first conceptual goal** of this study was to examine whether parental warmth, psychological control and knowledge are differentially associated with subsequent alcohol and drug use in Asian and European American youth.

1.3. The Developmental Psychopathology Perspective and Pathways to Substance Use

Effective substance use prevention hinges upon sound substance use etiology theory. The developmental psychopathology perspective provides a useful framework to study the etiology of substance use among Asian Americans as it is compatible with the consideration of cultural influences (Garcia Coll, Crnic, Lamberty, & Wasik, 1996; Garcia Coll, Akerman, & Cicchetti, 2000). In this paper, we focus on three core concepts in developmental psychopathology, including the consideration of both normal and abnormal development, the use of multiple levels/domains of analysis, and the emphasis on understanding developmental pathways. A detailed account of the above and other related concepts can be found in reviews by Cicchetti (2006) and Rutter and Sroufe (2000).

A hallmark of developmental psychopathology is the concurrent consideration of normal and atypical development across the lifespan (Sroufe, 1990). The rationale for considering normal development along with atypical development is based on the assumptions that core

principles underlying normal and atypical development are the same, and that the two types of development are thought to be mutually informative. As such, psychopathology is considered an outcome of development (Stroufe, 1997). Within this broader framework, developmental psychopathologists also distinguish between different types of continuity and discontinuity of psychopathology. *Homotypic continuity* refers to a single underlying construct that is expressed in the same form across development. *Heterotypic continuity* refers to a single underlying construct that is expressed in different forms across development. *Discontinuity* refers to a single underlying construct that is only present in a developmental period.

Another core characteristic of developmental psychopathology is the use of multiple levels/domains of analysis (Cicchetti, 1984). This approach entails the integration of factors ranging from biological, psychological, social, and cultural, and requires interdisciplinary collaboration. Its emphasis does not only lie on risk factors that contribute to the development of psychopathology, but it also takes into account the role of resilience and protective mechanisms across multiple domains (Cicchetti, 2008; Rutter, 1987). This assumes that developmental outcomes, whether normal or abnormal, are the result of a dynamic interplay between risk and protective factors across multiple levels. In the context of Asian American substance use, multiple levels/domains of analysis implies an examination of how protective and risk factors from biological, psychosocial, and cultural levels are related to each other and substance use across development.

The explicit delineation of developmental pathways to psychopathology is perhaps the most important characteristics that distinguish developmental psychopathology from other perspectives. Central to the understanding of developmental pathways is the idea that many risk and protective factors are related to abnormal developmental outcomes in a probabilistic, rather

than a deterministic manner (Sroufe, 2009). A developmental pathway refers to an underlying mechanism that emerges over the course of development to explain how early risk or protective factors influence later developmental outcomes. The identification of specific developmental pathways is important for prevention and intervention because these are causal mechanisms that may determine the developmental trajectory. Two common patterns are often identifiable in understanding developmental pathways; *multifinality* refers to the presence of more than one outcome that result from a similar pattern of early risks, whereas *equifinality* refers to the presence of more than one development pathways that lead to the same outcome. A better understanding of developmental pathways can inform interventionists when and where to best intervene with abnormal development.

1.4. Etiological Models of Substance Use Development

Etiological models of substance use have been proposed to describe how substance use and problems arise across development (see Chassin, Ritter, Trim, & King, 2003 for a review). Consistent with the multiple-levels-of-analysis approach, Hawkins, Catalano, and Miller (1992) reviewed empirical research that was relevant to risk-focused prevention strategies and identified 17 risk factors were thought to be important targets for intervention efforts. Likewise, a recent review by Stone, Becker, Huber, and Catalano (2012) demonstrated that numerous risk factors proposed by Hawkins and colleagues (1992), such as having substance-dependent parents, low commitment to school, and peer substance use were all associated with increased risk for substance use and problems among emerging adults. These review papers point to the importance of simultaneously targeting multiple risk factors in the prevention of substance use.

In their review paper, Harachi and colleagues (2001) documented research on risk and protective factors for substance use among Asian American youth and contrasted this list with

the factors that were proposed by Hawkins and colleagues (1992). These authors reported that several factors, such as availability of marijuana and peer alcohol use, were associated with increased risks for substance use across European and Asian American youth, supporting the utilization of existing evidence-based prevention approaches among different Asian populations. However, they also noted that only a subset of risk and protective factors have been tested across European and Asian American youth, thereby highlighted the need for additional research.

Other researchers have similarly conceptualized these risk and protective factors within a developmental framework. For example, the deviance proneness model proposed by Sher (1991) suggests that one pathway to substance use and problems is characterized by early manifestation of externalizing problems that progress into difficulty in familial, social, and school settings, which lead to deviant peer affiliations and subsequent substance use and dependence. The dynamic cascade model of the development of substance-use onset proposed by Dodge and colleagues (2009) posits that initiation of substance use is preceded by multiple factors that lead to one another. Specifically, they suggested difficult child factors and adverse sociocultural context predict early parenting problems, which in turn predict early behavior and peer problems. These early appearing problems predicted early initiation of substance use via adolescent parenting and peer problems. To date, there is no comparable or supplementary developmental model of substance use for Asian American youth.

Theory and research generally suggested that the effects of parenting on subsequent alcohol and drug use in adolescents may be mediated by lower school achievement and peer substance use. According to the deviance proneness theory (Sher, 1991), temperamental, cognitive and environmental risk factors, including poor parenting, may put youth at elevated risks for academic failure and affiliation with deviant peers, which in turn increases risks for

problem behaviors. Empirical data similarly suggest that the effects of parental involvement and risk taking on adolescent substance use are mediated by school achievement and peer substance use in African, European and Hispanic American youth (Pilgrim, Schulenberg, O'Malley, Bachman, & Johnston, 2006). However, this study only examined parental involvement as a one-dimensional construct and did not test the generalizability to Asian American youth. Moreover, only one prior study tested the indirect effect of youth-parent relations on substance use in Asian American youth via vulnerability to negative peer pressure (Kim, Zane, & Hong, 2002). Research is needed to test whether and how developmental pathways to substance use in Asian American youth are different from those found in European American youth.

Based on previous research showing differences in the effects of parenting styles and subsequent academic achievement and socio-competence across ethnic groups, it is possible that the effects of parenting on school achievement and peer substance use are different across European and Asian American youth. For example, prior research has shown that parental closeness and intimacy, as contrast to parental respect, are more treasured in European than Asian American youth (Chao & Tseng, 2002). As such, it may be that parental warmth may be less predictive of school achievement and peer substance use in Asian than European American youth (e.g., Chao, 2001), perhaps because it is considered by Asian youth to be less of an indicator of their parents' love for or bond with them. In turn, the indirect effect of parental warmth on alcohol and drug use via these putative mediators may be weaker in Asian American youth.

Asian American parents generally emphasize the importance of exercising self-control and succeeding in school more so than European American parents (Julian, McKenry, & McKelvey, 1994), which is different from European American youth, where parental

psychological control tends to act as a risk factor, Asian American youth who experience more parental psychological control may have higher school achievement and less peer substance use, which in turn, may protect Asian American youth from alcohol and drug use. Finally, a prior study showed no relation between parental monitoring and adolescent smoking (Shakib, et al., 2003), suggesting that parental knowledge may be less strongly related to the putative mediators and substance use. Thus, the **second conceptual goal** of this study was to test whether the pathways from three parenting constructs to alcohol and drug use via school achievement and peer substance use are different in Asian American youth.

1.5. Measurement Invariance Testing of Parenting as a Critical First Step

Measurement invariance refers to the condition in which a measure exhibits identical psychometric properties when used in different settings (Meade, Johnson, & Braddy, 2008). Test of measurement invariance is the foundation upon which meaningful comparisons across time and populations can be carried out (Schmitt & Kuljanin, 2008). A measure is considered invariant when the associations between observed scores and the latent construct being measured are identical across groups (also known as measurement equivalence; see Drasgow, 1984). Conversely, a measure is considered non-invariant when the relations between the observed scores and the latent construct being measured differ across groups (also known as measurement bias; see Millsap, 2011). Test of measurement invariance has important implications for cross-cultural research as it enables researchers to understand the degree to which group differences in observed scores reflect actual differences in the latent constructs of interest, or are attributable to measurement artifacts (Chen, 2008; Milfont & Fischer, 2010). Thus, prior to examining the two conceptual questions, I first conducted measurement invariance testing.

Measurement invariance can be tested within a confirmatory factor analysis (CFA) framework (Reise, Widaman, & Pugh, 1993), in which different forms of measurement invariance can be evaluated using a series of sequential nested model comparisons (Vandenberg & Lance, 2000). Broadly, these forms of measurement invariance can be subdivided into two parts: measurement invariance and structural invariance. Typically, the measurement part includes tests of configural invariance, metric invariance, scalar invariance, and invariance of uniquenesses, whereas the structural part includes tests of invariance of factor variances, covariances, and factor means (Schmitt & Kuljanin, 2008). To test measurement invariance, a least restrictive configural measurement invariance model is first specified. Then, a series of increasingly restrictive models are conducted and invariance is indicated when imposing equality constraints across groups did not worsen model fit. If a form of invariance is not established in an earlier step (i.e., when equality constraints worsened overall model fit), a partial invariance model (i.e., freeing the non-invariant parameters but fixing the invariant parameters across groups) is specified before subsequent tests are conducted.

Different forms of measurement invariance are related to different parts of the CFA model and correspond to different substantive questions. The establishment of configural, metric, and scalar invariance, relative to other forms of invariance, is often the most relevant to answering substantive research questions (Byrne & Stewart, 2006; Cheng & Rensvold, 2002; Widaman & Reise, 1997). Configural invariance tests whether each latent factor is indicated by the same indicators across groups. Specifically, while the factor loadings for each indicator can be different across groups, the same indicators must load onto the same latent factor across groups (Chen, 2008). Put simply, configural invariance is met when the same factor structure holds across groups. Metric invariance tests whether the magnitude of each factor loading is the

same across groups. Metric invariance is met when the strength of the association between the indicator and the latent factor is not significantly different across groups. If metric invariance is not met, it suggests that individuals from different groups might ascribe different meanings to the same latent construct (Gregorich, 2006). Scalar invariance tests whether the intercepts (for continuous indicators) or thresholds (for categorical indicators) of the regression equations of the observed indicators on the latent factor are the same across groups (Schmitt & Kuljanin, 2008). Scalar invariance is met if fixing the intercepts or thresholds does not lead to a significantly worse model fit. If scalar invariance is not met, comparisons of group means are biased such that individuals from different groups who have the same observed score might actually be different at the latent factor level (Chen, 2008; Gregorich, 2006).

Tests of invariant uniquenesses (or invariant residual variances), factor variances, factor covariances and factor means typically follow if prior tests support the presence of configural, metric and (at least partial) scalar invariance (Schmitt & Kuljanin, 2008). According to Cheng and Rensvold (2002), invariant uniquenesses tests whether indicators have the same quality as measures of the latent factor across groups; invariant factor variances tests whether the range of responses to indicators representing the latent factor are equivalent across groups; invariant factor covariances tests whether the associations among latent factors are equivalent across groups; and invariant factor means tests whether the mean level of each latent construct is equivalent across groups. While the typical sequence of subsequent measurement invariance tests is to begin with a test of invariant uniquenesses, followed by tests of invariant factor variances, factor covariances and factor means, the exact sequence of these tests may vary across studies due to various considerations (Vandenberg & Lance, 2000). For example, invariant factor variances might be tested prior to invariant uniquenesses because the legitimacy of invariant

uniquenesses is contingent upon the assumption that factor variances are equal across groups (Rock, Werts, & Flaugher, 1978; Vandenberg & Lance, 2000).

Chapter 2: Methodology

2.1. Research Design

The current study utilized an existing community-based longitudinal dataset collected as part of the Developmental Pathways Project (DPP). The original study aim of DPP, conducted by Dr. Ann Vander Stoep and Dr. Elizabeth McCauley (R01 MH/DA63711; R01 MH079402), was to understand developmental trajectories for depression and comorbid conduct problems among adolescents. Using the DPP dataset, Dr. Carolyn McCarty (R01 AA018701) further examined the interplay among depression, conduct problems, and other risk factors in the etiology of alcohol-related problems. This study was conducted within the context of these two larger studies, with a special emphasis on how parenting constructs may be interpreted differently and may have different effects on alcohol- and marijuana-related outcomes across two ethnic groups, and how developmental pathways might also be moderated by ethnicity. These specific aims did not overlap with the aims of any of the original R01 grants.

2.2. Participants

In the original DPP sample, children with depressive and conduct problems were oversampled. Initially, 521 6th graders (age 11-12) were selected from 2,190 students from an urban school district in Seattle after a screening on depressive and conduct problems. This sample was racially diverse (48.9% White, 28.4% African American, 18.6% Asian and 4.0% Native American) and has been followed over the course of six years (to age 17-18). Because the proposed study focuses on ethnic differences across European and Asian American youth, the study sample will be restricted to these two ethnic groups, resulting in a sample size of 352 (97 Asians; 27.6% of the current sample). The largest Asian ethnic subgroups in this sample included

16 Vietnamese, 16 Filipino, 15 Chinese, and 12 Japanese. Table 2.1 presents sample characteristics for the full sample and by ethnicity.

2.3. Procedures and Measures

Interviews with youth were mostly conducted in family homes by trained DPP interviewers. A monetary incentive was given upon completing interviews. A summary of the measurement of constructs is presented in Table 2.2.

Parenting. Youth self-report on perceived parenting behaviors was obtained using validated measures. Specifically, **parental warmth** was measured by the 10-item acceptance subscale the Child Report of Parent Behavior Inventory (Schaefer, 1965). **Parental psychological control** was measured by the 8-item psychological control scale (Barber, 1996). **Parental knowledge** was measured by the 5-item parental monitoring scale (Brown, Mounts, Lamborn, & Steinberg, 1993). All parenting items were rated on a 3-point scale. Two identical versions of all items were administered to assess mother and father parenting separately. All the individual parenting items can be found in Tables 3.3. and 3.5. Barber and Olsen (1997) presented an integrative socialization model which incorporated the three parenting dimensions used in this study.

Academic Achievement. Due to substantial missing data and low base rate in various school-related variables (e.g., days absent, school truancy, and school dropout), grade point average (GPA) was used as a measure of academic achievement. GPA in the fall of grades 7 and 8 was obtained through school records. The possible range of GPA was from 0 to 4.

Externalizing Problems. The Child Behavior Checklist (CBCL) is a widely used parent-report questionnaire that measures a range of internalizing and externalizing problems and related behaviors (Achenbach, 2001). The reliability and validity of the CBCL are well-

established and the CBCL externalizing subscale has been shown to correlate with other valid measures of externalizing psychopathology (Achenbach, & Rescorla, 2001; Doyle, Ostrander, Skare, Crosby, & August, 1997; Hudziak, Copeland, Stanger, & Wadsworth, 2004). Raw scores rather than T scores of the CBCL externalizing subscale in grades 7 and 8 were used in the current analyses (Thurber, & Sheehan, 2012).

Alcohol and Drug Outcomes. Data were collected on alcohol and drug initiation, use, and problems across adolescence. The **Drinking and Drug Use Questionnaire** was validated in a community sample of adolescents aged 13-22 and desired psychometric properties were documented (Brown et al., 1998). This instrument was used to assess age of onset, quantity and frequency of use of alcohol, tobacco, marijuana, other illicit drugs. Month and year of first use was determined for youth who reported alcohol or drug initiation. Based on a close examination of the variability of these items, only ever use of alcohol use in grades 7 and 9 and marijuana use in grade 7 were included in the current analyses as covariates and/or outcomes.

The 23-item **Rutgers Alcohol Problem Inventory** (RAPI) was administered to youth who endorsed alcohol or marijuana use in the past six months to assess negative drug and alcohol-related consequences. RAPI responses were coded as zeros for youth who did not report substance use in the past six months. Response options ranged from 0 = “never” to 4 = “more than 10 times”. A total score indicates how alcohol has influenced the youth’s personal, social and academic functioning over the past year. The RAPI is a psychometrically sound measure with a 3-year stability coefficient of .40 (White & Labouvie, 1989).

The **alcohol and marijuana abuse modules of the “Voice”-DISC-IV** were self-administered by youth in the grade 12th interview. Computer-assisted technology was used to grant youth more privacy and greater anonymity in responding to sensitive questions about

illegal activities. The reliability of the Voice DISC has been shown to be comparable to that of other versions of the DISC (Lucas, 2003). Roberts and colleagues (1996) suggested that the substance use disorder modules have moderate test-retest stability (Kappa = .46). Fisher and colleagues (1993) found that 75% of youth with a hospital diagnosis of any substance use disorder were accurately classified using parent and child versions of the DISC-IV. Initial analyses indicated substantial overlap of the abuse and dependence diagnoses in the current sample. Only alcohol and marijuana dependence were used as outcomes in this study.

Tables 2.3 and 2.4 present bivariate correlations between parenting and substance use variables for the full sample, as well as for each of the ethnic groups.

Chapter 3: Measurement Invariance Testing

3.1. Data Analysis Plan

Analyses were conducted in Mplus 7.2. (Muthén & Muthén, 1998-2014). I conducted measurement invariance testing following general suggestions outlined by Vandenberg and Lance (2000) and Schmitt and Kuljanin (2008), with the exception that I tailored my analyses to accommodate for the ordered categorical nature of the parenting items used in this study (Flora & Curran, 2004). For the measurement invariance tests, I first evaluated model fit of three-factor parenting models for each group. If the single-group models did not exhibit acceptable model fit, I would examine modification indices to understand which parameter(s) contributed to the misfit and would modify the models accordingly. If the single-group models provided acceptable model fit, I would use the same specifications for the multiple-group baseline configural model. Besides evaluating overall model fit, I also examined whether all parenting indicators loaded onto their respective latent parenting factor as a step in establishing configural invariance. Configural invariance is met if the same set of items significantly loaded onto the corresponding latent factors across groups. Conversely, if an indicator significantly loaded on one latent parenting factor in one group but not the other, then configural non-invariance is found and the model should be re-specified before the subsequent measurement invariance tests. Fitting these single-group models is a critical step in establishing the validity of the multiple-group baseline configural invariance model (Meade, Johnson, & Braddy, 2008). Specifically, French and Finch (2011) suggested that if the baseline configural invariance model is misspecified, the subsequent measurement invariance tests are susceptible to increased type I error rates and other misspecifications.

After the multiple-group baseline configural invariance model was established, I performed a series of increasingly restrictive measurement invariance tests for order-categorical data following the method suggested by Millsap (2011). In the *configural invariance model*, the metric of each of the three parenting latent factors was set by fixing the largest factor loading in the European American group to 1. In other words, a total of three factor loadings were set to 1 in each group. All other factor loadings and all thresholds were freed across groups. For model identification purposes, scale factors were fixed to 1 in all groups, whereas factor means were freed across groups. Factor variances were freed across groups. In the *metric invariance model*, the factor loadings were fixed across groups. In addition, following Millsap's approach (2011), scale factors were fixed at 1 in the European American group and were freed in the Asian American group. Similarly, factor means were fixed at 0 in the European American group and were freed in the Asian American group. For model identification purposes, the first threshold of each item was fixed across groups, and the second threshold of the reference item used to set the metric of the factor was also fixed across groups. Factor variances were freed across groups. In the *scalar invariance model*, both all factor loadings and all thresholds were fixed across groups. Identical to the metric invariance model, scale factors were fixed at 1 in the European American group and were freed in the Asian American group, whereas factor means were fixed at 0 in the European American group and were freed in the Asian American group. Factor variances were freed across groups. If the model fit was significantly worsened in any of the above steps, a series of one-degree-of-freedom chi-square tests would be conducted to identify the non-invariance parameters. A partial invariance model is estimated before testing the next form of measurement invariance.

The typical sequence of measurement invariance testing is to evaluate invariant uniqueness, or invariant residual variances, after examining configural, metric, and scalar invariance (Schmitt & Kuljanin, 2008; Vandenberg & Lance, 2000). However, given that the parenting items were treated as ordered categorical indicators rather than continuous indicators (Flora & Curran, 2004), the WLSMV estimator and the delta parameterization were chosen (see the *Model Estimator* section for a full discussion of these choices). Under these conditions, scale factors rather than residual variances were estimated (Muthén, 1984). Scale factors are a function of loadings, residual variances, and factor variances (Muthén & Asparouhov, 2002). As such, it is impossible to directly test for invariant uniqueness. However, if both loadings and factor variances were first found to be invariant across groups, then testing invariant scale factors would indirectly test whether the residual variances were invariant across groups. Thus, following the configural, metric, and scalar invariance models, I first moved onto test invariant factor variances, followed by invariant scale factors, invariant factor covariances, and invariant factor means. All of these parameters were freely estimated in the scalar invariance model and were constrained to be equal across groups in a stepwise fashion in the series of measurement invariance tests.

3.2. Model Estimator and Parameterization

According to Flora and Curran (2004), weighted least squares (WLS) or robust WLS estimators are appropriate for CFA with ordinal data such as items utilizing a Likert-type scale, whereas the widely used maximum likelihood (ML) estimator is appropriate for continuous data. Given that the parenting items in this study were constructed on a three-point Likert-type scale, the use of WLS estimator or robust WLS estimator would in theory yield superior model fit than the use of ML estimator. I chose to use the robust WLS estimator (WLSMV in Mplus) in this

study because it performs better than the WLS estimator with smaller samples (Flora & Curran, 2004). Two parameterization options are available in Mplus, including the delta parameterization and the theta parameterization (Muthén & Muthén, 1998-2014). I used the delta parameterization because it was found to be superior to the theta parameterization in many situations (Muthén & Asparouhov, 2002). To illustrate the appropriate use of the robust WLS estimator in this study, I began by fitting single-group models using both approaches and compared the resulting model fit across approaches. Specifically, I utilized two different estimators in Mplus: the WLSMV estimator, a robust weighted least squares estimator using a diagonal weight matrix, and the MLR estimator, a maximum likelihood estimation with robust standard errors using a numerical integration algorithm (Muthén & Muthén, 1998-2014). I then proceeded with the WLSMV estimator as it provided superior model fit across all models of interest (see Tables 3.1 and 3.2).

3.3. Criteria for Acceptable Model fit and Significant Difference in Nested Model

Comparisons

In general, model fit was evaluated using the chi-square test and a variety of alternative fit indices (Chen, 2007; Cheung & Rensvold, 2002; Meade et al., 2008; Millsap, 2011), including comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR for continuous models) or weighted root-mean-square residual (WRMR for categorical models). Acceptable model fit is first indicated by a non-significant chi-square test. If the chi-square test was significant, I then evaluated the alternative fit indices. Prior research provided recommended cutoffs for these alternative fit indices: $CFI > 0.95$, $TLI > 0.95$, $RMSEA < 0.06$, $SRMR < 0.08$, and $WRMR < 0.9$ (Chen, 2007; Hu & Bentler, 1999; Yu, 2002). In the current study, I referenced these cutoffs in

the evaluation of overall model fit for both single-group and multiple-group models when the chi-square test was significant.

When continuous indicators are used, the recommended criteria for nested model comparisons include significance of the adjusted chi-square difference test and change in CFI. However, due to the use of the WLSMV estimator for categorical indicators, the present analyses relied primarily on the adjusted chi-square difference test, which was computed using the DIFFTEST function in Mplus (Muthén & Muthén, 1998-2014). For each step in the measurement invariance sequence, an omnibus test was conducted to control for potential alpha inflation. Significance is indicated when the change in the adjusted chi-square exceeded the critical value of $p < .05$ for the corresponding change in the degrees of freedom. For the sake of completeness, changes in CFI were also reported. In a study using continuous indicators, Cheung and Rensvold (2002) suggested that the null hypothesis should not be rejected (i.e., measurement invariance) if the change in CFI is smaller than or equal to -0.01. This CFI cutoff was generated based on a simulation conducted under the conditions of perfect invariance in various levels. In a subsequent study, Meade, Johnson, and Braddy (2008) examined how different fit indices performed under simulated conditions of non-invariance and found that a 0.002 change in CFI is a generally acceptable cutoff for detecting measurement non-invariance. As noted above, these prior simulations treated the items as continuous and not order-categorical, and thus the exact change in CFI needed to indicate non-invariance in the current analyses is not known. Thus, in deciding whether two nested models were significantly different from one another, I relied primarily on the chi-square statistic and referenced CFI as needed.

3.4. Measurement Invariance Testing Results

3.4.1. Preliminary Single-Group CFA Models

Measurement invariance tests were conducted within a confirmatory factor analysis framework. I began by fitting single-group models to evaluate the degree to which the three-factor structure of the parent behavior inventory holds in European Americans and Asian Americans, respectively. Preliminary analyses indicated that the correlations of pairwise mother-father parenting items ranged from 0.110 to 0.596, with 7 pairwise correlations over 0.400; bivariate correlations of mother-father parenting factor were 0.306 (for mother and father psychological control), 0.468 (for mother and father parental knowledge), and 0.527 (for mother and father parental warmth). Given the substantial correlations among mother and father parenting items and factors, analyses were conducted separately for mother and father parenting to avoid potential problems with multicollinearity.

Tables 3.1 and 3.2 present model fit statistics of the single-group three-factor mother and father parenting models by ethnicity. Consistent with Flora and Curran's (2004) findings, the models using WLSMV yielded better model fit statistics than models using the MLR estimator, reflecting the order-categorical nature of the individual parenting items. The model fit statistics were superior in the European American group than in the Asian American group. To probe whether differences in sample size accounted for these differences in model fit statistics, I utilized SPSS to draw a random sample of European Americans with the same number of Asian Americans and evaluated model fit statistics.

Results indicated that, for models using the MLR estimator, model fit statistics were sensitive to sample size. As shown in Table 3.2, the smaller sample of European Americans produced worse model fit, whereas model fit statistics fell within the acceptable range only when the model was fitted in the full European American sample. In this case, the relatively poor model fit in the Asian American group may be at least partially due to differences in sample size.

Conversely, for models using the WLSMV estimator, reducing the sample size of the European American group did not worsen model fit. This suggests that models using the WLSMV estimator may be less sensitive to changes in sample size.

A close examination of the factor loadings of the single-group mother parenting models (see Table 3.3) indicate that item 4 of the Parent Behavior Inventory (“always tries to change how I feel or think about things”) did not load onto the psychological control factor in the Asian American group ($b = .253$, $SE = .181$, $p = .161$). In addition, the factor loading of this item was substantially smaller than other psychological control indicators in the European American group ($b = .504$, $SE = .069$, $p < .001$). Consequently, I estimated parallel models with item 4 removed (see Table 3.4). Results indicated that the overall model fit statistics were improved in the Asian American sample, whereas as model fit did not change much for the European American sample (see Table 3.1). In both groups, all remaining factor loadings significantly loaded on the respective parenting factor. Based on these observations, I removed item 4 in all subsequent tests of measurement invariance of mother parenting.

Similarly, I examined the factor loadings of the single-group father parenting models. All the factor loadings except items 34 and 41 were above 0.70 in the father parenting models (see Table 3.5). Item 34, which is the identical item to item 4 for mother parenting, yielded the lowest factor loading across all groups. Specifically, item 34 significantly loaded onto the psychological control factor in the full ($n = 242$) European American group ($b = .591$, $SE = .123$, $p < .001$), in the full ($n = 82$) Asian American group ($b = .412$, $SE = .131$, $p = .002$), but not significantly load onto the psychological control factor in the reduced random sample of European American group ($n = 82$; $b = .312$, $SE = .193$, $p = .106$; not shown in Table). Due to the relatively low factor loading, as well as consistency of parenting items across mother and father parenting models, I

decided to remove item 34 in all subsequent tests of measurement invariance of father parenting. Item 41, on the other hand, had factor loadings over 0.60 in both groups, and thus was kept for all subsequent analyses. Table 3.2 shows that the resulting model fit improved for Asian American sample, and did not change much for the European American sample. All the factor loadings in the revised single-group father parenting models are presented in Table 3.6.

In sum, I found evidence of configural invariance for parental warmth and knowledge, but not for parental psychological control. In other words, I found that the same set of items can be used to represent parental warmth and knowledge across ethnicity, whereas only a subset of items (after the elimination of item 4 or 34) can be used to represent parental psychological control across ethnicity. For mother psychological control, this conclusion was substantiated both by the non-significance factor loading of item 4, as well as the relatively small magnitude of the factor loading of this item. For father psychological control, this conclusion was only substantiated by the relatively small magnitude of the factor loading of item 34, as this factor loading did significantly load onto the father psychological control factor. Overall, I found that the item “always tries to change how I feel or think about things” was a good indicator of psychological control among European Americans but was a bad indicator of the same latent construct among Asian Americans. In other words, when a Asian American youth perceives that his/her parent always tries to change how he/she feels or thinks about things, he/she does not necessarily think that this means his/her parent is controlling him/her psychologically.

3.4.2. Multiple-Group Measurement Invariance Test within a CFA Framework: Mother Parenting Model

Results of nested model comparisons for measurement invariance testing of mother parenting are presented in Table 3.7. The configural invariance model without item 4 yielded

better model fit statistics than the one with all items (step 1), and was used as the baseline model for measurement invariance testing. Metric invariance (step 2) was established as constraining factor loadings across groups did not result in worsened model fit, as evidenced by a non-significant chi-square statistic and no change in CFI. This means that the associations between the latent factors and each individual item were identical across European American and Asian American youth. The final unstandardized factor loadings that were fixed across groups are presented in Table 3.8.

Scalar invariance (step 3), however, was not established as comparison with both the baseline configural model and the metric model yielded a significant chi-square statistic and a decrease of 0.001 in CFI (model 3a; even though this did meet the cutoff suggested by Cheung and Rensvold (2002) or by Meade, Johnson, and Braddy (2008), the CFI was worsened and so I did some follow-up probing tests for this model). Based on these model fit indices, I conducted a series of one-degree-of-freedom chi-square tests to identify the items that were non-invariant in the thresholds (Table 3.9). The two items that were found to be non-invariant at the threshold level include: “My mother makes me feel like the most important person in her life” ($\chi^2 = 5.422$, $df = 1$, $p = 0.0199$), and “My mother brings up my past mistakes when she criticizes me” ($\chi^2 = 6.631$, $df = 1$, $p = 0.0100$). The threshold of a third item, “How you spend your money?” (PBI23) was marginally significant based on the chi-square difference test ($\chi^2 = 3.473$, $df = 1$, $p = 0.0624$). To sum up, I found evidence of scalar non-invariance for mother parenting, which means that at the same level of the latent factor, the thresholds of the non-invariant individual items were different across ethnicity.

Two sets of partial scalar models were specified with one set freeing the threshold of the first two items across groups (model 3b), and another set freeing the threshold of all three items

across groups (model 3c). The reason for creating two sets of partial scalar invariance model is due to the fact that freeing the two non-invariant thresholds did not lead to a non-significant chi-square difference test statistic for the partial scalar model when compared to the metric invariant model (model 3b vs. model 2; $\chi^2 = 29.196$, $df = 17$, $p = 0.0328$). Based on change in CFI, however, freeing a third threshold did not further change model fit. Moreover, the chi-square difference test statistic did become non-significant when this partial scalar model was compared to the baseline configural model (model 3b vs. model 1). Taken together, I selected model 3b, the model with two freed thresholds, as the model with which the final measurement invariance tests would be built on. As a comparison, I also conducted a parallel set of analyses with model 3c, the model with three freed thresholds, as the intermediate model for additional measurement invariance tests. The unstandardized thresholds for model 3b and 3c are presented in Tables 3.10 and 3.11, respectively.

Next, I tested invariant factor variances (step 4) and scale factors (step 5) based on the two sets of partial scalar models. Invariant factor variances were not found based on the comparison with model 3c (model 4a vs. model 3c; $\chi^2 = 8.509$, $df = 3$, $p = 0.0366$). Conversely, invariant factor variances were found based on the comparison with model 3b (model 4 vs. model 3b; $\chi^2 = 7.009$, $df = 3$, $p = 0.0716$). Consistent across both sets of models, scale factors were found to be invariant across groups. For the sake of completeness, I conducted and footnoted the model fit statistics for parallel models in the switched order, that is, to test invariant scale factors as step 4 and invariant factor variances as step 5. The consistent message was that none of these tests yielded a significant chi-square difference test statistic. As such, the factor variances and scale factors were likely to be invariant across ethnic groups. The establishment of invariant factor variances means that the range of responses to indicators representing the latent

factor was similar across European American and Asian American youth. The establishment of invariant scale factors likely reflected invariant residual variances (Muthén & Asparouhov, 2002), which means that individual items had the same quality as measures of the latent factor across European American and Asian American youth.

In both sets of models, covariances were found to be invariant across groups (step 6), which means that the associations among the three parenting latent factors were equivalent across European American and Asian American youth. Conversely, factor means were found to be non-invariant across groups (step 7) regardless of which partial scalar invariance model was chosen earlier. This means that the mean level of each parenting latent construct was different across European American and Asian American youth. A series of one-degree-of-freedom chi-square tests were conducted to identify the non-invariant parameters across groups and the results are presented in Table 3.12. Factor means were non-invariant for the mother warmth and knowledge factors, whereas factor mean was invariant for mother psychological control in the final model.

3.4.3. Multiple-Group Measurement Invariance Test within a CFA Framework: Father Parenting Model

Results of nested model comparisons for measurement invariance testing of father parenting are presented in Table 3.13. The configural invariance model without item 34 yielded better model fit statistics than the one with all items (step 1), and was used as the baseline model for measurement invariance testing. Metric invariance (step 2) was established as constraining factor loadings across groups did not result in worsened model fit, as evidenced by a non-significant chi-square statistic and no change in CFI. In other words, the associations between the latent factor and each item were identical across European American and Asian American youth.

The final unstandardized factor loadings that were fixed across groups are presented in Table 3.14. Scalar invariance (step 3) was also established as comparison with both the baseline configural model and the metric model yielded a non-significant chi-square statistic and no change in CFI. In other words, at the same level of the latent factor, the thresholds of the individual items were similar across European American and Asian American youth.

Using the scalar model (model 3) as the comparison model, I proceeded to test for invariant factor variances (step 4) and invariant scale factors (step 5). Invariant factor variances were found as evidenced by the non-significant chi-square difference test statistic. This means that the range of responses to indicators representing the latent factor was equivalent across European American and Asian American youth. Conversely, invariant scale factors were not found as indicated by the significant chi-square difference test statistic (model 5a vs. model 4; $\chi^2 = 36.928$, $df = 22$, $p = 0.0241$). This reflected that the residual variances of these scales were likely to be non-invariant (Muthén & Asparouhov, 2002), which means that individual items did not have the same quality as measures of the latent factor across European American and Asian American youth.

These findings held when I switched the order of the above two tests (see footnotes of Table 3.13). A series of one-degree-of-freedom chi-square tests were conducted to identify the non-invariant scale factors across groups and the results are presented in Table 3.16. Four scale factors were found to be non-invariant with “My father makes me feel like the most important person in his life.” yielding the largest chi-square statistic ($\chi^2 = 19.794$, $df = 1$, $p = 0.0000$). Accordingly, I specified a partial invariant scale factors model (model 5b) by freeing this scale factor across groups and obtained a non-significant chi-square difference test statistic. The resulting scale factor coefficient in the Asian American group was 1.249, with a standard error of

0.086, $p = 0.000$. This means that the degree to which these items were quality measure of the latent parenting construct differed by ethnicity.

Finally, I proceeded to test invariant factor covariances (step 6) and factor means (step 7) in the father parenting model. Results indicated that the factor covariances were invariant across groups, meaning that the associations between the three parenting latent factors were equivalent across European American and Asian American youth. Conversely, the invariant factor means were non-invariant across groups (model 7 vs. model 6; $\chi^2 = 24.150$, $df = 3$, $p = 0.0000$), meaning that the mean level of each parenting latent construct differed across European American and Asian American youth. I conducted a series of one-degree-of-freedom chi-square tests to identify the non-invariant factor means across groups (Table 3.17). All three factor means were found to be non-invariant across the two ethnic groups.

Chapter 4. Direct Effect of Parenting on Substance Use Outcomes Moderated by Ethnicity

The current analyses focused on testing cross-cultural moderated effects of parenting constructs on the mediators and substance use outcomes. Based on my research questions, I fitted two sets of models which correspond to my second and third aims, respectively. Given the complexity of these models, all variables were treated as observed rather than latent variables. Such a decision enabled me to estimate other critical parts of the models, including imputation of missing data, modeling alcohol problems using negative binomial models, and moderated mediation analyses. These analyses were conducted in Mplus 7.2 (Muthén & Muthén, 1998-2014). This chapter focuses on the first set of analyses.

In this set of analyses, I tested whether ethnicity moderated the direct effects of parenting on five substance use outcomes, including alcohol use and problems at grade 9, as well as alcohol problems, CDISC alcohol and marijuana dependence at grade 12 . Analyses were conducted separately for mothers and fathers, yielding a total of 10 different models. To test moderation, I created three parenting by ethnicity interaction terms after specifying grand mean centering of each parenting construct in Mplus to facilitate interpretation of results. In all initial analyses, ethnicity was coded as European = 0 and Asian = 1. If the interaction was significant, then the regression coefficient of parenting on the outcome variable in the initial model would be the regression coefficient for European Americans. To probe the significant interaction, I created an alternative ethnicity variable coded as Asian = 0 and European = 1. The regression coefficient in this alternative model would provide the regression coefficient of parenting effect on the outcome variable for Asian Americans.

For these analyses, I first began with a full model in which I included all covariates (age, gender, and parent substance use) and baseline measure of the outcome variable, along with

ethnicity, three parenting predictors, as well as their interaction terms. I then fitted a trimmed model in which I dropped non-significant ($p > 0.05$) covariates and interaction terms. Finally, I also tested potential suppression effects by testing the effects of each parenting construct one at a time (MacKinnon, Krull, & Lockwood, 2000). I took into account all these results in my final interpretation of findings.

I utilized different modeling techniques to model the distributions of the outcomes in the analyses. Alcohol use was measured as ever using alcohol or not and thus was modeled as a binary outcome. CDISC alcohol and marijuana dependence were three-category variables and were modeled using ordered logistic regressions. Alcohol problems were measured and coded as a count variable such that these variables could be modeled using techniques that take into account the non-normality of the data. As the first step in my analyses, I conducted a series of models using a range of methods including ordinal least square, count, and zero-inflated models and evaluated the appropriateness of each of these methods. I took into account model fit statistics and practical considerations (e.g., difficulty in model estimation) while selecting the modeling technique for the alcohol problem models.

4.1. Comparison of Count and Zero-Inflated Models for Alcohol Problems

Two parallel sets of models were estimated to identify an appropriate count or zero-inflated model for the analyses of alcohol problems at grades 9 and 12. The predictors of these models can be arbitrarily chosen because the purpose was to model the outcome variables of interest. I decided to include age as the sole predictor in the first model, and then replicated the pattern of results using academic achievement and externalizing problems as the predictors. For these analyses, the baseline regression models were first estimated using ordinal least square. Then, I conducted a series of identical regressions using poisson, negative binomial, zero-

inflated poisson, zero-inflated negative binomial, and hurdle negative binomial, which are more appropriate for non-normal data (Atkins & Gallop, 2007; *Atkins, Baldwin, Zheng, Gallop, & Neighbors, 2013*). Loglikelihood (less negative is better), AIC (lower is better) and BIC (lower is better) values were used to select an appropriate count or zero-inflated model for subsequent analyses of alcohol problems. The resulting model fit statistics are reported in Table 4.1.

The overall pattern of results shows that ordinal least square and poisson performed worse than the other models (more negative loglikelihood and higher AIC and BIC), whereas negative binomial provided the best fit to the data. In addition, negative binomial, zero-inflated negative binomial, and hurdle negative binomial yielded similar model fit statistics indicating that they performed almost equivalently well in all models. Of note, issues with model estimation, including singularity of information matrix and reaching a saddle point, were found while running the zero-inflated and hurdle negative binomial models. To avoid similar issues in subsequent analyses, I decided to use negative binomial (which had the lowest BIC) to model alcohol problems at grades 9 and 12.

4.2. Direct Effects of Mother Parenting on Grade 9 Alcohol Use

Mother drinking was a significant covariate and was positively associated with alcohol use in both the full and trimmed models. No significant parenting by ethnicity interaction effect was found. In the trimmed model, there was a trending effect of mother psychological control being a risk factor for alcohol use. While this main effect was not replicated in both the full and initial suppression effects models, mother psychological control was a significant risk factor for alcohol use ($b = 0.531$, $SE = 0.250$, $p = 0.034$) after the mother psychological control x ethnicity interaction term was removed from the mother psychological control suppression effect model.

4.3. Direct Effects of Mother Parenting on Grade 9 Alcohol Problems

The mother knowledge x ethnicity interaction was significant in the full and trimmed model, and was trending in the suppression effects model (trimmed model: $b = 1.842$, $SE = 0.895$, $p = 0.040$; suppression effect model: $b = 1.635$, $SE = 0.871$, $p = 0.060$). I probed both the trimmed model and the mother knowledge suppression effect model and found that mother knowledge was protective against alcohol problems at grade 9 among European Americans but not among Asian Americans. In the trimmed model, mother knowledge had a trending protective effect on grade 9 alcohol problems among European Americans ($b = -1.096$, $SE = 0.603$, $p = 0.069$), but this protective effect was non-significant among Asian Americans ($b = 0.746$, $SE = 0.794$, $p = 0.348$). In the suppression effect model, mother knowledge was protective against alcohol problems at grade 9 among European Americans ($b = -1.272$, $SE = 0.503$, $p = 0.012$), but this protective effect was non-significant among Asian Americans ($b = 0.363$, $SE = 0.710$, $p = 0.609$). The overall pattern of results suggests the presence of an interaction between mother knowledge and ethnicity on alcohol problems at grade 9.

There was also a main effect in which mother psychological control was associated with more alcohol problems. This effect was trending in the full model ($b = 0.639$, $SE = 0.342$, $p = 0.061$), and was significant in the trimmed model ($b = 0.835$, $SE = 0.333$, $p = 0.012$) and the mother psychological control suppression effect model ($b = 0.702$, $SE = 0.332$, $p = 0.034$), as well as the revised suppression effect model ($b = 0.898$, $SE = 0.355$, $p = 0.011$) in which the non-significant mother psychological control x ethnicity interaction term was removed.

4.4. Direct Effects of Mother Parenting on Grade 12 Alcohol Problems

Mother warmth was protective against grade 12 alcohol problems in the full model, but this effect was not replicated in the trimmed model, and was trending in the mother warmth

suppression effect model. I also conducted a revised suppression effect model and found that mother warmth was not a significant predictor of grade 12 alcohol problems ($b = -0.388$, $SE = 0.295$, $p = 0.188$). Overall, there was no significant main or interaction effect predicting grade 12 alcohol problems.

4.5. Direct Effects of Mother Parenting on Grade 12 CDISC Alcohol Dependence

Ethnicity was a significant covariate in the full and trimmed models in which Asian Americans were less likely to have a diagnosis of alcohol dependence than European Americans. I probed the trending interaction in the mother warmth suppression effect model ($b = 1.530$, $SE = 0.812$, $p = 0.059$). Mother warmth was protective against alcohol dependence among European Americans ($b = -0.848$, $SE = 0.345$, $p = 0.014$) and was not associated with alcohol dependence among Asian Americans ($b = 0.682$, $SE = 0.736$, $p = 0.354$). No other main or interaction effect was significant.

4.6. Direct Effects of Mother Parenting on Grade 12 CDISC Marijuana Dependence

Consistent across the full, trimmed, and suppression effects models, ethnicity did not moderate the associations of parenting constructs and marijuana dependence. There were no main effects of parenting on alcohol use as well. Several covariates, including gender, parent drug problem, and baseline marijuana use, significantly predicted marijuana dependence. Specifically, females were less likely than males to have a diagnosis of marijuana dependence, whereas parent drug problems and baseline marijuana use both predicted marijuana dependence at grade 12.

4.7. Direct Effect of Father Parenting on Grade 9 Alcohol Use

There was a significant protective main effect of father knowledge on grade 7 alcohol use ($b = -0.657$, $SE = 0.331$, $p = 0.047$) in the trimmed model. However, this effect was trending in

the full model ($b = -0.629$, $SE = 0.358$, $p = 0.079$) and was non-significant in both the initial suppression effects model ($b = -0.350$, $SE = 0.252$, $p = 0.165$), as well as a revised suppression effect model without the interaction term ($b = -0.380$, $SE = 0.239$, $p = 0.112$). Given the inconsistency across models and the lack of statistical significance in the suppression effect models, I judged this effect to be a spurious main effect and did not interpret this finding.

4.8. Direct Effect of Father Parenting on Grade 9 Alcohol Problems

Father drinking problems was a significant covariate in the full model, which was associated with more alcohol problems at grade 9. Ethnicity was also a significant covariate in the full model, in which Asian Americans were less likely than European Americans to report more alcohol problems at grade 9. Father drinking problems, baseline alcohol problems, and ethnicity were all retained in the trimmed model.

Father warmth and psychological control were non-significant in the full model. Father warmth was trending in the trimmed model ($b = 0.963$, $SE = 0.571$, $p = 0.092$), and was significant in the initial father warmth suppression effect model ($b = 0.778$, $SE = 0.394$, $p = 0.048$). However, this main effect became non-significant once the warmth x ethnicity was removed from the suppression effect model ($b = 0.122$, $SE = 0.531$, $p = 0.818$), thereby suggesting that this finding was spurious. Similarly, father psychological control was trending in the initial father psychological control suppression effect model ($b = -0.760$, $SE = 0.397$, $p = 0.055$). However, this main effect became non-significant once the psychological control x ethnicity was removed from the suppression effect model ($b = 0.077$, $SE = 0.539$, $p = 0.886$). Based on this overall pattern of results, I judged the main effects of father warmth and father psychological control to be non-significant.

The interaction between father knowledge and ethnicity was trending in the full model ($b = -1.249$, $SE = 0.653$, $p = 0.056$), but this interaction was non-significant in the father knowledge suppression effect model ($b = -1.072$, $SE = 0.708$, $p = 0.130$). In contrast, the main effect of father knowledge was significant in both the trimmed model ($b = -1.142$, $SE = 0.343$, $p = 0.001$) and the revised father knowledge suppression effect model ($b = -0.896$, $SE = 0.370$, $p = 0.015$).

4.9. Direct Effect of Father Parenting on Grade 12 Alcohol Problems

Age, gender, and father drinking problems were significant covariates in the full model and were included in the trimmed and suppression effects models. No significant parenting by ethnicity interaction was found. Father knowledge was not significant in the initial suppression effect and full models, but it was protective against alcohol problems at grade 12 in the trimmed model ($b = -0.640$, $SE = 0.279$, $p = 0.022$) and in the revised father knowledge suppression effect model ($b = -0.572$, $SE = 0.252$, $p = 0.023$). I judged this main effect to be significant and interpretable.

4.10. Direct Effect of Father Parenting on Grade 12 CDISC Alcohol Dependence

Gender was a significant covariate in the full model and was included in both the trimmed and suppression effects models. All three parenting by ethnicity interactions were significant in the full model but became non-significant in the suppression effects models. I examined the estimated full model and found substantial correlations among the three parenting by ethnicity interaction terms. Specifically, the correlation between father warmth x ethnicity and father psychological control x ethnicity was -0.680 . The correlation between father warmth x ethnicity and father knowledge x ethnicity was 0.638 . The correlation between father psychological control x ethnicity and father knowledge x ethnicity was -0.547 . The significant

interactions in the full model might be due to multicollinearity and I judged them to be uninterpretable.

I then estimated the trimmed model without all three parenting x ethnicity interactions. Father knowledge was protective against CDISC alcohol dependence in the trimmed model ($b = -0.707$, $SE = 0.320$, $p = 0.027$). Similarly, in the suppression effect model, the main effect of father knowledge was significant after the removal of the father knowledge x ethnicity interaction term such that it was protective against CDISC alcohol dependence ($b = -0.581$, $SE = 0.247$, $p = 0.019$).

4.11. Direct Effect of Father Parenting on Grade 12 CDISC Marijuana Dependence

Gender, parent drug problems, as well as baseline marijuana use were significant covariates of the marijuana dependence at grade 12 and were retained in the trimmed and suppression effects models. Consistent across all models, none of the parenting x ethnicity interaction and parenting main effects was significant. Moreover, removal of the parenting x ethnicity interaction terms did not change the results in the suppression effects models.

4.12. Summary of Direct Effects of Mother Parenting on Substance Use Outcomes

Mother psychological control was a risk factor for alcohol use and problems in grade 9 among both European Americans and Asian Americans. Mother knowledge was a trending protective factor of grade 9 alcohol problems among European Americans only. There was a trending effect in which mother warmth was protective factor of alcohol dependence in grade 12 among European Americans only.

4.13. Summary of Direct Effects of Father Parenting on Substance Use Outcomes

Father knowledge had a significant main, protective effect on three substance use outcomes, including alcohol problems in grade 9, alcohol problems in grade 12, and alcohol dependence in grade 12.

Chapter 5. Path Analysis Testing Moderated Mediation Effect by Ethnicity

In the second set of analyses, I tested whether ethnicity moderated the mediational pathways from parenting at grade 7 to the five substance use outcomes at grades 9 and 12 through academic achievement and externalizing problems at grade 8. Different from the effects of parenting, little empirical evidence suggests potential cross-cultural moderation of the effects of academic achievement and externalizing problems on substance use outcomes. Based on this theoretical consideration, I decided to focus on testing cross-cultural moderation of the a' but not the b' paths (i.e., ethnicity moderating the paths from parenting to mediators, but not the paths from mediators to substance use outcomes). Edwards and Lambert (2007) referred to this kind of moderated mediation as “first-stage moderated model”.

Similar to the first set of analyses, I included covariates (age, gender, and parent substance use), baseline measure of the outcome variable, ethnicity, three parenting predictors, three interaction terms, as well as the mediators in the full model. This conceptual model (excluding the covariates and baseline measure of the outcome variable) is presented in Figure 1. However, given the complexity of the models, I began my analyses of the a' paths for potential suppression effects before fitting the full models. Specifically, I probed whether each parenting construct and its interaction with ethnicity would be significantly linked to academic achievement and externalizing problems at grade 8, and then compared the results with a final model with all three parenting and their interactions with ethnicity simultaneously included in the same model.

After testing potential suppression effects, I examined the full models and then trimmed these models by removing non-significant ($p > 0.05$) covariates and interactions. If the pattern of results appeared to be consistent across the full and trimmed models, I would use the results from

the trimmed model as the final model. However, if the pattern of results appeared to be inconsistent across the two models, I would further specify a revised trimmed model. I took into account all these results in my final interpretation of findings.

Tests of moderated mediation were guided by theoretical and practical recommendations made by Preacher, Rucker, and Hayes (2007). Specifically, I expanded upon the basic single-predictor and single-mediator model to include three predictors and two mediators. One deviation from their approach is that I abandoned the use of “model constraint” to create bias-corrected confidence intervals of the moderated mediation effects, given that this approach was not compatible with the use of multiple imputation in Mplus. Instead, I tested moderated mediation effects using the online version of the RMediation package (MacKinnon, Fritz, Williams, & Lockwood, 2007; Tofighi & MacKinnon, 2011), which then allowed me to do multiple imputation in Mplus to handle missing data.

According to MacKinnon, Lockwood, Hoffman, West, and Sheets (2002), the product of coefficients approach provides the best balance of Type I error and statistical power relative to the casual steps and difference in coefficients approaches. Moreover, confidence limits for the indirect effect obtained through either the distribution of the product or resampling methods tend to be more balanced than confidence limits generated by comparing the z statistic of the indirect effect against a critical value from the standard normal distribution (MacKinnon, Lockwood, & Williams, 2004). In the current analyses, I calculated the estimate and the 95% confidence intervals for the mediated effects by entering the regression coefficient estimates, their standard errors, the correlation between the regression coefficient estimates. The significance level for the confidence interval was set to 0.05. Mediated effects were calculated separately for European and Asian Americans.

Given the complexity of the indirect effect models, I first tested whether there were suppression effects before testing the full and trimmed models. As the hypothesized cross-cultural moderation concerns the a path of the mediation model, tests of suppression effects focused on the effects of parenting x ethnicity on the two putative mediators: academic achievement and externalizing problems. Specifically, I included all the covariates in the suppression effects models and estimated whether entered each parenting construct and its interaction term one at a time before estimating the full model.

After the examination of suppression effects, I fitted the full and trimmed indirect effect models and tested for moderated mediation effects. Specifically, all paths were estimated in the full model, and non-significant covariates (i.e., age, gender, parent substance use), as well as interaction terms were excluded in the trimmed model. Whenever necessary, I would fit a revised trimmed model to determine whether certain paths were significant or not. Test of mediation would be conducted when the path model indicated significant a and b paths simultaneously.

5.1. Testing Suppression Effects of Mother Parenting on Academic Achievement

The main effects of mother warmth and mother knowledge on grade 8 academic achievement approached significance in the initial suppression effects models. However, these parenting main effects became non-significant after the removal of the corresponding parenting x ethnicity interaction. The main and interaction effects of mother psychological control were trending in the full model but these effects were not significant in the psychological control suppression effect model.

5.2. Testing Suppression Effects of Mother Parenting on Externalizing Problems

The main and interaction effects of mother warmth and psychological control on grade 8 externalizing problems were non-significant in both the suppression effects model and the full

model. Conversely, the interaction effects of mother knowledge were significant in both the suppression effect model ($b = 2.879$, $SE = 1.156$, $p = 0.013$) and the full model ($b = 3.399$, $SE = 1.407$, $p = 0.016$). I probed the mother knowledge by ethnicity interaction in both models. In the suppression effect model, mother knowledge was protective against externalizing problems among European Americans ($b = -2.461$, $SE = 0.831$, $p = 0.003$) but was not associated with externalizing problems among Asian Americans ($b = 0.418$, $SE = 0.869$, $p = 0.630$). In the full model, mother knowledge was protective against externalizing problems among European Americans ($b = -3.161$, $SE = 1.130$, $p = 0.005$) but was not associated with externalizing problems among Asian Americans ($b = 0.238$, $SE = 0.957$, $p = 0.803$).

5.3. Testing Suppression Effects of Father Parenting on Academic Achievement

The main and interaction effects of father psychological control on grade 8 academic achievement were non-significant in both the suppression effect and full models. There was a trending main effect of father knowledge in the suppression effect model ($b = 0.201$, $SE = 0.106$, $p = 0.059$), but this trend became non-significant in the full model ($b = -0.058$, $SE = 0.133$, $p = 0.663$). The father knowledge x ethnicity interaction was non-significant in both the suppression effect model ($b = -0.071$, $SE = 0.162$, $p = 0.661$) and the full model ($b = 0.228$, $SE = 0.193$, $p = 0.236$).

The main and interaction effects of father warmth on grade 8 academic achievement were significant in both the suppression effect model ($b = -0.403$, $SE = 0.182$, $p = 0.027$) and the full model ($b = -0.569$, $SE = 0.273$, $p = 0.037$). In the suppression effect model, father warmth was associated with higher levels of academic achievement among European Americans ($b = 0.451$, $SE = 0.121$, $p = 0.000$) but was not associated with academic achievement among Asian Americans ($b = 0.047$, $SE = 0.135$, $p = 0.726$). In the full model, father warmth was associated

with higher levels of academic achievement among European Americans ($b = 0.632$, $SE = 0.199$, $p = 0.002$) but was not associated with academic achievement among Asian Americans ($b = 0.063$, $SE = 0.198$, $p = 0.751$).

5.4. Testing Suppression Effects of Father Parenting on Grade 8 Externalizing Problems

None of the father parenting main and interaction effects on grade 8 externalizing problems was significant in the full model. In the suppression effects models, the father warmth x ethnicity interaction ($b = 2.235$, $SE = 0.872$, $p = 0.010$) and the father psychological control x ethnicity ($b = -2.470$, $SE = 0.973$, $p = 0.011$) were both significant. There was also a trending main effect of father knowledge on externalizing problems in the initial suppression effect model ($b = -1.013$, $SE = 0.537$, $p = 0.059$), but this main effect became non-significant after the removal of the father knowledge x ethnicity interaction term ($b = -0.688$, $SE = 0.421$, $p = 0.122$).

I probed the significant father parenting x ethnicity interactions in the suppression effect models. First, father warmth was protective against externalizing problems among European Americans ($b = -1.271$, $SE = 0.578$, $p = 0.028$) but was not associated with externalizing problems among Asian Americans ($b = 0.964$, $SE = 0.678$, $p = 0.156$). Second, there was a trend in which father psychological control was a risk factor for externalizing problems among European Americans ($b = 1.198$, $SE = 0.695$, $p = 0.085$). Conversely, there was a trend in which father psychological control was protective against externalizing problems among Asian Americans ($b = -1.272$, $SE = 0.722$, $p = 0.078$).

5.5. Indirect Effect of Mother Parenting on Grade 9 Alcohol Use

Results were consistent across the full and trimmed models. In the trimmed model, baseline academic achievement predicted academic achievement at grade 8 ($b = 0.546$, $SE = 0.086$, $p = 0.000$). Likewise, baseline externalizing problems predicted externalizing problems at

grade 8 ($b = 0.780$, $SE = 0.067$, $p = 0.000$). Mother drinking was a significant covariate predicting grade 9 alcohol use ($b = 0.902$, $SE = 0.383$, $p = 0.019$).

Consistent with the suppression effect model (Table 5.2), the mother knowledge x ethnicity interaction on externalizing problems was significant in both the full ($b = 3.448$, $SE = 1.391$, $p = 0.013$) and trimmed ($b = 2.975$, $SE = 1.166$, $p = 0.011$) models. However, the corresponding b path from grade 8 externalizing problems to grade 9 alcohol use was non-significant. In sum, there was no evidence for any mediation or moderated mediation effect.

5.6. Indirect Effect of Mother Parenting on Grade 9 Alcohol Problems

Results were largely consistent across the full and trimmed models. Similar to the previous model, baseline academic achievement predicted grade 8 academic achievement, whereas baseline externalizing problems predicted grade 8 externalizing problems. A revised trimmed model was estimated because there were multiple significant direct effects on alcohol problems at grade 9 in the trimmed model. This was done to ensure that the significant effects were not spurious findings due to other variables in the model. In deciding what variables to include in the revised trimmed model, I reference the corresponding direct effect models in Table 4.3.

Consistent with the suppression effect model (Table 5.2), the interaction effect of mother knowledge and ethnicity on grade 8 externalizing problems was significant in the full and trimmed models. Multiple direct effects on grade 9 alcohol problems were significant in the trimmed model. First, the two mediators, academic achievement and externalizing problems at grade 8, were both significant predictors of alcohol problems at grade 9. Second, ethnicity was a significant predictor of grade 9 alcohol problems such that Asian Americans were less likely to report alcohol problems than European Americans. Third, consistent with the direct effect

models (Table 4.3), mother psychological control was a significant risk factor for alcohol problems and this effect was not conditioned by ethnicity. Fourth, the mother knowledge x ethnicity interaction was significant in both the full and trimmed models. This was also consistent with the direct effect models (Table 4.3).

In contrast, the main effect of mother warmth and the mother warmth x ethnicity interaction were both significant in the trimmed model. However, these effects were not significant in the direct effect models (Table 4.3). To ensure that these variables along with the effect of grade 8 academic achievement did not create spurious findings in the trimmed model, I estimated a revised trimmed model with the following predictors: baseline alcohol problems, grade 8 externalizing problems, ethnicity, mother psychological control, mother knowledge, and mother knowledge x ethnicity. This revised trimmed similarly replicated the significant effect of grade 8 externalizing problems on grade 9 alcohol problems ($b = 0.107$, $SE = 0.032$, $p = 0.001$), suggesting that this effect was not a spurious finding due to other variables (e.g., grade 8 academic achievement, mother warmth, and mother warmth x ethnicity) in the model. Taken together, the pattern of results indicated a possible moderated mediation effect. Results of the moderated mediation significance tests are presented in Section 5.15 and in Table 5.17.

5.7. Indirect Effect of Mother Parenting on Grade 12 Alcohol Problems

Results were largely consistent across the full and trimmed models. Consistent with the previous models, baseline academic achievement predicted grade 8 academic achievement, and baseline externalizing problems predicted grade 8 externalizing problems. Mother drinking problems was a significant covariate predicting grade 12 alcohol problems in both the full model ($b = 1.096$, $SE = 0.514$, $p = 0.033$) and the trimmed model ($b = 0.965$, $SE = 0.456$, $p = 0.034$).

Consistent with the suppression effect model (Table 5.2), the interaction effect of mother knowledge and ethnicity on grade 8 externalizing problems was significant in the full and trimmed models. In addition, grade 8 externalizing problems consistently predicted more alcohol problems in both the full model ($b = 0.066$, $SE = 0.025$, $p = 0.009$) and the trimmed model ($b = 0.072$, $SE = 0.024$, $p = 0.003$), indicating the presence of a moderated mediation effect. Results of the moderated mediation significance tests are presented in Section 5.15 and in Table 5.17.

5.8. Indirect Effect of Mother Parenting on Grade 12 CDISC Alcohol Dependence

Consistent with the previous models, baseline academic achievement predicted grade 8 academic achievement, and baseline externalizing problems predicted grade 8 externalizing problems. The interaction effect between mother knowledge and ethnicity on grade 8 externalizing problems remained to be significant in both the full and the trimmed models. Ethnicity was a significant covariate such that Asian Americans were less likely to report alcohol problems than European Americans in both the full ($b = -0.891$, $SE = 0.422$, $p = 0.035$) and trimmed ($b = -0.810$, $SE = 0.381$, $p = 0.033$) models. Grade 8 academic achievement was protective against grade 12 alcohol dependence in both the full ($b = -0.482$, $SE = 0.204$, $p = 0.018$) and trimmed ($b = -0.480$, $SE = 0.198$, $p = 0.015$) models. However, grade 8 externalizing problems was not associated with grade 12 alcohol dependence (full model: $b = 0.038$, $SE = 0.025$, $p = 0.124$; trimmed model: $b = 0.034$, $SE = 0.025$, $p = 0.178$). Taken together, there was no evidence of any significant moderated mediation effect.

I also estimated a revised trimmed model because the mother warmth x ethnicity interaction became trending in the trimmed model. None of the estimated paths changed significantly in the revised trimmed model, suggesting that these effects were robust findings.

5.9. Indirect Effect of Mother Parenting on Grade 12 CDISC Marijuana Dependence

Consistent with the previous models, baseline academic achievement predicted grade 8 academic achievement, and baseline externalizing problems predicted grade 8 externalizing problems. The mother knowledge x ethnicity interaction was significant in both the full and trimmed models. Multiple covariates, including gender, parent drug problems, and baseline marijuana use, were significant predictors of grade 12 marijuana dependence. There was also a trend in which Asian Americans were less likely to have more alcohol problems than European Americans. Finally, similar to model 5.8, grade 8 academic achievement (full model: $b = -0.366$, $SE = 0.186$, $p = 0.049$; trimmed model: $b = -0.370$, $SE = 0.188$, $p = 0.048$) but not grade 8 externalizing problems (full model: $b = 0.026$, $SE = 0.028$, $p = 0.355$; trimmed model: $b = 0.023$, $SE = 0.027$, $p = 0.387$) was protective against grade 12 marijuana dependence, suggesting that there was no significant moderated mediation effect.

5.10. Indirect Effect of Father Parenting on Grade 9 Alcohol Use

In both the full and trimmed models, baseline academic achievement and baseline externalizing problems significantly predicted grade 8 academic achievement and grade 8 externalizing problems, respectively. Consistent with the suppression effect model (Table 5.3), the father warmth x ethnicity interaction was significant in both the full ($b = -0.576$, $SE = 0.274$, $p = 0.036$) and trimmed ($b = -0.404$, $SE = 0.182$, $p = 0.026$) models.

In the full model, baseline alcohol use predicted grade 9 alcohol use ($b = 0.981$, $SE = 0.493$, $p = 0.047$). This effect became trending in the trimmed model ($b = 0.950$, $SE = 0.495$, $p = 0.055$). The effect of grade 8 externalizing problems on grade 9 alcohol use was also trending in both the full ($b = 0.043$, $SE = 0.024$, $p = 0.076$) and trimmed ($b = 0.039$, $SE = 0.024$, $p = 0.097$)

models. Grade 8 academic achievement was not associated with grade 9 alcohol use. Overall, there was no evidence of significant moderated mediation effect.

5.11. Indirect Effect of Father Parenting on Grade 9 Alcohol Problems

Similar to the previous model (Table 5.10), baseline academic achievement and baseline externalizing problems respectively predicted grade 8 academic achievement and grade 8 externalizing problems. The interaction between father warmth and ethnicity was significant in the full model ($b = -0.579$, $SE = 0.272$, $p = 0.034$), and in the trimmed models ($b = -0.404$, $SE = 0.182$, $p = 0.026$). There was also a trend in the trimmed models in which father psychological control was associated with higher academic achievement at grade 8 ($b = 0.216$, $SE = 0.125$, $p = 0.085$).

In the full model, father drinking problems was a significant predictor of grade 9 alcohol problems ($b = 1.163$, $SE = 0.587$, $p = 0.048$). This effect became non-significant in the trimmed model ($b = 0.588$, $SE = 0.525$, $p = 0.263$) and was removed in the revised trimmed model. Consistent across the full and trimmed models, ethnicity was a significant covariate predicting grade 9 alcohol problems such that Asian Americans were less likely than European Americans to report alcohol problems. Conversely, father knowledge was a consistent protective factor against grade 9 alcohol problems.

Greater academic achievement at grade 8 was associated with lower levels of alcohol problems at grade 9 in the full model ($b = -0.628$, $SE = 0.294$, $p = 0.033$). This effect became trending in the trimmed model ($b = -0.507$, $SE = 0.271$, $p = 0.061$). Based on the results of the trimmed model, I estimated a revised trimmed model in which I only retained baseline alcohol problems and other significant or trending predictors. Results indicated that greater academic achievement was significantly associated with lower levels of alcohol problems at grade 9 in the

revised trimmed model ($b = -1.446$, $SE = 0.470$, $p = 0.002$). The overall pattern of results suggested the possible presence of a moderated mediation effect. Results of the moderated mediation significance tests are presented in Section 5.15 and in Table 5.17.

5.12. Indirect Effect of Father Parenting on Grade 12 Alcohol Problems

Similar to previous models, academic achievement and externalizing problems at baseline respectively predicted academic achievement and externalizing problems at grade 8. The father warmth x ethnicity interaction was significant in both the full and trimmed models. There was also a trending effect of father psychological control on grade 8 academic achievement in the trimmed model ($b = 0.216$, $SE = 0.125$, $p = 0.085$). No other predictor was associated with the two mediators at grade 8.

In the full model, age was a significant covariate predicting fewer alcohol problems ($b = -0.827$, $SE = 0.362$, $p = 0.022$) and thus was included in the trimmed models. Age became a trending covariate in the trimmed models. In the full model, the effects of academic achievement and externalizing problems at grade 8 approached significance in predicting grade 12 alcohol problems (academic achievement: $b = -0.346$, $SE = 0.180$, $p = 0.055$; externalizing problems: $b = 0.052$, $SE = 0.027$, $p = 0.054$). These effects became significant in the trimmed model (academic achievement: $b = -0.388$, $SE = 0.178$, $p = 0.029$; externalizing problems: $b = 0.055$, $SE = 0.024$, $p = 0.025$). The effect of grade 8 academic achievement on grade 12 alcohol problems was relevant to the b path of the moderated mediation effect. To ensure that this effect was not a spurious finding, I fitted a revised trimmed model with the following predictors: age, baseline alcohol problems, and grade 8 academic achievement. The significant effect of grade 8 academic achievement on grade 12 alcohol problems was replicated in the revised trimmed model ($b = -0.464$, $SE = 0.157$, $p = 0.003$). The overall pattern of results suggested the likely presence of a

moderated mediation effect. Results of the moderated mediation significance tests are presented in Section 5.15 and in Table 5.17.

5.13. Indirect Effect of Father Parenting on Grade 12 CDISC Alcohol Dependence

Similar to previous models, the interaction between father warmth and ethnicity significantly predicted grade 8 academic achievement in both the full ($b = -0.579$, $SE = 0.272$, $p = 0.034$) and trimmed ($b = -0.404$, $SE = 0.182$, $p = 0.026$) models, even after controlling for the significant effect of baseline academic achievement. None of the parenting and parenting by ethnicity effects were significant predictors of grade 8 externalizing problems; only baseline externalizing problems significantly predicted grade 8 externalizing problems.

In the full model, ethnicity was a significant predictor of grade 12 CDISC alcohol dependence such that Asian Americans were less likely than European Americans to have alcohol dependence. The three parenting by ethnicity interactions were significant in the full model and were kept in the trimmed model. However, given that all of these interactions were not significant in the corresponding direct effect model (Table 4.10), I decided to fit a revised trimmed model without these interactions to ensure that the significant grade 8 academic achievement effect was robust to these changes to the model. Indeed, grade 8 academic achievement was a protective factor against grade 12 alcohol dependence across all three models (full model: $b = -0.493$, $SE = 0.241$, $p = 0.041$; trimmed model: $b = -0.504$, $SE = 0.226$, $p = 0.026$; revised trimmed model: $b = -0.512$, $SE = 0.213$, $p = 0.016$). Taken together, evidence suggested the possible presence of a moderated mediation effect. Results of the moderated mediation significance tests are presented in Section 5.15 and in Table 5.17.

5.14. Indirect Effect of Father Parenting on Grade 12 CDISC Marijuana Dependence

Similar to previous models, baseline academic achievement and baseline externalizing problems respectively predicted academic achievement and externalizing problems at grade 8. The father warmth x ethnicity interaction was significant across all models.

In the full model, gender, parent drug problems, and baseline marijuana use were significant covariates predicting grade 12 marijuana dependence. Ethnicity was a significant predictor in the full model such that Asian Americans were less likely to have marijuana dependence than European Americans. This effect became trending in the trimmed models. In the trimmed model, there was a spurious effect of father warmth on grade 12 marijuana dependence. Based on the direct effect model (Table 4.11), none of the direct parenting effects significantly predicted grade 12 marijuana dependence. Thus, I fitted a revised trimmed model without the parenting main effects. The effect of grade 8 academic achievement on grade 12 marijuana dependence remained significant across all models (full model: $b = -0.466$, $SE = 0.212$, $p = 0.028$; trimmed model: $b = -0.470$, $SE = 0.206$, $p = 0.023$; revised trimmed model: $b = -0.369$, $SE = 0.179$, $p = 0.039$), indicating the likely presence of a moderated mediation effect. Results of the moderated mediation significance tests are presented in Section 5.15 and in Table 5.17.

5.15. Summary of Estimates and Confidence Intervals of the Moderated Mediation Effects

Table 5.17 presents the estimate and 95% confidence intervals of the mediation effects separately for European American and Asian American youth. These mediation effects were only tested when there was evidence of moderated mediation in prior analyses. Six specific paths were tested. Overall, the majority of these effects were significant as indicated by the exclusion of 0 within the 95% confidence intervals. For four out of six path models, different iterations of the model (full, trimmed, revised trimmed) did not lead to change in the significance of the

moderated mediation effect. For the remaining two path models (father warmth to academic achievement to grades 9 and 12 alcohol problems), two out of three iterations of the model were significant, whereas one was not. Overall, the pattern of results was largely consistent and supported the presence of six moderated mediation effects.

Chapter 6. Discussion

Etiological models of substance use development suggest that genetic, familial, and environmental vulnerabilities interact to predict emergence and engagement in substance use behaviors (Dodge et al., 2009; Sher, 1991). In particular, parenting factors, engagement in school, as well as externalizing problem behaviors are important precursors of substance use behaviors. In the current study, I tested both direct and indirect effects of parenting in grade 8 on five different substance use outcomes in grades 9 and 12, and tested ethnicity as a moderator of these associations. Results indicated several significant longitudinal associations, after controlling for significant covariates as well as the initial level of the same or equivalent substance use outcome. Notably, mother psychological control was a risk factor for alcohol use and problems in grade 9 for the entire sample, whereas father knowledge was a protective factor against alcohol problems in grades 9 and 12, as well as alcohol dependence in grade 12 for the entire sample. Moreover, the two sets of moderated mediation effects were found. First, mother knowledge at baseline was protective against externalizing problems in grade 8, which in turn was associated with fewer alcohol problems in grades 9 and 12 among European Americans but not Asian Americans. Second, father warmth at baseline was associated with better academic achievement in grade 8, which in turn was associated with lower levels of engagement in all substance use outcomes except alcohol use in grade 9.

6.1. Measurement Invariance Testing

Prior research suggested that the interpretation and effects of parenting might be different across European Americans and Asian Americans (Chao & Tseng, 2002; Kim & Rohner, 2002; Leung, Lau, & Lam, 1998; Russell, Crockett, & Chao, 2010). However, the majority of cross-cultural research did not explicitly test for measurement invariance of parenting constructs prior

to conducting mean-level comparisons. As such, it is unclear to what extent significant findings reflect actual mean-level differences versus measurement artifacts. In the current study, I tested for all types of measurement invariance separately for mother and father parenting. As suggested by prior research (Byrne & Stewart, 2006; Cheng & Rensvold, 2002; Widaman & Reise, 1997), the establishment of configural, metric, and scalar invariance, relative to other forms of invariance, is the most relevant to addressing substantive research questions, and thus is the focus of the current discussion.

For both mother and father parenting, I identified one item, “always tries to change how I feel or think about things”, which factor loading was consistently lower than other items, particularly among Asian Americans. I concluded that configural invariance was met for parental warmth and knowledge, but not for parental psychological control. In other words, the latent factor of parental psychological control was not indicated by the same set of items across ethnicity. Specifically, for mother parenting, this item was a significant indicator of the psychological control latent factor among European Americans, but it was not a significant indicator of the same latent factor among Asian Americans. For father parenting, although this item was a significant indicator of the psychological control latent factor across ethnicity, the factor loading of this item on the psychological control latent factor was lower among Asian Americans than among European Americans. Moreover, given that the factor loading (European Americans = 0.591; Asian Americans = 0.412) of this item was lower than other indicators of parenting (all above 0.600), this item was removed for all subsequent analyses.

Metric invariance is another type of invariance that bears important implications on the substantive interpretation of findings. After the removal of the item “always tries to change how I feel or think about things”, I found no evidence of metric non-invariance for both mother and

father parenting. In other words, the magnitude of the associations between the three parenting latent factors and the respective items was comparable across ethnicity. This can also be seen by comparable factor loadings across ethnicity. Establishment of metric invariance is important for meaningful mean-level comparisons across ethnicity because it indicates that mean-level differences are not attributable to differential interpretation of parenting latent factors. Put simply, the meaning of different dimensions of parenting is similar across ethnicity, and so comparisons between these parenting dimensions are meaningful.

Scalar invariance was met for father parenting but not for mother parenting. Given that parenting items were treated as ordered-categorical indicators, scalar non-invariance indicates that at the same level of the latent parenting factor, the threshold of the parenting item differed across ethnicity. Specifically, for mother parenting, the thresholds of two parenting items were non-invariant across ethnicity and were higher for European Americans compared to Asian Americans. These items include “my mother makes me feel like the most important person in her life” (for mother warmth) and “my mother brings up my past mistakes when she criticizes me” (for mother psychological control). In other words, at the same level of the latent parenting factor, European Americans tend to endorse a higher threshold for these two parenting items than Asian Americans, which may indicate potential biases in mean-level comparisons. Of note, the vast majority of parenting indicators were found to meet scalar invariance across ethnicity (Table 3.10), suggesting that the degree of scalar non-invariance was not extensive.

6.2. Ethnicity as a Moderator of the Direct Effects of Parenting on Substance Use

The current study was the first to test whether the longitudinal associations between dimensions of parenting in grade 7 and substance use outcomes in grades 9 and 12 were moderated by ethnicity. It should be noted that for all of these longitudinal analyses, the initial

level of substance use or problems was controlled for, such that the effects of parenting were over-and-above those of the initial level of substance use or problems. Generally, I found little evidence for cross-cultural moderation of the direct effects of parenting on substance use outcomes with only two trending interaction effects. Specifically, mother knowledge at baseline was a trending protective factor of grade 9 alcohol problems among European Americans but not among Asian Americans. Similarly, there was a trending interaction effect in which mother warmth was a protective factor of alcohol dependence in grade 12 among European Americans but not among Asian Americans. These trending effects are generally in line with existing research supporting the protective roles of mother knowledge and warmth (Hemovich, Lac, & Crano, 2011; Lippold, Coffman, & Greenberg, 2013). These patterns suggest that the direct protective effects of mother knowledge and warmth among European Americans may not be readily generalized to Asian Americans.

In contrast, two significant main effects were found for the entire sample. Specifically, mother psychological control at baseline was associated with greater risks for alcohol use and problems in grade 9 regardless of ethnicity. This direction of parenting effect was in line what is expected among European Americans, and thus indicates the generalizability of the effect of parental psychological control. Conceptually, mother psychological control could be considered part of authoritarian parenting in which demands and strictness were paired with little emotional support. Thus, in contrast to studies suggesting authoritarian parenting might be beneficial among Asian American youth, the current findings suggest that mother psychological control was a risk factor for alcohol use and problems in grade 9. One possible explanation of this finding is that psychological control increases the novelty of substance use experimentation, and so for both European American and Asian American youth, it was associated with increased

alcohol use and problems in grade 9. However, these effects did not generalize to subsequent and more severe substance use outcomes, indicating that mother psychological control was likely associated with time limited substance use experimentation behaviors only.

Father knowledge, on the other hand, was associated with lower risks for alcohol problems in grade 9, alcohol problems in grade 12, and alcohol dependence in grade 12 regardless of ethnicity. This finding is consistent with existing research showing parental knowledge being a protective factor of adolescent substance use (Lippold, Coffman, & Greenberg, 2013). It is interesting that to note that while mother knowledge was a trending protective factor among European Americans only, father knowledge was a protective factor for the entire sample. This suggests father parenting should not be ignored, especially among Asian Americans. Theoretically, parental knowledge reflects the overall quality of parent-adolescent relationship as parents typically acquire knowledge about the adolescents' whereabouts based on their willingness to disclose information. As such, cultivation of the parent-adolescent relationship as a secure and trusting environment for adolescents to talk about their daily issues might be important for the prevention of alcohol-related problems.

6.3. Path Analysis with Academic Achievement and Externalizing Problems as Mediators

The dimensions of parenting that had significant indirect effects on substance use (i.e., mother knowledge and father warmth) were different from those that exerted direct effects on substance use (i.e., mother psychological control and father knowledge). Path analyses indicated six significant moderated mediation effects that maps onto two specific paths from parenting to substance use outcomes. First, for European Americans but not Asian Americans, mother knowledge at baseline was a significant predictor of fewer alcohol problems in grades 9 and 12 via fewer externalizing problems in grade 8. The moderated path focused on the association

between mother knowledge and externalizing problems, such that the significant inverse association was only present among European Americans. The mediating role of externalizing problems has been implicated in previous research (Goodman, 2010; Monshouwer et al., 2012;) and is consistent with existing etiological theory of substance use development (Dodge et al., 2009). The present finding suggests that externalizing problems might not be a significant mediator of the parenting-substance use association among Asian Americans.

Second, for European Americans but not Asian Americans, father warmth at baseline predicted alcohol problems in grade 9, alcohol problems, alcohol dependence, and marijuana dependence at grade 12 via better academic achievement. Existing research suggested that parental warmth might be associated with better academic achievement through greater perceptions of control (Fulton & Turner, 2008) or improved self-efficacy (Boon, 2007). However, there is little evidence from the current literature that this effect would be specific to father warmth. It is possible that this discrepancy was simply due to the lack of disaggregation of mother versus father warmth, and that the parental warmth effects in prior research were driven by father warmth. Alternatively, it is possible that there might be a ceiling effect for mother warmth such that father warmth was actually more predictive of academic achievement among adolescents. Regardless, the presenting findings suggested that father warmth was an important protective factor against numerous substance use outcomes among European Americans through the mediating role of academic achievement, and yet this mediational pathway was not generalizable to Asian Americans.

6.4. Developmental Considerations

It should be noted that while several significant longitudinal associations were found in this study, the current study focused on a specific time frame that might not fully capture the

developmental trajectories of substance use and related variables. Specifically, parenting was only measured in grade 8 and it is possible that earlier parenting might be even more critical in shaping protective and risk factors leading to substance use outcomes. Alternatively, it is possible that patterns of parenting might change over time (e.g., psychological control was greater earlier in development whereas knowledge was greater later in developmental), and so the current findings should be considered as an initial step in understanding the associations between parenting dimensions and substance use across ethnicity.

6.5. Strengths of the Current Study

The current study adds to the literature in several distinct ways. First, existing studies of parenting and substance use among Asian Americans mostly utilized cross-sectional data, and only focused on a global measure of parenting. This study extended prior studies by testing the longitudinal associations between three well-established dimensions of parenting and substance use outcomes while controlling for the initial level of substance use. In this way, a more comprehensive analysis of how specific dimensions of parenting are linked to substance use can be made. In addition, the current analyses led to stronger inferences about the direction of effects as compared to cross-sectional studies.

Second, the current study included five different substance use outcomes and was one of the first to test whether the effects were generalizable marijuana use outcomes. The five different substance use outcomes were carefully chosen to represent a range of substance use behaviors from the least severe (e.g., alcohol use) to the most severe (e.g., DSM diagnoses of alcohol and marijuana dependence). Alcohol and marijuana abuse were not tested because they provided substantially overlapping information as alcohol and marijuana dependence, and there was no meaningful way of combining the abuse and dependence diagnoses.

Third, while prior studies mostly treated substance use outcomes as dichotomous or continuous variables, the current study appropriately modeled the outcomes based on their respective characteristics. Notably, I computed a total score of the Rutgers Alcohol Problem Inventory and modeled alcohol problems using negative binomial model, which was empirically shown to be superior to the regular ordinal least square approach.

Fourth, tests of measurement invariance of parenting constructs preceded the main analyses focusing on direct and indirect effects of parenting on substance use outcomes. Guided by these tests, the psychological control item “always tries to change how I feel or think about things” was removed from the main analyses and likely improved the measurement of the psychological control latent construct. Moreover, the establishment of metric invariance indicated that the significant findings in the main analyses were not simply attributable to measurement artifacts.

6.6. Limitations of the Current Study

The current study has several limitations. First, the sample sizes for European Americans and Asian Americans were not balanced. It is therefore possible that the lack of significant effects among Asian Americans might reflect such imbalance in sample sizes. Related to this, the relatively small sample size of Asian Americans prohibited meaningful tests of Asian subgroup differences due to a lack of statistical power. Second, the current study did not have data on adolescents’ *ALDH2* genotype status. Thus, the potential confounding effects of the different rates of metabolism of alcohol in Asian and European American adolescents were not controlled in this study. Third, this study did not include measures of acculturation, which could be a covariate or moderator of the associations examined in this study. Finally, measures of parental warmth, psychological control, and knowledge were only available in grade 7 in the

Developmental Pathways Project. This precluded the examination of changes in parenting over time as well as potential parallel processes of variations in parenting and substance use over time.

6.7. Future Directions

Risk and protective factors leading to the development of substance use across different ethnic groups might not necessarily be the same. Guided by existing cross-cultural research, the current study focused on measurement issues and longitudinal effect of three well-established dimensions of parenting. To develop more comprehensive etiological models of substance use that are suitable for ethnic minority groups, it is imperative to extend the range of variables tested beyond parenting alone. In theory, it is likely that some core components of existing etiological models of substance use could be applicable to individuals from all cultural contexts. Thus, the most critical goal of future research in this field would be to focus on other constructs that are likely to be culturally-specific, such as *ALDH2* genotype status and acculturation for Asian American youth. Empirical data on how these factors independently or interactively predict substance use outcomes among ethnic minority youth would inform culturally-sensitive etiological models of substance use development.

Another important future direction is to recruit an equal or oversample of Asian Americans in cross-cultural research projects. Utilizing more balanced sample sizes of European and Asian Americans might enable more comparable variability in variables and thus would enable stronger tests of similar hypotheses. Oversampling Asian Americans might lead to opportunities to conduct analyses by Asian subgroups, which could potentially reveal more nuanced associations among variables. Similarly, analyses could be conducted such that the effects of risk and protective factors of substance use are compared not only across ethnic groups,

but also across different levels of acculturation, generational status, and nativity. Moderation analyses that probe these interactions would be a natural extension of the current research.

Chapter 7. Conclusions

This study is the first longitudinal study of the effects of parenting on substance use across European and Asian American youth. Examination of direct and indirect effects revealed that four out of six parenting dimensions were associated with later substance use outcomes, but in different ways. Mother psychological control and father knowledge had direct effects on several alcohol-related outcomes for the entire sample, whereas mother knowledge and father warmth had indirect effects on certain substance use outcomes among European Americans only. Tests of measurement invariance suggested that these effects were not likely to be attributed to measurement artifacts. These findings provide initial evidence for possible moderated mediation effects in the developmental pathways to substance use across European American and Asian American youth.

Understanding developmental pathways to substance use enables clinicians and practitioners to identify possible points of intervention. The current study focused on two different well-established mediating factors: academic achievement and externalizing problems. Results indicated that while these mediating factors did mediate the effects of specific parenting dimensions on subsequent substance use outcomes among European Americans, they were not significant mediators among Asian Americans. This pattern raises several questions including whether parenting effects might be more direct among Asian Americans, and whether other mediators might be more relevant to the Asian American population. Overall, the current findings highlighted the need to develop culturally-specific etiological models of substance use for Asian American youth.

References

- Achenbach, T. M. (1991). *Manual for the Child Behavior Checklist/4 - 18 and 1991 Profile*. Burlington, VT: University of Vermont Department of Psychiatry.
- Achenbach, T. M., & Rescorla, L. A. (2001). *Manual for the ASEBA School-Age Forms and Profiles*. Burlington, VT: University of Vermont, Research Center for Children, Youth, & Families.
- Atkins, D. C., Baldwin, S. A., Zheng, C., Gallop, R. J., & Neighbors, C. (2013). A tutorial on count regression and zero-altered count models for longitudinal substance use data. *Psychology of Addictive Behaviors, 27*(1), 166-177. doi:10.1037/a0029508
- Atkins, D. C., & Gallop, R. J. (2007). Rethinking how family researchers model infrequent outcomes: A tutorial on count regression and zero-inflated models. *Journal of Family Psychology, 21*(4), 726-735. doi:10.1037/0893-3200.21.4.726
- Au, J., & Donaldson, S. (2000). Social influences as explanations for substance use differences among Asian-American and European-American adolescents. *Journal of Psychoactive Drugs, 32*(1), 15-23.
- Barber, B. K. (1996). Parental Psychological Control: Revisiting a Neglected Construct. *Child Development, 67*(6), 3296-3319.
- Barber, B. K., & Olsen, J. A. (1997). Socialization in context: Connection, regulation, and autonomy in the family, school, and neighborhood, and with peers. *Journal of Adolescent Research, 12*(2), 287-315.

- Barnes, G. M., & Farrell, M. P. (1992). Parental support and control as predictors of adolescent drinking, delinquency, and related problem behaviors. *Journal of Marriage & the Family*, 54(4), 763-776.
- Barnes, G. M., Reifman, A. S., Farrell, M. P., & Dintcheff, B. A. (2000). The effects of parenting on the development of adolescent alcohol misuse: A six-wave latent growth model. *Journal of Marriage & the Family*, 62(1), 175-186.
- Baumrind, D. (1967). Child care practices anteceding three patterns of preschool behavior. *Genet Psychol Monogr*, 75(1), 43-88.
- Baumrind, D. (1991). The influence of parenting style on adolescent competence and substance abuse. *Journal of Early Adolescence*, 11(1), 56-95.
- Bersamin, M., Paschall, M. J., & Flewelling, R. L. (2005). Ethnic differences in relationships between risk factors and adolescent binge drinking: A national study. [Article]. *Prevention Science*, 6(2), 127-137.
- Boon, H. (2007). Low- and high-achieving Australian secondary school students: Their parenting, motivations and academic achievement. *Australian Psychologist*, 42(3), 212-225.
doi:10.1080/00050060701405584
- Brown, B. B., Mounts, N., Lamborn, S. D., & Steinberg, L. (1993). Parenting practices and peer group affiliation in adolescence. *Child Development*, 64(2), 467-482.
- Brown, S. A., Myers, M. G., Lippke, L., Tapert, S. F., Stewart, D. G., & Vik, P. W. (1998). Psychometric evaluation of the Customary Drinking and Drug Use Record (CDDR): a measure of adolescent alcohol and drug involvement. *J Stud Alcohol*, 59(4), 427-438.

- Byrne, B. M., & Stewart, S. M. (2006). The MACS approach to testing for multigroup invariance of a second-order structure: A walk through the process. *Structural Equation Modeling, 13*(2), 287-321. doi:10.1207/s15328007sem1302_7
- Chao, R. (1994). Beyond parental control and authoritarian parenting style: Understanding Chinese parenting through the cultural notion of training. *Child Development, 65*(4), 1111-1119.
- Chao, R., & Aque, C. (2009). Interpretations of parental control by Asian immigrant and European American youth. *J Fam Psychol, 23*(3), 342-354.
- Chen, F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling, 14*(3), 464-504. doi:10.1080/10705510701301834
- Chen, F. (2008). What happens if we compare chopsticks with forks? The impact of making inappropriate comparisons in cross-cultural research. *Journal Of Personality And Social Psychology, 95*(5), 1005-1018. doi:10.1037/a0013193
- Cheung, G. W., & Lau, R. S. (2012). A direct comparison approach for testing measurement invariance. *Organizational Research Methods, 15*(2), 167-198.
doi:10.1177/1094428111421987
- Cheung, G. W., & Rensvold, R. B. (2000). Assessing extreme and acquiescence response sets in cross-cultural research using structural equations modeling. *Journal Of Cross-Cultural Psychology, 31*(2), 187-212. doi:10.1177/0022022100031002003
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling, 9*(2), 233-255.
doi:10.1207/S15328007SEM0902_5

- Choi, Y., & Lahey, B. B. (2006). *Testing the model minority stereotype: Youth behaviors across racial and ethnic groups.*
- Choi, Y. S. (2008). Diversity within: Subgroup differences of youth problem behaviors among Asian Pacific Islander American adolescents. [Article]. *Journal of Community Psychology, 36*(3), 352-370.
- Darling, N., & Steinberg, L. (1993). Parenting style as context: An integrative model. *Psychological Bulletin, 113*(3), 487-496.
- Dishion, T., & McMahon, R. (1998). Parental monitoring and the prevention of child and adolescent problem behavior: a conceptual and empirical formulation. *Clin Child Fam Psychol Rev, 1*(1), 61-75.
- Doyle, A., Ostrander, R., Skare, S., Crosby, R. D., & August, G. J. (1997). Convergent and criterion-related validity of the Behavior Assessment System for Children–Parent Rating Scale. *Journal Of Clinical Child Psychology, 26*(3), 276-284.
doi:10.1207/s15374424jccp2603_6
- Drasgow, F. (1982). Biased test items and differential validity. *Psychological Bulletin, 92*(2), 526-531. doi:10.1037/0033-2909.92.2.526
- Drasgow, F. (1984). Scrutinizing psychological tests: Measurement equivalence and equivalent relations with external variables are the central issues. *Psychological Bulletin, 95*(1), 134-135. doi:10.1037/0033-2909.95.1.134
- Dwairy, M., & Achoui, M. (2010). Parental Control: A Second Cross-Cultural Research on Parenting and Psychological Adjustment of Children. [Article]. *Journal of Child and Family Studies, 19*(1), 16-22.

- Enders, C. K. (2001). The performance of the full information maximum likelihood estimator in multiple regression models with missing data. *Educational and Psychological Measurement, 61*(5), 713-740.
- Fisher, P. W., Shaffer, D., Piacentini, J., & Lapkin, J. (1993). Sensitivity of the Diagnostic Interview Schedule for Children, 2nd edition (DISC-2.1) for specific diagnoses of children and adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry, 32*(3), 666-673.
- Flora, D. B., & Curran, P. J. (2004). An empirical evaluation of alternative methods of estimation for confirmatory factor analysis with ordinal data. *Psychological Methods, 9*(4), 466-491. doi:10.1037/1082-989X.9.4.466
- French, B. F., & Finch, W. (2011). Model misspecification and invariance testing using confirmatory factor analytic procedures. *Journal of Experimental Education, 79*(4), 404-428. doi:10.1080/00220973.2010.517811
- Fulton, E., & Turner, L. A. (2008). Students' academic motivation: relations with parental warmth, autonomy granting, and supervision. *Educational Psychology, 28*(5), 521-534. doi:10.1080/01443410701846119
- Goodman, A. (2010). Substance use and common child mental health problems: Examining longitudinal associations in a British sample. *Addiction, 105*(8), 1484-1496. doi:10.1111/j.1360-0443.2010.02981.x
- Gregorich, S. E. (2006). Do self-report instruments allow meaningful comparisons across diverse population groups? Testing measurement invariance using the confirmatory factor analysis framework. *Medical Care, 44*(11, Suppl 3), S78-S94. doi:10.1097/01.mlr.0000245454.12228.8f

- Harachi, T. W., Catalano, R. F., Kim, S., & Choi, Y. (2001). Etiology and prevention of substance use among Asian American youth. *Prevention Science, 2*(1), 57-65.
- Hawkins, J., Catalano, R., & Miller, J. (1992). Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: implications for substance abuse prevention. *Psychol Bull, 112*(1), 64-105.
- Hemovich, V., Lac, A., & Crano, W. D. (2011). Understanding early-onset drug and alcohol outcomes among youth: The role of family structure, social factors, and interpersonal perceptions of use. *Psychology, Health & Medicine, 16*(3), 249-267.
doi:10.1080/13548506.2010.532560
- Hendershot, C., Collins, S., George, W., Wall, T., McCarthy, D., Liang, T., et al. (2009). Associations of ALDH2 and ADH1B genotypes with alcohol-related phenotypes in Asian young adults. *Alcohol Clin Exp Res, 33*(5), 839-847.
- Hendershot, C., Dillworth, T., Neighbors, C., & George, W. (2008). Differential effects of acculturation on drinking behavior in Chinese- and Korean-American college students. *J Stud Alcohol Drugs, 69*(1), 121-128.
- Hendershot, C., MacPherson, L., Myers, M., Carr, L., & Wall, T. (2005). Psychosocial, cultural and genetic influences on alcohol use in Asian American youth. *J Stud Alcohol, 66*(2), 185-195.
- Hendershot, C., Neighbors, C., George, W., McCarthy, D., Wall, T., Liang, T., et al. (2009). ALDH2, ADH1B and alcohol expectancies: integrating genetic and learning perspectives. *Psychol Addict Behav, 23*(3), 452-463.

- Horn, J. L., & McArdle, J. J. (1992). A practical and theoretical guide to measurement invariance in aging research. *Experimental Aging Research, 18*(3-4), 117-144.
- Hsu, J. (1983). Asian family interaction patterns and their therapeutic implications. *International Journal of Family Psychiatry, 4*(4), 307-320.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*(1), 1-55.
doi:10.1080/10705519909540118
- Hudziak, J. J., Copeland, W., Stanger, C., & Wadsworth, M. (2004). Screening for DSM-IV externalizing disorders with the Child Behavior Checklist: A receiver-operating characteristic analysis. *Journal of Child Psychology and Psychiatry, 45*(7), 1299-1307.
doi:10.1111/j.1469-7610.2004.00314.x
- Hurley, S., Bierman, K., Coie, J., Dodge, K., Greenberg, M., Lochman, J., et al. (2008). Disentangling Ethnic and Contextual Influences Among Parents Raising Youth in High-Risk Communities. *Appl Dev Sci, 12*(4), 211-219.
- Joshanloo, M., Wissing, M. P., Khumalo, I. P., & Lamers, S. A. (2013). Measurement invariance of the Mental Health Continuum-Short Form (MHC-SF) across three cultural groups. *Personality And Individual Differences, 55*(7), 755-759. doi:10.1016/j.paid.2013.06.002
- Julian, T. W., McKenry, P. C., & McKelvey, M. W. (1994). Cultural variations in parenting: Perceptions of Caucasain, African-American, Hispanice, and Asian-American parents. *Family Relations, 43*(1), 30-37.
- Keefe, K., & Newcomb, M. (1996). Demographic and psychosocial risk for alcohol use: ethnic differences. *J Stud Alcohol, 57*(5), 521-530.

- Kim, I. J., Zane, N. W. S., & Hong, S. (2002). Protective factor against substance use among Asian American youth: A test of the peer cluster theory. *Journal of Community Psychology, 30*(5), 565-584.
- Kim, J., & McCarthy, W. J. (2006). School-level contextual influences on smoking and drinking among Asian and Pacific Islander adolescents. [Article]. *Drug and Alcohol Dependence, 84*(1), 56-68.
- Kim, K., & Rohner, R. P. (2002). Parental warmth, control, and involvement in schooling - Predicting academic achievement among Korean American adolescents. [Article]. *Journal of Cross-Cultural Psychology, 33*(2), 127-140.
- Le, T., Goebert, D., & Wallen, J. (2009). Acculturation factors and substance use among Asian American youth. *J Prim Prev, 30*(3-4), 453-473.
- Leung, K., Lau, S., & Lam, W. L. (1998). Parenting styles and academic achievement: A cross-cultural study. [Article]. *Merrill-Palmer Quarterly-Journal of Developmental Psychology, 44*(2), 157-172.
- Lippold, M. A., Coffman, D. L., & Greenberg, M. T. (2013). Investigating the potential causal relationship between parental knowledge and youth risky behavior: A propensity score analysis. *Prevention Science*, doi:10.1007/s11121-013-0443-1
- Lucas, C. P. (2003). The use of structured diagnostic interviews in clinical child psychiatric practice. In M. B. First (Ed.), *Standardized Evaluation in Clinical Practice* (Vol. 22, pp. 75-102). Washington, DC: American Psychiatric Publishing.

- MacKinnon, D., Fritz, M., Williams, J., & Lockwood, C. (2007). Distribution of the product confidence limits for the indirect effect: program PRODCLIN. *Behavior Research Methods, 39*(3), 384-389.
- MacKinnon, D. P., Krull, J. L., & Lockwood, C. M. (2000). Equivalence of the mediation, confounding and suppression effect. *Prevention Science, 1*(4), 173-181.
doi:10.1023/A:1026595011371
- MacKinnon, D. P., Lockwood, C. M., Hoffman, J. M., West, S. G., & Sheets, V. (2002). A comparison of methods to test mediation and other intervening variable effects. *Psychological Methods, 7*(1), 83-104. doi:10.1037/1082-989X.7.1.83
- MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research, 39*(1), 99-128. doi:10.1207/s15327906mbr3901_4
- Meade, A. W., Johnson, E. C., & Braddy, P. W. (2008). Power and sensitivity of alternative fit indices in tests of measurement invariance. *Journal of Applied Psychology, 93*(3), 568-592. doi:10.1037/0021-9010.93.3.568
- Meredith, W. (1993). Measurement invariance, factor analysis and factorial invariance. *Psychometrika, 58*(4), 525-543. doi:10.1007/BF02294825
- McClelland, G., & Judd, C. (1993). Statistical difficulties of detecting interactions and moderator effects. *Psychol Bull, 114*(2), 376-390.
- Milfont, T. L., & Fischer, R. (2010). Testing measurement invariance across groups: Application in cross-cultural research. *International Journal of Psychological Research, 3*(1), 111-121.

- Millsap, R. E. (2011). *Statistical approaches to measurement invariance*. Taylor and Francis Group: New York.
- Monshouwer, K. K., Harakeh, Z. Z., Lugtig, P. P., Huizink, A. A., Creemers, H. E., Reijneveld, S. A., & ... Vollebergh, W. M. (2012). Predicting transitions in low and high levels of risk behavior from early to middle adolescence: The TRAILS study. *Journal of Abnormal Child Psychology*, *40*(6), 923-931. doi:10.1007/s10802-012-9624-9
- Muthén, B. (1984). A general structural equation model with dichotomous, ordered categorical, and continuous latent variable indicators. *Psychometrika*, *49*(1), 115-132.
doi:10.1007/BF02294210
- Muthén, B., & Asparouhov, T. (2002). *Latent Variable Analysis With Categorical Outcomes: Multiple-Group And Growth Modeling In Mplus. Version 5*, December 9, 2002.
- Muthén, L. K., & Muthén, B. O. (1998-2014). *Mplus User's Guide. Seventh Edition*. Los Angeles, CA: Muthén & Muthén
- Nagasawa, R., Qian, Z. C., & Wong, P. (2000). *Social control theory as a theory of conformity: The case of Asian/Pacific drug and alcohol nonuse*.
- Nakashima, J., & Wong, M. (2000). Characteristics of alcohol consumption, correlates of alcohol misuse among Korean American adolescents. *J Drug Educ*, *30*(3), 343-359.
- O'Hare, T. (1995). Differences in asian and white drinking: Consumption level, drinking contexts, and expectancies. *Addictive Behaviors*, *20*(2), 261-266.
- Otsuki, T. A. (2003). Substance use, self-esteem, and depression among Asian American adolescents. [Article]. *Journal of Drug Education*, *33*(4), 369-390.

- Parker, G., Tupling, H., & Brown, L. (1979). A parental bonding instrument. *Br J Psychiatry*, *51*(1), 1-10.
- Pew Research Center. (2008). U.S. Population Projections: 2005–2050. In J. S. Passel & D. V. Cohn (Eds.).
- Pilgrim, C., Schulenberg, J., O'Malley, P., Bachman, J., & Johnston, L. (2006). Mediators and moderators of parental involvement on substance use: a national study of adolescents. *Prevention Science*, *7*(1), 75-89.
- Preacher, K. J., Rucker, D. D., & Hayes, A. F. (2007). Assessing moderated mediation hypotheses: Theory, methods, and prescriptions. *Multivariate Behavioral Research*, *42*, 185-227.
- Raykov, T., Marcoulides, G. A., & Li, C. (2012). Measurement invariance for latent constructs in multiple populations: A critical view and refocus. *Educational And Psychological Measurement*, *72*(6), 954-974. doi:10.1177/0013164412441607
- Reise, S. P., Widaman, K. F., & Pugh, R. H. (1993). Confirmatory factor analysis and item response theory: Two approaches for exploring measurement invariance. *Psychological Bulletin*, *114*(3), 552-566. doi:10.1037/0033-2909.114.3.552
- Roberts, R. E., Solovitz, B. L., Chen, Y. W., & Casat, C. (1996). Retest stability of DSM-III-R diagnoses among adolescents using the Diagnostic Interview Schedule for Children (DISC-2.1C). *J Abnorm Child Psychol*, *24*(3), 349-362.
- Rock, D. A., Werts, C. E., & Flaughter, R. L. (1978). The use of analysis of covariance structures for comparing the psychometric properties of multiple variables across populations. *Multivariate Behavioral Research*, *13*(4), 403-418. doi:10.1207/s15327906mbr1304_3

- Russell, S. T., Crockett, L. J., & Chao, R. K. (2010). Introduction: Asian American parenting and parent-adolescent relationships. In S. T. Russell, L. J. Crockett & R. K. Chao (Eds.), *Asian American parenting and parent-adolescent relationships*. (pp. 1-15). New York, NY US: Springer Science + Business Media.
- SAMHSA. (2009). Results from the 2008 National Survey on Drug Use and Health: National Findings (Office of Applied Studies, NSDUH Series H-36, HHS Publication No. SMA 09-4434). Rockville, MD.: Substance Abuse and Mental Health Services Administration.
- Schaefer, E. S. (1965). Children's Reports of Parental Behavior: An Inventory. *Child Development, 36*(2), 413-424.
- Schmitt, N., & Kuljanin, G. (2008). Measurement invariance: Review of practice and implications. *Human Resource Management Review, 18*(4), 210-222.
doi:10.1016/j.hrmr.2008.03.003
- Shakib, S., Mouttapa, M., Johnson, C., Ritt-Olson, A., Trinidad, D., Gallaher, P., et al. (2003). Ethnic variation in parenting characteristics and adolescent smoking. *J Adolesc Health, 33*(2), 88-97.
- Sher, K. (1991). *Children of Alcoholics: A Critical Appraisal of Theory and Research*. Chicago: Chicago University Press.
- Shrake, E., & Rhee, S. (2004). Ethnic identity as a predictor of problem behaviors among Korean American adolescents. *Adolescence, 39*(155), 601-622.
- Sue, S., Sue, D., Sue, L., & Takeuchi, D. (1995). Psychopathology among Asian Americans: a model minority? *Cult Divers Ment Health, 1*(1), 39-51.

- Thurber, S., & Sheehan, W. P. (2012). Note on truncated T scores in discrepancy studies with the Child Behavior Checklist and Youth Self Report. *Archives of Assessment Psychology*, 2(1), 73-80.
- Tilton-Weaver, L. (2014). Adolescents' information management: Comparing ideas about why adolescents disclose to or keep secrets from their parents. *Journal of Youth and Adolescence*, 43(5), 803-813. doi:10.1007/s10964-013-0008-4
- Tofighi, D. & MacKinnon, D. P. (2011). RMediation: An R package for mediation analysis confidence intervals. *Behavior Research Methods*, 43, 692-700.
- Tosh, A. K., & Simmons, P. S. (2007). Sexual activity and other risk-taking behaviors among Asian-American adolescents. [Article]. *Journal of Pediatric and Adolescent Gynecology*, 20(1), 29-34.
- U.S. Census Bureau. (2008). Table 6. Percent of the Projected Population by Race and Hispanic Origin for the United States: 2010 to 2050. (NP2008-T6): Population Division, U.S. Census Bureau.
- Vandenberg, R. J., & Lance, C. E. (2000). A review and synthesis of the measurement invariance literature: Suggestions, practices, and recommendations for organizational research. *Organizational Research Methods*, 3(1), 4-69. doi:10.1177/109442810031002
- White, H. R., & Labouvie, E. W. (1989). Towards the assessment of adolescent problem drinking. *Journal of the Studies on Alcohol*, 51, 30-37.
- Widaman, K. F., & Reise, S. P. (1997). Exploring the measurement invariance of psychological instruments: Applications in the substance use domain. In K. J. Bryant, M. Windle, S. G. West (Eds.) , *The science of prevention: Methodological advances from alcohol and*

- substance abuse research* (pp. 281-324). Washington, DC US: American Psychological Association. doi:10.1037/10222-009
- Wong, M. M., Klinge, R. S., & Price, R. K. (2004). Alcohol, tobacco, and other drug use among Asian American and Pacific Islander adolescents in California and Hawaii. [Article]. *Addictive Behaviors, 29*(1), 127-141.
- Yang, P. Q., & Solis, P. (2002). Illegal drug use among Asian American youths in Dallas. *Journal of Ethnicity in Substance Abuse, 1*(3), 17-38.
- Yu, C.Y. (2002). Evaluating cutoff criteria of model fit indices for latent variable models with binary and continuous outcomes. Los Angeles, CA: University of California.

Table 2.1. Means and Standard Deviations of Study Variables for the Full Sample and by Ethnicity

Study Variables	European American		Asian American		<i>t</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Mother Warmth	1.60	0.45	1.35	0.56	4.03	0.000
Mother Psychological Control	0.58	0.61	0.81	0.55	-3.10	0.002
Mother Knowledge	1.66	0.42	1.41	0.48	4.39	0.000
Father Warmth	1.50	0.53	1.24	0.61	3.64	0.000
Father Psychological Control	0.36	0.45	0.63	0.56	-4.51	0.000
Father Knowledge	1.35	0.60	1.18	0.61	2.20	0.028
Grade 8 Academic Achievement	2.90	0.81	2.94	0.93	-0.37	0.712
Grade 8 Externalizing Behaviors	6.10	7.11	5.05	5.52	1.21	0.226
Grade 9 Alcohol Use	0.28	0.45	0.22	0.41	1.18	0.239
Grade 9 Alcohol Problems	1.59	5.50	0.63	2.67	1.65	0.100
Grade 12 Alcohol Problems	4.40	8.15	2.93	7.37	1.56	0.120
Grade 12 Alcohol Dependence	0.37	0.61	0.17	0.47	2.69	0.008
Grade 12 Marijuana Dependence	0.39	0.68	0.19	0.52	2.58	0.010

Table 2.2. Measurement of Predictors, Mediators and Outcomes

Constructs	Measure [Cronbach's Alpha]	Year
<i><u>Predictors:</u></i>		
Parental warmth	10-item Acceptance subscale from the Child Report of Parent Behavior Inventory (Schaefer, 1965) [$\alpha = 0.81-0.94$]	Grade 7
Parental psychological control	8-item Psychological Control Scale—Youth Self Report (Barber, 1996) [$\alpha = 0.80-0.83$]	Grade 7
Parental knowledge	5-item Parental Monitoring Scale (Brown et al., 1993) [$\alpha = 0.80$]	Grade 7
<i><u>Mediators:</u></i>		
Academic Achievement	Grade Point Average	Grades 7 & 8
Externalizing Problems	Child Behavior Checklist Externalizing Raw Score	Grades 7 & 8
<i><u>Outcomes:</u></i>		
Alcohol and drug use outcomes	Drinking and Drug Use Questionnaire (DDQ; Brown et al., 1998) [$\alpha = 0.63-0.92$]	Grades 7, 8, 9 & 12
	Rutgers Alcohol Problem Inventory (RAPI; White & Labouvie, 1989) [$\alpha = 0.92$]	Grades 7, 8, 9 & 12
	DISC Alcohol and Marijuana Abuse Modules	Grade 12

Table 2.3. Bivariate Correlations between Parenting and Substance Use Variables for the Full Sample

Study Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Mother Warmth	1.00	-.284**	.588**	.456**	-.269**	.284**	-.080	-.037	-.035	-.024	.013
2. Mother Psychological Control		1.00	-.235**	-.166**	.210**	-.136*	.119*	.077	-.012	-.029	.017
3. Mother Knowledge			1.00	.403**	-.219**	.458**	-.118*	-.117*	.029	.003	-.016
4. Father Warmth				1.00	-.657**	.627**	-.037	-.048	-.051	-.015	-.008
5. Father Psychological Control					1.00	-.501**	.043	.033	.087	.042	.054
6. Father Knowledge						1.00	-.123*	-.132*	-.097	-.028	-.101
7. Grade 9 Alcohol Use							1.00	.437**	.243**	.232**	.197**
8. Grade 9 Alcohol/ Marijuana Problems								1.00	.262**	.174**	.272**
9. Grade 12 Alcohol/ Marijuana Problems									1.00	.602**	.610**
10. Grade 12 Alcohol Dependence										1.00	.484**
11. Grade 12 Marijuana Dependence											1.00

Note. * $p < .05$, ** $p < .01$.

Table 2.4. Bivariate Correlations between Parenting and Substance Use Variables by Ethnicity

Study Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Mother Warmth	1.00	-.226**	.597**	.458**	-.174**	.327**	-.138*	-.075	-.107	-.130	-.012
2. Mother Psychological Control	<i>-.348**</i>	1.00	-.183*	-.082	.089	-.075	.112	.096	.031	-.006	.043
3. Mother Knowledge	<i>.502**</i>	<i>-.266*</i>	1.00	.409**	-.157*	.479**	-.158*	-.177**	-.039	-.057	-.074
4. Father Warmth	<i>.378**</i>	<i>-.297**</i>	<i>.296**</i>	1.00	-.647**	.632**	-.083	-.074	-.042	-.052	-.044
5. Father Psychological Control	<i>-.336**</i>	<i>.412**</i>	<i>-.202</i>	<i>-.628**</i>	1.00	-.503**	.049	.041	.087	.043	.062
6. Father Knowledge	<i>.118</i>	<i>-.256*</i>	<i>.357**</i>	<i>.590**</i>	<i>-.464**</i>	1.00	-.118	-.137*	-.066	.024	-.082
7. Grade 9 Alcohol Use	<i>.012</i>	<i>.199</i>	<i>-.076</i>	<i>.046</i>	<i>.084</i>	<i>-.166</i>	1.00	.444**	.260**	.255**	.218**
8. Grade 9 Alcohol/Marijuana Problems	<i>.019</i>	<i>.072</i>	<i>.013</i>	<i>-.029</i>	<i>.121</i>	<i>-.199</i>	<i>.451**</i>	1.00	.283**	.158*	.245**
9. Grade 12 Alcohol/Marijuana Problems	<i>.080</i>	<i>-.104</i>	<i>.147</i>	<i>-.111</i>	<i>.139</i>	<i>-.205</i>	<i>.176</i>	<i>.143</i>	1.00	.614**	.653**
10. Grade 12 Alcohol Dependence	<i>.176</i>	<i>-.008</i>	<i>.049</i>	<i>-.045</i>	<i>.210</i>	<i>-.320**</i>	<i>.102</i>	<i>.217*</i>	<i>.546**</i>	1.00	.488**
11. Grade 12 Marijuana Dependence	<i>-.038</i>	<i>.030</i>	<i>.019</i>	<i>-.033</i>	<i>.190</i>	<i>-.256*</i>	<i>.079</i>	<i>.441**</i>	<i>.435**</i>	<i>.399**</i>	1.00

Note. Bivariate correlations for European Americans are presented in **bold** above the diagonal. Bivariate correlations for Asian Americans are presented in *italics* below the diagonal. * $p < .05$, ** $p < .01$.

Table 3.1. Comparison of Single-Group CFA Models of Child-Report Parent Behavior Inventory on Mother Parenting across Ethnicity

	χ^2	df	<i>p</i>	RMSEA (90% CI)	CFI	TLI	SRMR/WRMR
Model using MLR estimator with all items							
European Americans only (n = 242)	299.197	227	0.0009	0.036 (0.024-0.047)	0.961	0.956	0.048
Asian Americans only (n = 83)	346.698	227	0.0000	0.080 (0.062-0.096)	0.838	0.820	0.089
Random Sample of European Americans (n = 83)	378.439	227	0.0000	0.090 (0.074-0.105)	0.860	0.844	0.063
Model using WLSMV estimator with all items							
European Americans only (n = 242)	232.754	227	0.3825	0.010 (0.000-0.029)	0.999	0.999	0.686
Asian Americans only (n = 83)	275.014	227	0.0161	0.050 (0.023-0.071)	0.961	0.957	0.875
Random Sample of European Americans (n = 83)	232.158	227	0.3930	0.017 (0.000-0.049)	0.998	0.998	0.706
Model using MLR estimator without item 4							
European Americans only (n = 242)	271.783	206	0.0014	0.036 (0.023-0.048)	0.963	0.958	0.048
Asian Americans only (n = 83)	310.946	206	0.0000	0.078 (0.060-0.096)	0.853	0.835	0.085
Random Sample of European Americans (n = 83)	344.347	206	0.0000	0.090 (0.073-0.106)	0.866	0.850	0.063
Model using WLSMV estimator without item 4							
European Americans only (n = 242)	214.610	206	0.3259	0.013 (0.000-0.031)	0.998	0.998	0.684
Asian Americans only (n = 83)	244.516	206	0.0341	0.047 (0.014-0.069)	0.969	0.965	0.839
Random Sample of European Americans (n = 83)	215.570	206	0.3096	0.024 (0.000-0.053)	0.996	0.996	0.715

Note. RMSEA = root mean square error of approximation, CI = confidence interval, CFI = comparative fit index, TLI = Tucker-Lewis index, SRMR = standardized root mean square residual, and WRMR = weighted root-mean-square residual. SRMR was obtained in models using the MLR estimator, a maximum likelihood estimator with robust standard errors using a numerical integration algorithm. WRMR was obtained in models using the WLSMV estimator, a robust weighted least squares estimator using a diagonal weight matrix.

Table 3.2. Comparison of Single-Group CFA Models of Child-Report Parent Behavior Inventory on Father Parenting across Ethnicity

	χ^2	df	<i>p</i>	RMSEA (90% CI)	CFI	TLI	SRMR/WRMR
Model using MLR estimator with all items							
European Americans only (n = 242)	396.487	227	0.0000	0.056 (0.046-0.065)	0.920	0.911	0.058
Asian Americans only (n = 82)	347.218	227	0.0000	0.080 (0.063-0.097)	0.859	0.843	0.098
Random Sample of European Americans (n = 82)	433.636	227	0.0000	0.105 (0.090-0.120)	0.808	0.786	0.089
Model using WLSMV estimator with all items							
European Americans only (n = 242)	330.050	227	0.0000	0.043 (0.033-0.053)	0.987	0.986	0.953
Asian Americans only (n = 82)	298.476	227	0.0010	0.062 (0.041-0.080)	0.968	0.965	0.948
Random Sample of European Americans (n = 82)	299.599	227	0.0009	0.062 (0.041-0.081)	0.983	0.981	1.000
Model using MLR estimator without item 34							
European Americans only (n = 242)	356.310	206	0.0000	0.055 (0.045-0.064)	0.926	0.917	0.060
Asian Americans only (n = 82)	304.907	206	0.0000	0.077 (0.058-0.094)	0.879	0.864	0.089
Random Sample of European Americans (n = 82)	396.015	206	0.0000	0.106 (0.090-0.122)	0.818	0.796	0.087
Model using WLSMV estimator without item 34							
European Americans only (n = 242)	310.292	206	0.0000	0.046 (0.035-0.056)	0.987	0.986	0.959
Asian Americans only (n = 82)	254.671	206	0.0118	0.054 (0.027-0.074)	0.979	0.976	0.849
Random Sample of European Americans (n = 82)	277.962	206	0.0006	0.065 (0.044-0.084)	0.983	0.981	0.995

Note. RMSEA = root mean square error of approximation, CI = confidence interval, CFI = comparative fit index, TLI = Tucker-Lewis index, SRMR = standardized root mean square residual, and WRMR = weighted root-mean-square residual. SRMR was obtained in models using the MLR estimator, a maximum likelihood estimator with robust standard errors using a numerical integration algorithm. WRMR was obtained in models using the WLSMV estimator, a robust weighted least squares estimator using a diagonal weight matrix.

Table 3.3. Factor Loadings of Indicators in Multiple-Group Configural Invariant Model of Mother Parenting with all Items (using WLSMV estimator)

Parenting Items	European Americans			Asian Americans		
	<i>b</i>	SE	<i>P</i>	<i>b</i>	SE	<i>p</i>
Factor: Warmth						
Is able to make me feel better when I am upset (PBI6)	1.000	0.000	999.000	1.000	0.000	999.000
Makes me feel better after talking over my worries with her (PBI1)	0.879	0.036	0.000	0.974	0.065	0.000
Smiles at me very often (PBI3)	0.757	0.057	0.000	0.883	0.067	0.000
Enjoys doing things with me (PBI7)	0.890	0.042	0.000	0.940	0.068	0.000
Cheers me up when I am sad (PBI9)	0.972	0.025	0.000	1.010	0.058	0.000
Gives me a lot of care and attention (PBI12)	0.867	0.053	0.000	1.010	0.052	0.000
Makes me feel like the most important person in her life (PBI13)	0.701	0.058	0.000	0.829	0.085	0.000
Believes in showing her love for me (PBI15)	0.863	0.046	0.000	0.967	0.065	0.000
Often praises me (PBI17)	0.761	0.051	0.000	0.788	0.098	0.000
Is easy to talk to (PBI18)	0.889	0.036	0.000	0.960	0.054	0.000
Factor: Psychological Control						
Blames me for other family member's problems (PBI8)	1.000	0.000	999.000	1.000	0.000	999.000
Changes the subject whenever I have something to say (PBI2)	0.911	0.042	0.000	0.980	0.065	0.000
Always tries to change how I feel or think about things (PBI4)	0.504	0.069	0.000	0.253	0.181	0.161
Often interrupts me (PBI5)	0.835	0.051	0.000	0.847	0.094	0.000
Brings up my past mistakes when she criticizes me (PBI10)	0.833	0.035	0.000	0.661	0.146	0.000
Is less friendly with me if I do not see things her way (PBI11)	0.887	0.041	0.000	0.997	0.084	0.000
Will avoid looking at me when I have disappointed her (PBI14)	0.888	0.032	0.000	0.879	0.088	0.000
If I have hurt her feelings, stops talking to me until I please her again (PBI16)	0.857	0.036	0.000	0.854	0.079	0.000
Factor: Knowledge						
Where you go at night? (PBI22)	1.000	0.000	999.000	1.000	0.000	999.000
Who your friends are? (PBI21)	0.978	0.108	0.000	0.924	0.162	0.000
How you spend your money? (PBI23)	0.954	0.095	0.000	0.804	0.124	0.000
What you do with your free time? (PBI24)	0.965	0.097	0.000	1.034	0.143	0.000
Where you are most afternoons after school? (PBI25)	0.953	0.102	0.000	1.024	0.139	0.000
Correlations Among Parenting Factors						
Psychological Control with Warmth	-0.286	0.073	0.000	-0.279	0.096	0.004
Knowledge with Warmth	0.566	0.073	0.000	0.359	0.091	0.000
Knowledge with Psychological Control	-0.205	0.067	0.002	-0.006	0.102	0.953

Table 3.4. Factor Loadings of Indicators in Multiple-Group Configural Invariant Model of Mother Parenting without Item 4 (using WLSMV estimator)

Parenting Items	European Americans			Asian Americans		
	<i>b</i>	SE	<i>P</i>	<i>b</i>	SE	<i>p</i>
Factor: Warmth						
Is able to make me feel better when I am upset (PBI6)	1.000	0.000	999.000	1.000	0.000	999.000
Makes me feel better after talking over my worries with her (PBI1)	0.879	0.036	0.000	0.974	0.065	0.000
Smiles at me very often (PBI3)	0.757	0.057	0.000	0.884	0.067	0.000
Enjoys doing things with me (PBI7)	0.890	0.042	0.000	0.938	0.068	0.000
Cheers me up when I am sad (PBI9)	0.973	0.025	0.000	1.009	0.057	0.000
Gives me a lot of care and attention (PBI12)	0.867	0.053	0.000	1.008	0.052	0.000
Makes me feel like the most important person in her life (PBI13)	0.703	0.058	0.000	0.830	0.085	0.000
Believes in showing her love for me (PBI15)	0.862	0.046	0.000	0.966	0.065	0.000
Often praises me (PBI17)	0.761	0.051	0.000	0.785	0.099	0.000
Is easy to talk to (PBI18)	0.889	0.036	0.000	0.961	0.054	0.000
Factor: Psychological Control						
Blames me for other family member's problems (PBI8)	1.000	0.000	999.000	1.000	0.000	999.000
Changes the subject whenever I have something to say (PBI2)	0.913	0.041	0.000	0.978	0.067	0.000
Always tries to change how I feel or think about things (PBI4)	--	--	--	--	--	--
Often interrupts me (PBI5)	0.829	0.051	0.000	0.853	0.094	0.000
Brings up my past mistakes when she criticizes me (PBI10)	0.834	0.035	0.000	0.649	0.150	0.000
Is less friendly with me if I do not see things her way (PBI11)	0.885	0.040	0.000	0.998	0.085	0.000
Will avoid looking at me when I have disappointed her (PBI14)	0.886	0.032	0.000	0.869	0.090	0.000
If I have hurt her feelings, stops talking to me until I please her again (PBI16)	0.854	0.036	0.000	0.854	0.080	0.000
Factor: Knowledge						
Where you go at night? (PBI22)	1.000	0.000	999.000	1.000	0.000	999.000
Who your friends are? (PBI21)	0.977	0.108	0.000	0.919	0.162	0.000
How you spend your money? (PBI23)	0.956	0.096	0.000	0.805	0.124	0.000
What you do with your free time? (PBI24)	0.966	0.097	0.000	1.034	0.143	0.000
Where you are most afternoons after school? (PBI25)	0.951	0.103	0.000	1.026	0.139	0.000
Correlations Among Parenting Factors						
Psychological Control with Warmth	-0.293	0.073	0.000	-0.284	0.096	0.003
Knowledge with Warmth	0.566	0.073	0.000	0.359	0.091	0.000
Knowledge with Psychological Control	-0.203	0.066	0.002	-0.016	0.102	0.875

Table 3.5. Factor Loadings of Indicators in Multiple-Group Configural Invariant Model of Father Parenting with all Items (using WLSMV estimator)

Parenting Items	European Americans			Asian Americans		
	<i>b</i>	SE	<i>P</i>	<i>b</i>	SE	<i>p</i>
Factor: Warmth						
Is able to make me feel better when I am upset (PBI36)	1.000	0.000	999.000	1.000	0.000	999.000
Makes me feel better after talking over my worries with him (PBI31)	0.961	0.018	0.000	0.931	0.035	0.000
Smiles at me very often (PBI33)	0.825	0.035	0.000	0.764	0.069	0.000
Enjoys doing things with me (PBI37)	0.981	0.016	0.000	0.953	0.035	0.000
Cheers me up when I am sad (PBI39)	0.981	0.029	0.000	0.952	0.033	0.000
Gives me a lot of care and attention (PBI42)	0.978	0.017	0.000	0.947	0.033	0.000
Makes me feel like the most important person in his life (PBI43)	0.762	0.038	0.000	1.003	0.041	0.000
Believes in showing his love for me (PBI45)	0.979	0.019	0.000	0.962	0.028	0.000
Often praises me (PBI47)	0.831	0.032	0.000	0.754	0.070	0.000
Is easy to talk to (PBI48)	0.909	0.024	0.000	0.901	0.040	0.000
Factor: Psychological Control						
Blames me for other family member's problems (PBI38)	1.000	0.000	999.000	1.000	0.000	999.000
Changes the subject whenever I have something to say (PBI32)	0.977	0.146	0.000	0.871	0.080	0.000
Always tries to change how I feel or think about things (PBI34)	0.591	0.123	0.000	0.412	0.131	0.002
Often interrupts me (PBI35)	0.894	0.130	0.000	0.983	0.121	0.000
Brings up my past mistakes when she criticizes me (PBI40)	0.989	0.156	0.000	0.841	0.159	0.000
Is less friendly with me if I do not see things his way (PBI41)	0.623	0.103	0.000	0.665	0.112	0.000
Will avoid looking at me when I have disappointed him (PBI44)	0.959	0.101	0.000	0.936	0.072	0.000
If I have hurt his feelings, stops talking to me until I please him again (PBI46)	0.968	0.107	0.000	0.754	0.118	0.000
Factor: Knowledge						
Where you go at night? (PBI52)	1.000	0.000	999.000	1.000	0.000	999.000
Who your friends are? (PBI51)	0.897	0.049	0.000	1.203	0.231	0.000
How you spend your money? (PBI53)	0.859	0.051	0.000	0.984	0.159	0.000
What you do with your free time? (PBI54)	0.947	0.049	0.000	1.321	0.180	0.000
Where you are most afternoons after school? (PBI55)	0.894	0.045	0.000	1.324	0.168	0.000
Correlations Among Parenting Factors						
Psychological Control with Warmth	-0.274	0.064	0.000	-0.321	0.093	0.001
Knowledge with Warmth	0.671	0.049	0.000	0.406	0.096	0.000
Knowledge with Psychological Control	-0.225	0.066	0.001	-0.086	0.085	0.311

Table 3.6. Factor Loadings of Indicators in Multiple-Group Configural Invariant Model of Father Parenting without Item 34 (using WLSMV estimator)

Parenting Items	European Americans			Asian Americans		
	<i>b</i>	SE	<i>P</i>	<i>b</i>	SE	<i>p</i>
Factor: Warmth						
Is able to make me feel better when I am upset (PBI36)	1.000	0.000	999.000	1.000	0.000	999.000
Makes me feel better after talking over my worries with him (PBI31)	0.961	0.018	0.000	0.931	0.035	0.000
Smiles at me very often (PBI33)	0.826	0.035	0.000	0.763	0.069	0.000
Enjoys doing things with me (PBI37)	0.981	0.016	0.000	0.953	0.035	0.000
Cheers me up when I am sad (PBI39)	0.981	0.029	0.000	0.953	0.033	0.000
Gives me a lot of care and attention (PBI42)	0.978	0.017	0.000	0.947	0.033	0.000
Makes me feel like the most important person in his life (PBI43)	0.763	0.038	0.000	1.003	0.041	0.000
Believes in showing his love for me (PBI45)	0.979	0.019	0.000	0.962	0.028	0.000
Often praises me (PBI47)	0.830	0.032	0.000	0.755	0.069	0.000
Is easy to talk to (PBI48)	0.910	0.024	0.000	0.902	0.041	0.000
Factor: Psychological Control						
Blames me for other family member's problems (PBI38)	1.000	0.000	999.000	1.000	0.000	999.000
Changes the subject whenever I have something to say (PBI32)	0.975	0.150	0.000	0.865	0.089	0.000
Always tries to change how I feel or think about things (PBI34)	--	--	--	--	--	--
Often interrupts me (PBI35)	0.877	0.134	0.000	1.002	0.130	0.000
Brings up my past mistakes when she criticizes me (PBI40)	0.998	0.160	0.000	0.865	0.162	0.000
Is less friendly with me if I do not see things his way (PBI41)	0.619	0.104	0.000	0.617	0.120	0.000
Will avoid looking at me when I have disappointed him (PBI44)	0.980	0.104	0.000	0.938	0.077	0.000
If I have hurt his feelings, stops talking to me until I please him again (PBI46)	0.977	0.108	0.000	0.751	0.123	0.000
Factor: Knowledge						
Where you go at night? (PBI52)	1.000	0.000	999.000	1.000	0.000	999.000
Who your friends are? (PBI51)	0.897	0.049	0.000	1.204	0.230	0.000
How you spend your money? (PBI53)	0.858	0.051	0.000	0.984	0.159	0.000
What you do with your free time? (PBI54)	0.947	0.049	0.000	1.320	0.180	0.000
Where you are most afternoons after school? (PBI55)	0.895	0.045	0.000	1.323	0.168	0.000
Correlations Among Parenting Factors						
Psychological Control with Warmth	-0.277	0.064	0.000	-0.344	0.093	0.000
Knowledge with Warmth	0.670	0.049	0.000	0.406	0.096	0.000
Knowledge with Psychological Control	-0.227	0.066	0.001	-0.083	0.084	0.320

Table 3.7. Measurement Invariance Testing of a Three-Factor Model of Mother Parenting across Ethnicity (using WLSMV estimator)

	χ^2	df	<i>p</i>	RMSEA (90% CI)	CFI	TLI	WRMR	Δ in χ^2	Δ in df	<i>p</i>
1. Configural invariance										
With all items	515.029	454	0.0248	0.029 (0.011-0.041)	0.989	0.988	1.111	--	--	--
Without item 4 (Baseline Model)	464.379	412	0.0379	0.028 (0.007-0.040)	0.991	0.990	1.083	--	--	--
2. Metric invariance (vs. 1)	480.272	431	0.0504	0.027 (0.000-0.039)	0.991	0.991	1.102	16.257	19	0.6400
3a. Scalar invariance	--	--	--	--	--	--	--	--	--	--
3a versus 1	508.578	450	0.0290	0.028 (0.010-0.040)	0.990	0.989	1.149	53.913	38	0.0452
3a versus 2	508.578	450	0.0290	0.028 (0.010-0.040)	0.990	0.989	1.149	42.990	19	0.0013
3b. Partial scalar invariance (<i>p</i> < .05)	--	--	--	--	--	--	--	--	--	--
3b versus 1	501.354	448	0.0411	0.027 (0.006-0.039)	0.991	0.990	1.132	42.852	36	0.2008
3b versus 2	501.354	448	0.0411	0.027 (0.006-0.039)	0.991	0.990	1.132	29.196	17	0.0328
3c. Partial scalar invariance (<i>p</i> < .10)	--	--	--	--	--	--	--	--	--	--
3c versus 1	495.800	447	0.0550	0.026 (0.000-0.038)	0.991	0.991	1.118	32.857	35	0.5720
3c versus 2	495.800	447	0.0550	0.026 (0.000-0.038)	0.991	0.991	1.118	16.883	16	0.3932
Comparison with Model 3c (Preliminary)										
4a. Invariant factor variances (vs. 3c) ^a	506.560	450	0.0334	0.028 (0.009-0.040)	0.990	0.990	1.156	8.509	3	0.0366
4b. Partial invariant factor variances (vs. 3c)	493.903	448	0.0660	0.025 (0.000-0.038)	0.992	0.992	1.119	1.154	1	0.2827
5. Invariant scale factors (vs. 4b) ^b	508.804	470	0.1049	0.023 (0.000-0.036)	0.993	0.993	1.195	22.869	22	0.4092
6. Invariant factor covariances (vs. 5)	509.406	473	0.1198	0.022 (0.000-0.035)	0.994	0.994	1.294	4.231	3	0.2376
7. Invariant factor means (vs. 6)	563.942	476	0.0033	0.034 (0.021-0.044)	0.985	0.985	1.503	26.958	3	0.0000
Comparison with Model 3b (Final)										
4. Invariant factor variances (vs. 3b) ^c	509.543	451	0.0292	0.028 (0.010-0.040)	0.990	0.989	1.162	7.009	3	0.0716
5. Invariant scale factors (vs. 4) ^d	525.201	473	0.0485	0.026 (0.002-0.038)	0.991	0.991	1.257	24.487	22	0.3222
6. Invariant factor covariances (vs. 5)	522.886	476	0.0676	0.025 (0.000-0.037)	0.992	0.992	1.353	4.242	3	0.2365
7. Invariant factor means (vs. 6)	573.949	479	0.0018	0.035 (0.022-0.045)	0.983	0.984	1.550	26.009	3	0.0000

Note. RMSEA = root mean square error of approximation, CI = confidence interval, CFI = comparative fit index, TLI = Tucker-Lewis index, and WRMR = weighted root-mean-square residual. ^a Testing invariance of scale factors as step 4 yielded the following model fit statistics: $\chi^2 = 517.842$, *df* = 469, *p* = 0.0589, RMSEA = 0.025 (0.000-0.038), CFI = 0.991, TLI = 0.992, WRMR = 1.195, Δ in $\chi^2 = 26.928$, *df* = 22, *p* = 0.2140. ^b Testing invariance of invariance of factor variances as step 5 yielded the following model fit statistics: $\chi^2 = 522.582$, *df* = 472, *p* = 0.0534, RMSEA = 0.026 (0.000-0.038), CFI = 0.991, TLI = 0.991, WRMR = 1.252, Δ in $\chi^2 = 4.923$, *df* = 3, *p* = 0.1775. ^c Testing invariance of scale factors as step 4 yielded the following model fit statistics: $\chi^2 = 520.668$, *df* = 470, *p* = 0.0528, RMSEA = 0.026 (0.000-0.038), CFI = 0.991, TLI = 0.991, WRMR = 1.201, Δ in $\chi^2 = 24.871$, *df* = 22, *p* = 0.3033. ^d Testing invariance of factor variances as step 5 yielded the following model fit statistics: $\chi^2 = 525.201$, *df* = 473, *p* = 0.0485, RMSEA = 0.026 (0.002-0.038), CFI = 0.991, TLI = 0.991, WRMR = 1.257, Δ in $\chi^2 = 4.928$, *df* = 3, *p* = 0.1771.

Table 3.8. Factor Loadings of Indicators in Multiple-Group Metric Invariant Model of Mother Parenting without Item 4 (factor loadings fixed across groups)

Parenting Items	European Americans			Asian Americans		
	<i>b</i>	SE	<i>P</i>	<i>b</i>	SE	<i>p</i>
Factor: Warmth						
Is able to make me feel better when I am upset (PBI6)	1.000	0.000	999.000	1.000	0.000	999.000
Makes me feel better after talking over my worries with her (PBI1)	0.877	0.036	0.000	0.877	0.036	0.000
Smiles at me very often (PBI3)	0.759	0.054	0.000	0.759	0.054	0.000
Enjoys doing things with me (PBI7)	0.894	0.042	0.000	0.894	0.042	0.000
Cheers me up when I am sad (PBI9)	0.979	0.024	0.000	0.979	0.024	0.000
Gives me a lot of care and attention (PBI12)	0.868	0.052	0.000	0.868	0.052	0.000
Makes me feel like the most important person in her life (PBI13)	0.704	0.056	0.000	0.704	0.056	0.000
Believes in showing her love for me (PBI15)	0.863	0.045	0.000	0.863	0.045	0.000
Often praises me (PBI17)	0.769	0.049	0.000	0.769	0.049	0.000
Is easy to talk to (PBI18)	0.891	0.035	0.000	0.891	0.035	0.000
Factor: Psychological Control						
Blames me for other family member's problems (PBI8)	1.000	0.000	999.000	1.000	0.000	999.000
Changes the subject whenever I have something to say (PBI2)	0.913	0.041	0.000	0.913	0.041	0.000
Often interrupts me (PBI5)	0.826	0.051	0.000	0.826	0.051	0.000
Brings up my past mistakes when she criticizes me (PBI10)	0.832	0.035	0.000	0.832	0.035	0.000
Is less friendly with me if I do not see things her way (PBI11)	0.884	0.040	0.000	0.884	0.040	0.000
Will avoid looking at me when I have disappointed her (PBI14)	0.883	0.032	0.000	0.883	0.032	0.000
If I have hurt her feelings, stops talking to me until I please her again (PBI16)	0.852	0.037	0.000	0.852	0.037	0.000
Factor: Knowledge						
Where you go at night? (PBI22)	1.000	0.000	999.000	1.000	0.000	999.000
Who your friends are? (PBI21)	0.995	0.100	0.000	0.995	0.100	0.000
How you spend your money? (PBI23)	0.975	0.092	0.000	0.975	0.092	0.000
What you do with your free time? (PBI24)	0.995	0.093	0.000	0.995	0.093	0.000
Where you are most afternoons after school? (PBI25)	0.988	0.098	0.000	0.988	0.098	0.000
Correlations Among Parenting Factors						
Psychological Control with Warmth	-0.292	0.073	0.000	-0.178	0.082	0.031
Knowledge with Warmth	0.553	0.070	0.000	0.261	0.126	0.038
Knowledge with Psychological Control	-0.199	0.065	0.002	-0.006	0.043	0.882

Table 3.9. Identification of Non-Invariant Thresholds in Mother Parenting Model Using One-Degree-of-Freedom Chi-Square Tests

	<i>Compared to Mother Parenting Metric Invariance Model</i>		
	Δ in χ^2	Δ in df	<i>p</i>
Factor: Warmth			
Makes me feel better after talking over my worries with her (PBI1)	2.516	1	0.1127
Smiles at me very often (PBI3)	0.079	1	0.7788
Enjoys doing things with me (PBI7)	2.131	1	0.1444
Cheers me up when I am sad (PBI9)	1.934	1	0.1643
Gives me a lot of care and attention (PBI12)	1.735	1	0.1878
Makes me feel like the most important person in her life (PBI13)	5.422	1	0.0199
Believes in showing her love for me (PBI15)	1.672	1	0.1960
Often praises me (PBI17)	1.504	1	0.2201
Is easy to talk to (PBI18)	0.094	1	0.7595
Factor: Psychological Control			
Changes the subject whenever I have something to say (PBI2)	2.132	1	0.1442
Often interrupts me (PBI5)	1.467	1	0.2258
Brings up my past mistakes when she criticizes me (PBI10)	6.631	1	0.0100
Is less friendly with me if I do not see things her way (PBI11)	1.210	1	0.2713
Will avoid looking at me when I have disappointed her (PBI14)	1.001	1	0.3172
If I have hurt her feelings, stops talking to me until I please her again (PBI16)	0.628	1	0.4281
Factor: Knowledge			
Who your friends are? (PBI21)	1.112	1	0.2917
How you spend your money? (PBI23)	3.473	1	0.0624
What you do with your free time? (PBI24)	1.537	1	0.2150
Where you are most afternoons after school? (PBI25)	1.294	1	0.2552

Table 3.10. Thresholds of Indicators in Multiple-Group Partial Scalar Invariant Model 3b of Mother Parenting without Item 4

Parenting Items	Threshold #1			Threshold #2		
	<i>b</i>	SE	<i>P</i>	<i>b</i>	SE	<i>p</i>
Factor: Warmth						
Is able to make me feel better when I am upset (PBI6)	-1.518	0.127	0.000	-0.550	0.091	0.000
Makes me feel better after talking over my worries with her (PBI1)	-1.609	0.117	0.000	-0.533	0.090	0.000
Smiles at me very often (PBI3)	-1.877	0.142	0.000	-0.524	0.085	0.000
Enjoys doing things with me (PBI7)	-1.846	0.147	0.000	-0.852	0.092	0.000
Cheers me up when I am sad (PBI9)	-1.534	0.138	0.000	-0.597	0.091	0.000
Gives me a lot of care and attention (PBI12)	-1.877	0.142	0.000	-0.722	0.091	0.000
Makes me feel like the most important person in her life (PBI13)	-1.424	0.113	0.000	-0.011	0.091	0.901
Non-invariant threshold: Asian American	-1.424	0.113	0.000	-0.467	0.132	0.000
Believes in showing her love for me (PBI15)	-1.967	0.143	0.000	-0.802	0.093	0.000
Often praises me (PBI17)	-1.344	0.114	0.000	-0.086	0.087	0.323
Is easy to talk to (PBI18)	-1.502	0.116	0.000	-0.430	0.089	0.000
Factor: Psychological Control						
Blames me for other family member's problems (PBI8)	0.788	0.095	0.000	1.151	0.106	0.000
Changes the subject whenever I have something to say (PBI2)	0.637	0.087	0.000	1.059	0.102	0.000
Often interrupts me (PBI5)	0.426	0.080	0.000	1.159	0.109	0.000
Brings up my past mistakes when she criticizes me (PBI10)	0.041	0.090	0.647	1.129	0.105	0.000
Non-invariant threshold: Asian American	0.041	0.090	0.647	0.708	0.167	0.000
Is less friendly with me if I do not see things her way (PBI11)	0.424	0.084	0.000	1.024	0.098	0.000
Will avoid looking at me when I have disappointed her (PBI14)	0.341	0.083	0.000	1.102	0.108	0.000
If I have hurt her feelings, stops talking to me until I please her again (PBI16)	0.400	0.083	0.000	1.042	0.102	0.000
Factor: Knowledge						
Where you go at night? (PBI22)	-1.825	0.164	0.000	-1.118	0.104	0.000
Who your friends are? (PBI21)	-1.596	0.158	0.000	-0.163	0.089	0.069
How you spend your money? (PBI23)	-1.834	0.147	0.000	-0.473	0.086	0.000
What you do with your free time? (PBI24)	-1.428	0.122	0.000	-0.662	0.089	0.000
Where you are most afternoons after school? (PBI25)	-1.662	0.156	0.000	-1.025	0.099	0.000

Note. Two thresholds were freed across groups in this partial scalar invariance model.

Table 3.11. Thresholds of Indicators in Multiple-Group Partial Scalar Invariant Model 3c of Mother Parenting without Item 4

Parenting Items	Threshold #1			Threshold #2		
	<i>b</i>	SE	<i>P</i>	<i>b</i>	SE	<i>p</i>
Factor: Warmth						
Is able to make me feel better when I am upset (PBI6)	-1.518	0.127	0.000	-0.550	0.091	0.000
Makes me feel better after talking over my worries with her (PBI1)	-1.609	0.117	0.000	-0.533	0.090	0.000
Smiles at me very often (PBI3)	-1.877	0.142	0.000	-0.524	0.085	0.000
Enjoys doing things with me (PBI7)	-1.846	0.147	0.000	-0.852	0.092	0.000
Cheers me up when I am sad (PBI9)	-1.534	0.138	0.000	-0.597	0.091	0.000
Gives me a lot of care and attention (PBI12)	-1.877	0.142	0.000	-0.722	0.091	0.000
Makes me feel like the most important person in her life (PBI13)	-1.424	0.113	0.000	-0.011	0.091	0.901
Non-invariant threshold: Asian American	-1.424	0.113	0.000	-0.467	0.132	0.000
Believes in showing her love for me (PBI15)	-1.967	0.143	0.000	-0.802	0.093	0.000
Often praises me (PBI17)	-1.344	0.114	0.000	-0.086	0.087	0.323
Is easy to talk to (PBI18)	-1.502	0.116	0.000	-0.430	0.089	0.000
Factor: Psychological Control						
Blames me for other family member's problems (PBI8)	0.788	0.095	0.000	1.151	0.106	0.000
Changes the subject whenever I have something to say (PBI2)	0.637	0.087	0.000	1.059	0.102	0.000
Often interrupts me (PBI5)	0.426	0.080	0.000	1.158	0.109	0.000
Brings up my past mistakes when she criticizes me (PBI10)	0.041	0.090	0.647	1.129	0.105	0.000
Non-invariant threshold: Asian American	0.041	0.090	0.647	0.708	0.167	0.000
Is less friendly with me if I do not see things her way (PBI11)	0.424	0.084	0.000	1.024	0.098	0.000
Will avoid looking at me when I have disappointed her (PBI14)	0.341	0.083	0.000	1.102	0.108	0.000
If I have hurt her feelings, stops talking to me until I please her again (PBI16)	0.399	0.083	0.000	1.042	0.102	0.000
Factor: Knowledge						
Where you go at night? (PBI22)	-1.811	0.162	0.000	-1.142	0.103	0.000
Who your friends are? (PBI21)	-1.603	0.158	0.000	-0.210	0.091	0.021
How you spend your money? (PBI23)	-1.826	0.148	0.000	-0.355	0.092	0.000
Non-invariant threshold: Asian American	-1.826	0.148	0.000	-0.916	0.150	0.000
What you do with your free time? (PBI24)	-1.427	0.120	0.000	-0.707	0.089	0.000
Where you are most afternoons after school? (PBI25)	-1.643	0.154	0.000	-1.052	0.099	0.000

Note. Three thresholds were freed across groups in this partial scalar invariance model.

Table 3.12. Identification of mother parenting non-invariant factor variances and factor means using one degree of freedom chi-square tests

	<i>Compared to Partial Scalar Model 3c</i>		
Factor Variances	Δ in χ^2	Δ in df	<i>p</i>
Fix mother warmth	1.154	1	0.2827
Fix mother psychological control	8.799	1	0.0030
Fix mother knowledge	5.997	1	0.0143
	<i>Compared to Invariant Factor Covariances Model 6 Following Model 3c (Preliminary)</i>		
Factor Means	Δ in χ^2	Δ in df	<i>p</i>
Fix mother warmth factor mean to zero	11.840	1	0.0006
Fix mother psychological control factor mean to zero	4.551	1	0.0329
Fix mother knowledge factor mean to zero	16.703	1	0.0000
	<i>Compared to Invariant Factor Covariances Model 6 Following Model 3b (Final)</i>		
Factor Means	Δ in χ^2	Δ in df	<i>p</i>
Fix mother warmth factor mean to zero	11.840	1	0.0006
Fix mother psychological control factor mean to zero	3.554	1	0.0594
Fix mother knowledge factor mean to zero	13.455	1	0.0002

Table 3.13. Measurement Invariance Testing of a Three-Factor Model of Father Parenting across Ethnicity (using WLSMV estimator)

	χ^2	df	<i>p</i>	RMSEA (90% CI)	CFI	TLI	WRMR	Δ in χ^2	Δ in df	<i>p</i>
1. Configural invariance										
With all items	620.378	454	0.0000	0.048 (0.038-0.057)	0.983	0.982	1.344	--	--	--
Without item 4 (Baseline Model)	555.252	412	0.0000	0.046 (0.036-0.056)	0.986	0.984	1.281	--	--	--
2. Metric invariance (vs. 1)	572.091	431	0.0000	0.045 (0.034-0.054)	0.986	0.985	1.295	19.607	19	0.4186
3. Scalar invariance	--	--	--	--	--	--	--	--	--	--
3 versus 1	591.484	450	0.0000	0.044 (0.034-0.053)	0.986	0.986	1.332	47.848	38	0.1314
3 versus 2	591.484	450	0.0000	0.044 (0.034-0.053)	0.986	0.986	1.332	29.155	19	0.0636
4. Invariant factor variances (vs. 3) ^a	586.294	453	0.0000	0.043 (0.032-0.052)	0.987	0.987	1.335	1.183	3	0.7572
5a. Invariant scale factors (vs. 4) ^b	608.020	475	0.0000	0.042 (0.031-0.051)	0.987	0.987	1.481	36.928	22	0.0241
5b. Partial invariant scale factors (vs. 4)	591.686	474	0.0002	0.039 (0.028-0.049)	0.988	0.989	1.432	27.017	21	0.1703
6. Invariant factor covariances (vs. 5)	571.652	477	0.0018	0.035 (0.022-0.045)	0.991	0.991	1.508	3.905	3	0.2719
7. Invariant factor means (vs. 6)	622.935	480	0.0000	0.043 (0.033-0.052)	0.986	0.986	1.692	24.150	3	0.0000

Note. RMSEA = root mean square error of approximation, CI = confidence interval, CFI = comparative fit index, TLI = Tucker-Lewis index, and WRMR = weighted root-mean-square residual. ^a Testing invariance of scale factors as step 4 yielded the following model fit statistics: $\chi^2 = 629.257$, $df = 472$, $p = 0.0000$, RMSEA = 0.045 (0.035-0.054), CFI = 0.985, TLI = 0.985, WRMR = 1.465, Δ in $\chi^2 = 46.086$, $df = 22$, $p = 0.0019$. ^b Testing invariance of invariance of factor variances as step 5 yielded the following model fit statistics: $\chi^2 = 608.020$, $df = 475$, $p = 0.0000$, RMSEA = 0.042 (0.031-0.051), CFI = 0.987, TLI = 0.987, WRMR = 1.481, Δ in $\chi^2 = 2.715$, $df = 3$, $p = 0.4376$.

Table 3.14. Factor Loadings of Indicators in Multiple-Group Metric Invariant Model of Father Parenting without Item 34 (factor loadings fixed across groups)

Parenting Items	European Americans			Asian Americans		
	<i>b</i>	SE	<i>P</i>	<i>b</i>	SE	<i>p</i>
Factor: Warmth						
Is able to make me feel better when I am upset (PBI36)	1.000	0.000	999.000	1.000	0.000	999.000
Makes me feel better after talking over my worries with him (PBI31)	0.962	0.018	0.000	0.962	0.018	0.000
Smiles at me very often (PBI33)	0.828	0.034	0.000	0.828	0.034	0.000
Enjoys doing things with me (PBI37)	0.981	0.016	0.000	0.981	0.016	0.000
Cheers me up when I am sad (PBI39)	0.981	0.029	0.000	0.981	0.029	0.000
Gives me a lot of care and attention (PBI42)	0.978	0.017	0.000	0.978	0.017	0.000
Makes me feel like the most important person in his life (PBI43)	0.765	0.037	0.000	0.765	0.037	0.000
Believes in showing his love for me (PBI45)	0.979	0.019	0.000	0.979	0.019	0.000
Often praises me (PBI47)	0.832	0.031	0.000	0.832	0.031	0.000
Is easy to talk to (PBI48)	0.911	0.024	0.000	0.911	0.024	0.000
Factor: Psychological Control						
Blames me for other family member's problems (PBI38)	1.000	0.000	999.000	1.000	0.000	999.000
Changes the subject whenever I have something to say (PBI32)	0.960	0.138	0.000	0.960	0.138	0.000
Often interrupts me (PBI35)	0.866	0.122	0.000	0.866	0.122	0.000
Brings up my past mistakes when she criticizes me (PBI40)	0.977	0.140	0.000	0.977	0.140	0.000
Is less friendly with me if I do not see things his way (PBI41)	0.617	0.100	0.000	0.617	0.100	0.000
Will avoid looking at me when I have disappointed him (PBI44)	0.964	0.098	0.000	0.964	0.098	0.000
If I have hurt his feelings, stops talking to me until I please him again (PBI46)	0.950	0.102	0.000	0.950	0.102	0.000
Factor: Knowledge						
Where you go at night? (PBI52)	1.000	0.000	999.000	1.000	0.000	999.000
Who your friends are? (PBI51)	0.908	0.049	0.000	0.908	0.049	0.000
How you spend your money? (PBI53)	0.865	0.051	0.000	0.865	0.051	0.000
What you do with your free time? (PBI54)	0.957	0.049	0.000	0.957	0.049	0.000
Where you are most afternoons after school? (PBI55)	0.905	0.045	0.000	0.905	0.045	0.000
Correlations Among Parenting Factors						
Psychological Control with Warmth	-0.281	0.064	0.000	-0.271	0.126	0.032
Knowledge with Warmth	0.665	0.049	0.000	0.234	0.108	0.030
Knowledge with Psychological Control	-0.228	0.066	0.001	-0.074	0.079	0.353

Table 3.15. Thresholds of Indicators in Multiple-Group Scalar Invariant Model of Father Parenting without Item 34

Parenting Items	Threshold #1			Threshold #2		
	<i>b</i>	SE	<i>P</i>	<i>b</i>	SE	<i>p</i>
Factor: Warmth						
Is able to make me feel better when I am upset (PBI36)	-1.368	0.129	0.000	-0.346	0.087	0.000
Makes me feel better after talking over my worries with him (PBI31)	-1.223	0.119	0.000	-0.203	0.087	0.020
Smiles at me very often (PBI33)	-1.345	0.126	0.000	-0.244	0.086	0.004
Enjoys doing things with me (PBI37)	-1.556	0.139	0.000	-0.947	0.104	0.000
Cheers me up when I am sad (PBI39)	-1.409	0.133	0.000	-0.504	0.089	0.000
Gives me a lot of care and attention (PBI42)	-1.540	0.139	0.000	-0.549	0.091	0.000
Makes me feel like the most important person in his life (PBI43)	-1.202	0.104	0.000	-0.025	0.078	0.754
Believes in showing his love for me (PBI45)	-1.565	0.141	0.000	-0.615	0.091	0.000
Often praises me (PBI47)	-1.124	0.109	0.000	-0.083	0.084	0.328
Is easy to talk to (PBI48)	-1.281	0.124	0.000	-0.265	0.086	0.002
Factor: Psychological Control						
Blames me for other family member's problems (PBI38)	1.375	0.117	0.000	2.121	0.179	0.000
Changes the subject whenever I have something to say (PBI32)	1.035	0.100	0.000	1.881	0.156	0.000
Often interrupts me (PBI35)	0.793	0.091	0.000	1.887	0.163	0.000
Brings up my past mistakes when she criticizes me (PBI40)	0.503	0.085	0.000	1.458	0.125	0.000
Is less friendly with me if I do not see things his way (PBI41)	0.763	0.094	0.000	1.794	0.154	0.000
Will avoid looking at me when I have disappointed him (PBI44)	0.724	0.093	0.000	1.830	0.146	0.000
If I have hurt his feelings, stops talking to me until I please him again (PBI46)	0.970	0.100	0.000	2.117	0.171	0.000
Factor: Knowledge						
Where you go at night? (PBI52)	-1.191	0.117	0.000	-0.606	0.095	0.000
Who your friends are? (PBI51)	-0.992	0.110	0.000	0.425	0.093	0.000
How you spend your money? (PBI53)	-1.017	0.107	0.000	0.072	0.088	0.414
What you do with your free time? (PBI54)	-1.038	0.106	0.000	-0.122	0.087	0.162
Where you are most afternoons after school? (PBI55)	-0.975	0.106	0.000	-0.246	0.086	0.004

Table 3.16. Identification of Non-Invariant Scale Factors in the Father Parenting Model Using One-Degree-of-Freedom Chi-Square Tests

	<i>Compared to Invariant Factor Variances Model (Model 4)</i>		
	Δ in χ^2	Δ in df	<i>p</i>
Factor: Warmth			
Is able to make me feel better when I am upset (PBI36)	0.943	1	0.3316
Makes me feel better after talking over my worries with him (PBI31)	1.338	1	0.2473
Smiles at me very often (PBI33)	1.977	1	0.1597
Enjoys doing things with me (PBI37)	0.930	1	0.3350
Cheers me up when I am sad (PBI39)	0.321	1	0.5708
Gives me a lot of care and attention (PBI42)	1.795	1	0.1803
Makes me feel like the most important person in his life (PBI43)	19.794	1	0.0000
Believes in showing his love for me (PBI45)	0.758	1	0.3839
Often praises me (PBI47)	1.321	1	0.2504
Is easy to talk to (PBI48)	0.239	1	0.6251
Factor: Psychological Control			
Blames me for other family member's problems (PBI38)	0.031	1	0.8607
Changes the subject whenever I have something to say (PBI32)	1.000	1	0.3173
Often interrupts me (PBI35)	5.335	1	0.0209
Brings up my past mistakes when she criticizes me (PBI40)	0.344	1	0.5574
Is less friendly with me if I do not see things his way (PBI41)	1.097	1	0.2949
Will avoid looking at me when I have disappointed him (PBI44)	2.083	1	0.1490
If I have hurt his feelings, stops talking to me until I please him again (PBI46)	1.643	1	0.1999
Factor: Knowledge			
Where you go at night? (PBI52)	5.820	1	0.0158
Who your friends are? (PBI51)	1.091	1	0.2963
How you spend your money? (PBI53)	1.479	1	0.2239
What you do with your free time? (PBI54)	1.615	1	0.2038
Where you are most afternoons after school? (PBI55)	5.313	1	0.0212

Table 3.17. Identification of father parenting non-invariant factor means using one degree of freedom chi-square tests

	<i>Compared to Invariant Factor Covariances Model (6)</i>		
	Δ in χ^2	Δ in df	<i>p</i>
Fix mother warmth factor mean to zero	10.724	1	0.0011
Fix mother psychological control factor mean to zero	9.389	1	0.0022
Fix mother knowledge factor mean to zero	7.210	1	0.0073

Table 4.1. Comparison of count and zero-inflated models for alcohol problems as the outcome

Type of Count Model	Model with age as the predictor					
	Alcohol Problems at Grade 9			Alcohol Problems at Grade 12		
	Loglikelihood	AIC	BIC	Loglikelihood	AIC	BIC
Ordinal Least Square	-1130.602	2271.204	2290.522	-1400.030	2810.059	2829.377
Poisson	-1049.181	2106.362	2121.816	-2202.838	4413.677	4429.131
Negative Binomial	-468.411	946.823	966.141	-895.503	1801.006	1820.324
Zero-Inflated Poisson	-549.568	1111.136	1134.318	-1389.603	2791.205	2814.387
Zero-Inflated Negative Binomial	-465.066	944.131	971.177	-893.497	1800.994	1828.040
Hurdle Negative Binomial	-465.068	944.137	971.182	-894.276	1802.552	1829.597
Type of Count Model	Model with grade 8 academic achievement and externalizing problems as predictors					
	Alcohol Problems at Grade 9			Alcohol Problems at Grade 12		
	Loglikelihood	AIC	BIC	Loglikelihood	AIC	BIC
Ordinal Least Square	-2313.401	4644.803	4679.576	-2586.669	5191.338	5226.111
Poisson	-2146.322	4308.645	4339.554	-3279.462	6574.924	6605.833
Negative Binomial	-1655.409	3328.819	3363.591	-2082.953	4183.906	4218.679
Zero-Inflated Poisson	-1721.053	3464.107	3506.607	-2508.586	5039.172	5081.672
Zero-Inflated Negative Binomial	-1647.133 ^a	3318.266	3364.630	-2074.828	4173.656	4220.020
Hurdle Negative Binomial	-1653.804 ^b	3331.608	3377.972	-2081.906	4187.812	4234.176

^a The zero-inflated negative binomial model was not identified due to singularity of the information matrix.

^b The hurdle negative binomial model estimation reached a saddle point. A re-estimation using 10 random start values and 1 final stage starting values yielded the following model fit statistics: Loglikelihood = -1649.553, AIC = 3323.105, and BIC = 3369.469.

Table 4.2. Direct effects of mother parenting at grade 7 on alcohol use at grade 9 ($n = 352$)

Predictors	Full model				Trimmed model			
	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.490	0.391	-1.255	0.209	--	--	--	--
Gender	0.055	0.282	0.196	0.845	--	--	--	--
Mother drinking	0.901	0.379	2.375	0.018	0.911	0.371	2.453	0.014
Baseline alcohol use	0.657	0.523	1.255	0.209	0.696	0.516	1.350	0.177
Ethnicity	-0.540	0.389	-1.387	0.166	-0.471	0.349	-1.349	0.177
Mother warmth	-0.282	0.407	-0.693	0.488	-0.109	0.374	-0.293	0.770
Mother psychological control	0.261	0.278	0.941	0.347	<i>0.486</i>	<i>0.264</i>	<i>1.845</i>	<i>0.065^a</i>
Mother knowledge	-0.407	0.452	-0.900	0.368	-0.236	0.395	-0.598	0.550
Warmth x ethnicity	0.482	0.769	0.627	0.531	--	--	--	--
Psychological control x ethnicity	0.838	0.655	1.280	0.201	--	--	--	--
Knowledge x ethnicity	0.298	0.811	0.368	0.713	--	--	--	--
					Controlling for outcome variable at baseline and other significant covariate(s)			
Test of suppression effects					<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Model 1 (warmth only):								
Mother warmth	--	--	--	--	-0.480	0.327	-1.466	0.143
Warmth x ethnicity	--	--	--	--	0.284	0.665	0.427	0.669
Model 2 (psychological control only):								
Mother psychological control	--	--	--	--	0.323	0.252	1.281	0.200
Psychological control x ethnicity	--	--	--	--	0.704	0.642	1.096	0.273
Model 3 (knowledge only):								
Mother knowledge	--	--	--	--	-0.538	0.375	-1.435	0.151
Knowledge x ethnicity	--	--	--	--	0.395	0.666	0.594	0.553

Note. Estimator is MLR. Suppression effects were tested using the same set of covariates used in the trimmed model.

^a This trending main effect of mother psychological control was non-significant in both the full and suppression effects models. I further tested a revised suppression effects model in which I removed the non-significant psychological control x ethnicity interaction term. The main effect of mother psychological control on alcohol use became significant ($b = 0.531$, $SE = 0.250$, $p = 0.034$).

Table 4.3. Direct effects of mother parenting at grade 7 on alcohol problems at grade 9 ($n = 352$)

Predictors	Full model				Trimmed model			
	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	0.442	0.541	0.818	0.413	--	--	--	--
Gender	0.250	0.370	0.675	0.500	--	--	--	--
Mother drinking problems	0.230	0.496	0.465	0.642	--	--	--	--
Baseline alcohol problems	0.054	0.059	0.912	0.362	0.064	0.058	1.091	0.275
Ethnicity	-1.062	0.539	-1.971	0.049	-0.898	0.500	-1.796	0.072
Mother warmth	0.317	0.531	0.597	0.550	0.012	0.478	0.026	0.979
Mother psychological control	0.639	0.342	1.870	0.061	0.835	0.333	2.505	0.012
Mother knowledge	-1.318	0.593	-2.224	0.026	-1.096	0.603	-1.818	0.069
Warmth x ethnicity	-0.065	1.241	-0.052	0.958	--	--	--	--
Psychological control x ethnicity	1.797	1.208	1.487	0.137	--	--	--	--
Knowledge x ethnicity	2.728	1.193	2.286	0.022	1.842	0.895	2.059	0.040^a
Controlling for outcome variable at baseline and other significant covariate(s)								
Test of suppression effects					<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Model 1 (warmth only):								
Mother warmth	--	--	--	--	-0.567	0.458	-1.237	0.216
Warmth x ethnicity	--	--	--	--	0.098	1.007	0.097	0.923
Model 2 (psychological control only):								
Mother psychological control	--	--	--	--	0.702	0.332	2.115	0.034^b
Psychological control x ethnicity	--	--	--	--	1.223	1.148	1.066	0.287
Model 3 (knowledge only):								
Mother knowledge	--	--	--	--	-1.272	0.503	-2.527	0.012
Knowledge x ethnicity	--	--	--	--	1.635	0.871	1.877	0.060 ^c

Note. Estimator is MLR. Suppression effects were tested using the same set of covariates used in the trimmed model.

^a I probed the significant mother knowledge x ethnicity interaction in the trimmed model. Mother knowledge had a trending protective effect on grade 9 alcohol problems among European Americans ($b = -1.096$, $SE = 0.603$, $p = 0.069$), but this protective effect was non-significant among Asian Americans ($b = 0.746$, $SE = 0.794$, $p = 0.348$).

^b The main effect of mother psychological control remained significant after removing the mother psychological control x ethnicity interaction from the suppression effect model ($b = 0.898$, $SE = 0.355$, $p = 0.011$).

^c I also probed the trending mother knowledge x ethnicity interaction in the suppression effects model. Mother knowledge was protective against alcohol use at grade 9 among European Americans ($b = -1.272$, $SE = 0.503$, $p = 0.012$), but this protective effect was non-significant among Asian Americans ($b = 0.363$, $SE = 0.710$, $p = 0.609$).

Table 4.4. Direct effects of mother parenting at grade 7 on alcohol problems at grade 12 ($n = 352$)

Predictors	Full model				Trimmed model			
	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.367	0.351	-1.045	0.296	--	--	--	--
Gender	-0.394	0.257	-1.535	0.125	--	--	--	--
Mother drinking problems	0.833	0.473	1.761	0.078	--	--	--	--
Baseline alcohol problems	0.061	0.040	1.498	0.134	0.050	0.036	1.380	0.168
Ethnicity	-0.027	0.343	-0.079	0.937	-0.292	0.303	-0.965	0.335
Mother warmth	-0.724	0.332	-2.178	0.029	-0.499	0.303	-1.645	0.100
Mother psychological control	0.118	0.247	0.478	0.633	0.087	0.241	0.360	0.719
Mother knowledge	0.624	0.437	1.428	0.153	0.538	0.360	1.495	0.135
Warmth x ethnicity	0.741	0.642	1.153	0.249	--	--	--	--
Psychological control x ethnicity	-0.002	0.765	-0.003	0.998	--	--	--	--
Knowledge x ethnicity	0.255	0.804	0.317	0.751	--	--	--	--
					Controlling for outcome variable at baseline and other significant covariate(s)			
Test of suppression effects					<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Model 1 (warmth only):								
Mother warmth	--	--	--	--	-0.573	0.313	-1.832	0.067 ^a
Warmth x ethnicity	--	--	--	--	0.534	0.653	0.818	0.413
Model 2 (psychological control only):								
Mother psychological control	--	--	--	--	0.268	0.287	0.934	0.350
Psychological control x ethnicity	--	--	--	--	-0.397	0.666	-0.597	0.551
Model 3 (knowledge only):								
Mother knowledge	--	--	--	--	-0.058	0.433	-0.134	0.894
Knowledge x ethnicity	--	--	--	--	0.982	0.710	1.383	0.167

Note. Estimator is MLR. Suppression effects were tested using the same set of covariates used in the trimmed model.

^a Mother warmth was no longer a trending predictor of grade 12 alcohol problems in the mother warmth suppression effect model after the interaction term was removed ($b = -0.388$, $SE = 0.295$, $p = 0.188$).

Table 4.5. Direct effects of mother parenting at grade 7 on CDISC alcohol dependence diagnosis at grade 12 ($n = 352$)

Predictors	Full model				Trimmed model			
	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.370	0.470	-0.788	0.431	--	--	--	--
Gender	-0.570	0.334	-1.707	0.088	--	--	--	--
Mother alcohol problems	0.406	0.613	0.663	0.507	--	--	--	--
Baseline alcohol problems	0.012	0.034	0.366	0.714	0.002	0.031	0.056	0.955
Ethnicity	-0.872	0.397	-2.197	0.028	-0.907	0.389	-2.335	0.020
Mother warmth	-0.870	0.505	-1.724	0.085	-0.220	0.429	-0.512	0.608
Mother psychological control	-0.093	0.285	-0.325	0.745	0.068	0.245	0.278	0.781
Mother knowledge	0.048	0.502	0.096	0.923	-0.272	0.444	-0.613	0.540
Warmth x ethnicity	2.060	1.062	1.940	0.052	--	--	--	--
Psychological control x ethnicity	0.851	0.713	1.195	0.232	--	--	--	--
Knowledge x ethnicity	-0.546	1.032	-0.529	0.597	--	--	--	--
Controlling for outcome variable at baseline and other significant covariate(s)								
Test of suppression effects					<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Model 1 (warmth only):								
Mother warmth	--	--	--	--	-0.848	0.345	-2.458	0.014^a
Warmth x ethnicity	--	--	--	--	1.530	0.812	1.885	0.059 ^b
Model 2 (psychological control only):								
Mother psychological control	--	--	--	--	0.074	0.270	0.275	0.783
Psychological control x ethnicity	--	--	--	--	0.288	0.610	0.472	0.637
Model 3 (knowledge only):								
Mother knowledge	--	--	--	--	-0.573	0.350	-1.638	0.101
Knowledge x ethnicity	--	--	--	--	0.477	0.781	0.611	0.541

Note. Estimator is MLR. Suppression effects were tested using the same set of covariates used in the trimmed model.

^a Mother warmth was no longer protective against alcohol dependence at grade 12 after the removal of the warmth x ethnicity interaction term ($b = -0.380$, $SE = 0.313$, $p = 0.225$).

^b I probed the trending interaction in the mother warmth suppression effect model. Mother warmth was protective against alcohol dependence among European Americans ($b = -0.848$, $SE = 0.345$, $p = 0.014$) and was not associated with alcohol dependence among Asian Americans ($b = 0.682$, $SE = 0.736$, $p = 0.354$).

Table 4.6. Direct effects of mother parenting at grade 7 on CDISC marijuana dependence diagnosis at grade 12 ($n = 352$)

Predictors	Full model				Trimmed model			
	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	0.325	0.395	0.823	0.410	--	--	--	--
Gender	-0.854	0.356	-2.398	0.016	-0.861	0.346	-2.487	0.013
Parent drug problems	1.187	0.434	2.735	0.006	1.193	0.435	2.744	0.006
Baseline marijuana use	2.194	0.644	3.406	0.001	2.095	0.643	3.256	0.001
Ethnicity	-0.784	0.447	-1.753	0.080	-0.671	0.406	-1.651	0.099
Mother warmth	-0.177	0.475	-0.373	0.709	-0.169	0.407	-0.414	0.679
Mother psychological control	0.264	0.253	1.044	0.296	0.351	0.227	1.549	0.121
Mother knowledge	0.300	0.560	0.536	0.592	0.146	0.476	0.306	0.760
Warmth x ethnicity	0.098	0.834	0.118	0.906	--	--	--	--
Psychological control x ethnicity	0.394	0.592	0.666	0.506	--	--	--	--
Knowledge x ethnicity	-0.305	0.998	-0.305	0.760	--	--	--	--
					Controlling for outcome variable at baseline and other significant covariate(s)			
Test of suppression effects					<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Model 1 (warmth only):								
Mother warmth	--	--	--	--	-0.120	0.365	-0.329	0.742
Warmth x ethnicity	--	--	--	--	-0.232	0.668	-0.348	0.728
Model 2 (psychological control only):								
Mother psychological control	--	--	--	--	0.261	0.257	1.015	0.310
Psychological control x ethnicity	--	--	--	--	0.437	0.605	0.723	0.470
Model 3 (knowledge only):								
Mother knowledge	--	--	--	--	0.096	0.420	0.229	0.819
Knowledge x ethnicity	--	--	--	--	-0.331	0.773	-0.428	0.668

Note. Estimator is MLR. Suppression effects were tested using the same set of covariates used in the trimmed model.

Table 4.7. Direct effects of father parenting at grade 7 on alcohol use at grade 9 ($n=352$)

Predictors	Full model				Trimmed model			
	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.667	0.418	-1.593	0.111	--	--	--	--
Gender	0.000	0.287	0.001	0.999	--	--	--	--
Father drinking	0.511	0.318	1.608	0.108	--	--	--	--
Baseline alcohol use	0.899	0.485	1.853	0.064	0.920	0.484	1.902	0.057
Ethnicity	-0.317	0.367	-0.862	0.389	-0.363	0.342	-1.063	0.288
Father warmth	-0.017	0.447	-0.037	0.970	0.369	0.391	0.943	0.346
Father psychological control	-0.562	0.479	-1.175	0.240	-0.215	0.408	-0.526	0.599
Father knowledge	-0.629	0.358	-1.755	0.079	-0.657	0.331	-1.983	0.047
Warmth x ethnicity	0.926	0.868	1.066	0.286	--	--	--	--
Psychological control x ethnicity	0.906	0.842	1.076	0.282	--	--	--	--
Knowledge x ethnicity	-0.177	0.734	-0.241	0.810	--	--	--	--
					Controlling for outcome variable at baseline and other significant covariate(s)			
Test of suppression effects					<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Model 1 (warmth only):								
Father warmth	--	--	--	--	-0.051	0.264	-0.192	0.848
Warmth x ethnicity	--	--	--	--	0.321	0.656	0.490	0.624
Model 2 (psychological control only):								
Father psychological control	--	--	--	--	-0.146	0.326	-0.447	0.655
Psychological control x ethnicity	--	--	--	--	0.168	0.682	0.246	0.806
Model 3 (knowledge only):								
Father knowledge	--	--	--	--	-0.350	0.252	-1.389	0.165 ^a
Knowledge x ethnicity	--	--	--	--	-0.090	0.559	-0.161	0.872

Note. Estimator is MLR. Suppression effects were tested using the same set of covariates used in the trimmed model.

^a The main effect of father knowledge on grade 9 alcohol use remained non-significant after the removal of the knowledge x ethnicity interaction in the mother knowledge suppression effect model ($b = -0.380$, $SE = 0.239$, $p = 0.112$).

Table 4.8. Direct effects of father parenting at grade 7 on alcohol problems at grade 9 ($n = 352$)

Predictors	Full model				Trimmed model			
	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.453	0.572	-0.792	0.429	--	--	--	--
Gender	0.438	0.374	1.171	0.242	--	--	--	--
Father drinking problems	2.064	0.472	4.374	0.000	1.540	0.449	3.432	0.001
Baseline alcohol problems	<i>0.137</i>	<i>0.078</i>	<i>1.763</i>	<i>0.078</i>	0.057	0.069	0.826	0.409
Ethnicity	-0.940	0.459	-2.049	0.040	<i>-0.899</i>	<i>0.511</i>	<i>-1.761</i>	<i>0.078</i>
Father warmth	0.930	0.582	1.597	0.110	<i>0.963</i>	<i>0.571</i>	<i>1.685</i>	<i>0.092</i>
Father psychological control	-0.561	0.509	-1.103	0.270	0.426	0.665	0.641	0.522
Father knowledge	-0.648	0.421	-1.538	0.124	-1.142	0.343	-3.331	0.001
Warmth x ethnicity	0.540	1.140	0.474	0.636	--	--	--	--
Psychological control x ethnicity	1.600	1.020	1.568	0.117	--	--	--	--
Knowledge x ethnicity	<i>-1.249</i>	<i>0.653</i>	<i>-1.914</i>	<i>0.056</i>	--	--	--	--
Controlling for outcome variable at baseline and other significant covariate(s)								
Test of suppression effects					<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Model 1 (warmth only):								
Father warmth	--	--	--	--	0.778	0.394	1.977	0.048^a
Warmth x ethnicity	--	--	--	--	-0.895	0.812	-1.101	0.271
Model 2 (psychological control only):								
Father psychological control	--	--	--	--	<i>-0.760</i>	<i>0.397</i>	<i>-1.916</i>	<i>0.055^b</i>
Psychological control x ethnicity	--	--	--	--	1.124	0.774	1.452	0.146
Model 3 (knowledge only):								
Father knowledge	--	--	--	--	-0.279	0.411	-0.678	0.498 ^c
Knowledge x ethnicity	--	--	--	--	-1.072	0.708	-1.514	0.130

Note. Estimator is MLR. Suppression effects were tested using the same set of covariates used in the trimmed model.

^a Father warmth was no longer a significant predictor of alcohol problems in the father warmth suppression effect model after the removal of warmth x ethnicity interaction term ($b = 0.122$, $SE = 0.531$, $p = 0.818$).

^b The trending effect of father psychological control on grade 9 alcohol problems became non-significant after the removal of the psychological control x ethnicity interaction term ($b = 0.077$, $SE = 0.539$, $p = 0.886$).

^c The non-significant main effect of father knowledge became significant in the suppression effect model after the removal of the knowledge x ethnicity interaction term ($b = -0.896$, $SE = 0.370$, $p = 0.015$).

Table 4.9. Direct effects of father parenting at grade 7 on alcohol problems at grade 12 ($n = 352$)

Predictors	Full model				Trimmed model			
	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.760	0.355	-2.138	0.032	-0.687	0.351	-1.955	0.051
Gender	-0.543	0.251	-2.165	0.030	-0.550	0.255	-2.156	0.031
Father drinking problems	0.897	0.423	2.121	0.034	0.801	0.417	1.923	0.054
Baseline alcohol problems	0.037	0.045	0.822	0.411	0.024	0.041	0.581	0.561
Ethnicity	-0.417	0.324	-1.287	0.198	-0.403	0.330	-1.224	0.221
Father warmth	0.124	0.487	0.254	0.800	0.351	0.381	0.921	0.357
Father psychological control	0.252	0.614	0.410	0.682	0.262	0.447	0.586	0.558
Father knowledge	-0.277	0.353	-0.783	0.433	-0.640	0.279	-2.295	0.022
Warmth x ethnicity	0.387	0.769	0.503	0.615	--	--	--	--
Psychological control x ethnicity	-0.008	0.921	-0.009	0.993	--	--	--	--
Knowledge x ethnicity	-0.733	0.545	-1.346	0.178	--	--	--	--
					Controlling for outcome variable at baseline and other significant covariate(s)			
Test of suppression effects					<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Model 1 (warmth only):								
Father warmth	--	--	--	--	-0.134	0.381	-0.351	0.725
Warmth x ethnicity	--	--	--	--	-0.017	0.579	-0.030	0.976
Model 2 (psychological control only):								
Father psychological control	--	--	--	--	0.342	0.510	0.670	0.503
Psychological control x ethnicity	--	--	--	--	0.061	0.688	0.089	0.929
Model 3 (knowledge only):								
Father knowledge	--	--	--	--	-0.294	0.303	-0.972	0.331 ^a
Knowledge x ethnicity	--	--	--	--	-0.578	0.491	-1.178	0.239

Note. Estimator is MLR. Suppression effects were tested using the same set of covariates used in the trimmed model.

^a Father knowledge was protective against alcohol problems at grade 12 after the removal of the knowledge x ethnicity interaction term ($b = -0.572$, $SE = 0.252$, $p = 0.023$).

Table 4.10. Direct effects of father parenting at grade 7 on CDISC alcohol dependence diagnosis at grade 12

Predictors	Full model				Trimmed model			
	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.755	0.477	-1.582	0.114	--	--	--	--
Gender	-0.654	0.331	-1.974	0.048	-0.610	0.311	-1.961	0.050
Father drinking problems	0.455	0.398	1.144	0.253	--	--	--	--
Baseline alcohol problems	0.012	0.029	0.428	0.669	-0.003	0.030	-0.113	0.910
Ethnicity	-1.358	0.527	-2.579	0.010	-0.915	0.360	-2.539	0.011
Father warmth	-0.432	0.496	-0.870	0.384	0.510	0.462	1.103	0.270
Father psychological control	-0.164	0.486	-0.338	0.735	0.368	0.435	0.846	0.397
Father knowledge	-0.120	0.360	-0.333	0.739	-0.707	0.320	-2.207	0.027
Warmth x ethnicity	2.680	0.946	2.834	0.005	--	--	--	--
Psychological control x ethnicity	1.954	0.926	2.111	0.035	--	--	--	--
Knowledge x ethnicity	-1.842	0.686	-2.686	0.007	--	--	--	--
					Controlling for outcome variable at baseline and other significant covariate(s)			
Test of suppression effects					<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Model 1 (warmth only):								
Father warmth	--	--	--	--	-0.344	0.272	-1.263	0.207
Warmth x ethnicity	--	--	--	--	0.612	0.763	0.801	0.423
Model 2 (psychological control only):								
Father psychological control	--	--	--	--	0.240	0.339	0.709	0.479
Psychological control x ethnicity	--	--	--	--	0.501	0.631	0.794	0.427
Model 3 (knowledge only):								
Father knowledge	--	--	--	--	-0.260	0.259	-1.005	0.315 ^a
Knowledge x ethnicity	--	--	--	--	-1.174	0.647	-1.814	0.070

Note. Estimator is MLR. As the significant parenting x ethnicity interactions were all significant in the full model but became non-significant in the suppression effects models, I tested for suppression effects first before the estimation of the trimmed model, which I treated as the final model.

^a The main effect of father knowledge was significant after the removal of the father knowledge x ethnicity interaction term ($b = -0.581$, $SE = 0.247$, $p = 0.019$).

Table 4.11. Direct effects of father parenting at grade 7 on CDISC marijuana dependence diagnosis at grade 12 ($n = 352$)

Predictors	Full model				Trimmed model			
	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	0.095	0.415	0.228	0.820	--	--	--	--
Gender	-0.873	0.355	-2.457	0.014	-0.930	0.346	-2.689	0.007
Parent drug problems	1.274	0.444	2.868	0.004	1.227	0.436	2.814	0.005
Baseline marijuana use	2.069	0.572	3.617	0.000	1.919	0.574	3.345	0.001
Ethnicity	-1.067	0.476	-2.240	0.025	-0.641	0.409	-1.568	0.117
Father warmth	0.398	0.475	0.837	0.403	<i>0.939</i>	<i>0.529</i>	<i>1.775</i>	<i>0.076</i>
Father psychological control	0.178	0.468	0.380	0.704	0.590	0.423	1.393	0.164
Father knowledge	-0.175	0.384	-0.456	0.649	-0.647	0.427	-1.516	0.130
Warmth x ethnicity	1.734	1.321	1.313	0.189	--	--	--	--
Psychological control x ethnicity	1.465	1.014	1.446	0.148	--	--	--	--
Knowledge x ethnicity	-1.440	0.967	-1.489	0.137	--	--	--	--
					Controlling for outcome variable at baseline and other significant covariate(s)			
Test of suppression effects					<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Model 1 (warmth only):								
Father warmth	--	--	--	--	0.152	0.303	0.502	0.615
Warmth x ethnicity	--	--	--	--	-0.027	0.813	-0.034	0.973
Model 2 (psychological control only):								
Father psychological control	--	--	--	--	0.001	0.333	0.002	0.999
Psychological control x ethnicity	--	--	--	--	0.798	0.664	1.202	0.229
Model 3 (knowledge only):								
Father knowledge	--	--	--	--	-0.049	0.302	-0.161	0.872
Knowledge x ethnicity	--	--	--	--	<i>-1.154</i>	<i>0.676</i>	<i>-1.708</i>	<i>0.088</i>

Note. Estimator is MLR. Suppression effects were tested using the same set of covariates used in the trimmed model. For the suppression effects models, I also tested whether removal of each of the interaction term would change the estimation of the main effects. I found that all of the parenting main effects remained non-significant.

Table 4.12. Summary of direct effects of mother parenting on substance use outcomes moderated by ethnicity

	Grade 9 alcohol use (Table 4.2)	Grade 9 alcohol problems (Table 4.3)	Grade 12 alcohol problems (Table 4.4)	Grade 12 alcohol dependence (Table 4.5)	Grade 12 marijuana dependence (Table 4.6)
Significant covariates	mother drinking	ethnicity	none	ethnicity	gender, parent drug problem, & baseline marijuana use
Main effect of warmth	✘	✘	✘	Suppression model: European Americans: $b = -0.848$, $SE =$ 0.345 , $p = 0.014$ Asian Americans: $b = 0.682$, $SE =$ 0.736 , $p = 0.354$	✘
Main effect of psychological control	Suppression model: b $= 0.531$, $SE = 0.250$, $p = 0.034$	Trimmed model: $b = 0.835$, $SE =$ 0.333 , $p = 0.012$	✘	✘	✘
Main effect of knowledge	✘	Trimmed model: European Americans: $b = -1.096$, $SE =$ 0.603 , $p = 0.069$ Asian Americans: $b = 0.746$, $SE =$ 0.794 , $p = 0.348$	✘	✘	✘
Warmth x ethnicity	✘	✘	✘	Suppression model: $b = 1.530$, $SE =$ 0.812 , $p = 0.059$	✘
Psychological control x ethnicity	✘	✘	✘	✘	✘
Knowledge x ethnicity	✘	Trimmed model: $b = 1.842$, $SE =$ 0.895 , $p = 0.040$	✘	✘	✘

Table 4.13. Summary of direct effects of father parenting on substance use outcomes moderated by ethnicity

	Grade 9 alcohol use (Table 4.7)	Grade 9 alcohol problems (Table 4.8)	Grade 12 alcohol problems (Table 4.9)	Grade 12 alcohol dependence (Table 4.10)	Grade 12 marijuana dependence (Table 4.11)
Significant covariates	none	father drinking problems & ethnicity	age, gender, & father drinking problems	gender & ethnicity	gender, parent drug problem, & baseline marijuana use
Main effect of warmth	✗	✗	✗	✗	✗
Main effect of psychological control	✗	✗	✗	✗	✗
Main effect of knowledge	✗	Trimmed model: $b = -1.142$, SE = 0.343 , $p = 0.001$	Trimmed model: $b = -0.640$, SE = 0.279 , $p = 0.022$	Trimmed model: $b = -0.707$, SE = 0.320 , $p = 0.027$	✗
Warmth x ethnicity	✗	✗	✗	✗	✗
Psychological control x ethnicity	✗	✗	✗	✗	✗
Knowledge x ethnicity	✗	✗	✗	✗	✗

Table 5.1. Exploring suppression effects of mother parenting on grade 8 academic achievement

Predictors	Warmth only				Psychological control only			
	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.083	0.085	-0.971	0.332	-0.114	0.090	-1.275	0.202
Gender	0.084	0.094	0.886	0.376	0.105	0.093	1.126	0.260
Baseline academic achievement	0.523	0.088	5.952	0.000	0.549	0.087	6.295	0.000
Ethnicity	0.046	0.099	0.463	0.644	0.032	0.098	0.326	0.745
Mother warmth	0.335	0.171	1.958	0.050^a	--	--	--	--
Mother psychological control	--	--	--	--	0.133	0.101	1.319	0.187
Mother knowledge	--	--	--	--	--	--	--	--
Warmth x ethnicity	-0.298	0.224	-1.332	0.183	--	--	--	--
Psychological control x ethnicity	--	--	--	--	-0.283	0.179	-1.587	0.113
Knowledge x ethnicity	--	--	--	--	--	--	--	--
Predictors	Knowledge only				Full Model			
	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.092	0.084	-1.093	0.274	-0.078	0.082	-0.948	0.343
Gender	0.089	0.093	0.962	0.336	0.094	0.090	1.051	0.293
Baseline academic achievement	0.530	0.085	6.241	0.000	0.531	0.086	6.193	0.000
Ethnicity	0.047	0.099	0.479	0.632	0.060	0.097	0.616	0.538
Mother warmth	--	--	--	--	0.284	0.217	1.309	0.191
Mother psychological control	--	--	--	--	<i>0.193</i>	<i>0.104</i>	<i>1.853</i>	<i>0.064</i>
Mother knowledge	0.316	0.160	1.981	0.048^b	0.186	0.202	0.922	0.356
Warmth x ethnicity	--	--	--	--	-0.318	0.297	-1.072	0.284
Psychological control x ethnicity	--	--	--	--	<i>-0.365</i>	<i>0.204</i>	<i>-1.791</i>	<i>0.073</i>
Knowledge x ethnicity	-0.309	0.266	-1.162	0.245	-0.198	0.325	-0.607	0.544

Note. Estimator is MLR. Unstandardized regression coefficients are shown.

^a This main effect of mother warmth on academic achievement became non-significant after I removed the warmth x ethnicity interaction term ($b = 0.112$, $SE = 0.065$, $p = 0.085$).

^b This main effect of mother knowledge on academic achievement became non-significant after I removed the knowledge x ethnicity interaction term ($b = 0.176$, $SE = 0.139$, $p = 0.278$).

Table 5.2. Exploring suppression effects of mother parenting on grade 8 externalizing problems

Predictors	Warmth only				Psychological control only			
	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	0.089	0.619	0.145	0.885	0.106	0.621	0.171	0.864
Gender	-0.582	0.508	-1.146	0.252	-0.579	0.504	-1.151	0.250
Baseline externalizing problems	0.784	0.070	11.135	0.000	0.792	0.068	11.609	0.000
Ethnicity	0.023	0.558	0.042	0.967	0.046	0.535	0.086	0.932
Mother warmth	-0.495	0.762	-0.650	0.515	--	--	--	--
Mother psychological control	--	--	--	--	-0.014	0.484	-0.029	0.977
Mother knowledge	--	--	--	--	--	--	--	--
Warmth x ethnicity	1.062	1.032	1.029	0.304	--	--	--	--
Psychological control x ethnicity	--	--	--	--	-0.355	0.926	-0.384	0.701
Knowledge x ethnicity	--	--	--	--	--	--	--	--
Predictors	Knowledge only				Full Model			
	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.027	0.633	-0.043	0.966	0.037	0.619	0.060	0.952
Gender	-0.561	0.506	-1.109	0.267	-0.589	0.506	-1.164	0.244
Baseline externalizing problems	0.766	0.068	11.218	0.000	0.775	0.068	11.413	0.000
Ethnicity	-0.195	0.565	-0.346	0.730	-0.102	0.561	-0.181	0.856
Mother warmth	--	--	--	--	1.133	1.009	1.123	0.261
Mother psychological control	--	--	--	--	-0.174	0.469	-0.372	0.710
Mother knowledge	-2.461	0.831	-2.960	0.003	-3.161	1.130	-2.798	0.005
Warmth x ethnicity	--	--	--	--	-0.727	1.287	-0.565	0.572
Psychological control x ethnicity	--	--	--	--	0.010	0.935	0.010	0.992
Knowledge x ethnicity	2.879	1.156	2.491	0.013^a	3.399	1.407	2.417	0.016^b

Note. Estimator is MLR. Unstandardized regression coefficients are shown.

^a I probed the mother knowledge x ethnicity interaction in the suppression effect model. Mother knowledge was protective against externalizing problems among European Americans ($b = -2.461$, $SE = 0.831$, $p = 0.003$) but was not associated with externalizing problems among Asian Americans ($b = 0.418$, $SE = 0.869$, $p = 0.630$).

^b I also probed the mother knowledge x ethnicity interaction in the full model. Similar to the suppression effect model, mother knowledge was protective against externalizing problems among European Americans ($b = -3.161$, $SE = 1.130$, $p = 0.005$) but was not associated with externalizing problems among Asian Americans ($b = 0.238$, $SE = 0.957$, $p = 0.803$).

Table 5.3. Exploring suppression effects of father parenting on grade 8 academic achievement

Predictors	Warmth only				Psychological control only			
	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.030	0.084	-0.359	0.719	-0.105	0.086	-1.218	0.223
Gender	0.090	0.092	0.976	0.329	0.089	0.094	0.944	0.345
Baseline academic achievement	0.526	0.083	6.316	0.000	0.540	0.087	6.207	0.000
Ethnicity	0.060	0.100	0.603	0.546	0.023	0.099	0.234	0.815
Father warmth	0.451	0.121	3.724	0.000	--	--	--	--
Father psychological control	--	--	--	--	-0.200	0.125	-1.603	0.109
Father knowledge	--	--	--	--	--	--	--	--
Warmth x ethnicity	-0.403	0.182	-2.217	0.027^b	--	--	--	--
Psychological control x ethnicity	--	--	--	--	0.276	0.191	1.444	0.149
Knowledge x ethnicity	--	--	--	--	--	--	--	--
Predictors	Knowledge only				Full Model			
	<i>b</i>	SE	<i>b</i> /SE	<i>P</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.061	0.086	-0.709	0.478	-0.023	0.081	-0.284	0.776
Gender	0.113	0.096	1.187	0.235	0.085	0.091	0.932	0.351
Baseline academic achievement	0.512	0.089	5.791	0.000	0.529	0.083	6.403	0.000
Ethnicity	0.044	0.096	0.453	0.651	0.053	0.098	0.540	0.589
Father warmth	--	--	--	--	0.632	0.199	3.170	0.002
Father psychological control	--	--	--	--	0.237	0.180	1.318	0.188
Father knowledge	<i>0.201</i>	<i>0.106</i>	<i>1.887</i>	<i>0.059^a</i>	-0.058	0.133	-0.435	0.663
Warmth x ethnicity	--	--	--	--	-0.569	0.273	-2.085	0.037^c
Psychological control x ethnicity	--	--	--	--	-0.046	0.265	-0.173	0.863
Knowledge x ethnicity	-0.071	0.162	-0.438	0.661	0.228	0.193	1.185	0.236

Note. Estimator is MLR. Unstandardized regression coefficients are shown.

^a The father knowledge main effect remained to be trending after the removal of father knowledge x ethnicity interaction term ($b = 0.174$, $SE = 0.091$, $p = 0.058$).

^b I probed the father warmth x ethnicity interaction in the suppression effect model. Father warmth was associated with higher levels of academic achievement among European Americans ($b = 0.451$, $SE = 0.121$, $p = 0.000$) but was not associated with academic achievement among Asian Americans ($b = 0.047$, $SE = 0.135$, $p = 0.726$).

^c I also probed the father warmth x ethnicity interaction in the full model. Similar to the suppression effect model, father warmth was associated with higher levels of academic achievement among European Americans ($b = 0.632$, $SE = 0.199$, $p = 0.002$) but was not associated with academic achievement among Asian Americans ($b = 0.063$, $SE = 0.198$, $p = 0.751$).

Table 5.4. Exploring suppression effects of father parenting on grade 8 externalizing problems

Predictors	Warmth only				Psychological control only			
	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.105	0.607	-0.174	0.862	0.116	0.610	0.190	0.850
Gender	-0.594	0.500	-1.189	0.234	-0.557	0.498	-1.116	0.264
Baseline externalizing problems	0.772	0.068	11.288	0.000	0.782	0.068	11.463	0.000
Ethnicity	0.028	0.546	0.052	0.959	0.060	0.534	0.112	0.911
Father warmth	-1.271	0.578	-2.201	0.028	--	--	--	--
Father psychological control	--	--	--	--	<i>1.198</i>	<i>0.695</i>	<i>1.724</i>	<i>0.085</i>
Father knowledge	--	--	--	--	--	--	--	--
Warmth x ethnicity	2.235	0.872	2.561	0.010^a	--	--	--	--
Psychological control x ethnicity	--	--	--	--	-2.470	0.973	-2.540	0.011^b
Knowledge x ethnicity	--	--	--	--	--	--	--	--
Predictors	Knowledge only				Full Model			
	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.121	0.642	-0.188	0.851	-0.167	0.618	-0.270	0.787
Gender	-0.670	0.511	-1.313	0.189	-0.606	0.499	-1.214	0.225
Baseline externalizing problems	0.773	0.069	11.214	0.000	0.764	0.069	11.136	0.000
Ethnicity	-0.114	0.537	-0.212	0.832	0.005	0.535	0.009	0.993
Father warmth	--	--	--	--	-0.780	0.751	-1.040	0.299
Father psychological control	--	--	--	--	0.374	0.919	0.406	0.685
Father knowledge	<i>-1.013</i>	<i>0.537</i>	<i>-1.885</i>	<i>0.059^c</i>	-0.439	0.657	-0.668	0.504
Warmth x ethnicity	--	--	--	--	1.685	1.173	1.436	0.151
Psychological control x ethnicity	--	--	--	--	-1.509	1.281	-1.178	0.239
Knowledge x ethnicity	0.839	0.819	1.025	0.305	-0.644	0.941	-0.685	0.493

Note. Estimator is MLR. Unstandardized regression coefficients are shown.

^a I probed the father warmth x ethnicity interaction in the suppression effect model. Father warmth was protective against externalizing problems among European Americans ($b = -1.271$, $SE = 0.578$, $p = 0.028$) but was not associated with externalizing problems among Asian Americans ($b = 0.964$, $SE = 0.678$, $p = 0.156$).

^b I also probed the father psychological control x ethnicity interaction in the suppression effect model. There was a trend in which father psychological control was a risk factor for externalizing problems among European Americans ($b = 1.198$, $SE = 0.695$, $p = 0.085$). There was also a trend in which father psychological control was protective against externalizing problems among Asian Americans ($b = -1.272$, $SE = 0.722$, $p = 0.078$).

^c This trending effect of father knowledge on externalizing problems became non-significant after I removed the knowledge x ethnicity interaction term ($b = -0.688$, $SE = 0.421$, $p = 0.122$).

Table 5.5. Indirect effects of mother parenting at grade 7 on alcohol use at grade 9 via academic achievement and externalizing problems at grade 8 ($n = 352$)

	Full model				Trimmed model			
	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
<i>Predicting grade 8 academic achievement</i>								
Age	-0.079	0.082	-0.957	0.338	--	--	--	--
Gender	0.097	0.090	1.084	0.278	--	--	--	--
Mother drinking	-0.092	0.157	-0.588	0.557	--	--	--	--
Baseline alcohol use	0.049	0.163	0.298	0.766	--	--	--	--
Baseline academic achievement	0.531	0.086	6.204	0.000	0.546	0.086	6.330	0.000
Ethnicity	0.053	0.100	0.529	0.597	0.061	0.101	0.603	0.546
Mother warmth	0.281	0.214	1.314	0.189	0.185	0.146	1.264	0.206
Mother psychological control	<i>0.190</i>	<i>0.103</i>	<i>1.845</i>	<i>0.065</i>	0.087	0.101	0.862	0.388
Mother knowledge	0.191	0.199	0.957	0.339	0.116	0.166	0.699	0.485
Warmth x ethnicity	-0.314	0.294	-1.069	0.285	--	--	--	--
Psychological control x ethnicity	<i>-0.367</i>	<i>0.205</i>	<i>-1.793</i>	<i>0.073</i>	--	--	--	--
Knowledge x ethnicity	-0.200	0.322	-0.620	0.535	--	--	--	--
<i>Predicting grade 8 externalizing problems</i>								
Age	0.040	0.617	0.066	0.948	--	--	--	--
Gender	-0.602	0.506	-1.189	0.234	--	--	--	--
Mother drinking	0.536	0.758	0.707	0.479	--	--	--	--
Baseline alcohol use	-0.890	1.127	-0.790	0.429	--	--	--	--
Baseline externalizing problems	0.778	0.068	11.468	0.000	0.780	0.067	11.646	0.000
Ethnicity	-0.103	0.562	-0.183	0.855	-0.106	0.572	-0.185	0.853
Mother warmth	1.170	1.011	1.157	0.247	0.731	0.704	1.038	0.299
Mother psychological control	-0.150	0.467	-0.321	0.748	-0.157	0.429	-0.367	0.714
Mother knowledge	-3.253	1.118	-2.910	0.004	-2.957	0.990	-2.986	0.003
Warmth x ethnicity	-0.763	1.294	-0.589	0.556	--	--	--	--
Psychological control x ethnicity	0.038	0.947	0.040	0.968	--	--	--	--
Knowledge x ethnicity	3.448	1.391	2.479	0.013	2.975	1.166	2.552	0.011
<i>Predicting grade 9 alcohol use</i>								
Age	-0.606	0.398	-1.521	0.128	--	--	--	--
Gender	0.174	0.295	0.590	0.555	--	--	--	--
Mother drinking	0.887	0.390	2.277	0.023	0.902	0.383	2.352	0.019
Baseline alcohol use	0.721	0.530	1.362	0.173	0.741	0.528	1.403	0.160
Grade 8 academic achievement	-0.257	0.176	-1.460	0.144	-0.241	0.176	-1.369	0.171
Grade 8 externalizing problems	0.044	0.026	1.728	0.084	0.039	0.025	1.557	0.120
Ethnicity	-0.505	0.408	-1.238	0.216	-0.408	0.354	-1.153	0.249
Mother warmth	-0.161	0.438	-0.368	0.713	-0.007	0.400	-0.018	0.985
Mother psychological control	0.256	0.289	0.883	0.377	<i>0.464</i>	<i>0.273</i>	<i>1.697</i>	<i>0.090</i>
Mother knowledge	-0.174	0.480	-0.363	0.716	-0.092	0.430	-0.214	0.831

Warmth x ethnicity	0.353	0.818	0.432	0.666	--	--	--	--
Psychological control x ethnicity	0.777	0.697	1.114	0.265	--	--	--	--
Knowledge x ethnicity	0.053	0.849	0.062	0.950	--	--	--	--

Note. Estimator is MLR. Unstandardized regression coefficients are shown.

Table 5.6. Indirect effects of mother parenting at grade 7 on alcohol problems at grade 9 via academic achievement and externalizing behaviors at grade 8 ($n = 352$)

<i>Predicting grade 8 academic achievement</i>	Full model				Trimmed model				Revised Trimmed Model			
	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.081	0.083	-0.977	0.329	--	--	--	--	--	--	--	--
Gender	0.095	0.090	1.060	0.289	--	--	--	--	--	--	--	--
Mother drinking problems	0.092	0.183	0.501	0.616	--	--	--	--	--	--	--	--
Baseline alcohol problems	0.004	0.012	0.282	0.778	--	--	--	--	--	--	--	--
Baseline academic achievement	0.531	0.086	6.197	0.000	0.546	0.086	6.330	0.000	0.546	0.086	6.330	0.000
Ethnicity	0.069	0.100	0.690	0.490	0.061	0.101	0.603	0.546	0.061	0.101	0.603	0.546
Mother warmth	0.281	0.217	1.297	0.194	0.185	0.146	1.264	0.206	0.185	0.146	1.264	0.206
Mother psychological control	<i>0.193</i>	<i>0.104</i>	<i>1.856</i>	<i>0.063</i>	0.087	0.101	0.862	0.388	0.087	0.101	0.862	0.388
Mother knowledge	0.201	0.210	0.961	0.337	0.116	0.166	0.699	0.485	0.116	0.166	0.699	0.485
Warmth x ethnicity	-0.314	0.296	-1.061	0.289	--	--	--	--	--	--	--	--
Psychological control x ethnicity	<i>-0.365</i>	<i>0.204</i>	<i>-1.793</i>	<i>0.073</i>	--	--	--	--	--	--	--	--
Knowledge x ethnicity	-0.213	0.328	-0.648	0.517	--	--	--	--	--	--	--	--
<i>Predicting grade 8 externalizing problems</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	0.048	0.622	0.078	0.938	--	--	--	--	--	--	--	--
Gender	-0.605	0.511	-1.183	0.237	--	--	--	--	--	--	--	--
Mother drinking problems	-0.502	0.898	-0.558	0.577	--	--	--	--	--	--	--	--
Baseline alcohol problems	0.016	0.093	0.170	0.865	--	--	--	--	--	--	--	--
Baseline externalizing problems	0.775	0.067	11.502	0.000	0.780	0.067	11.646	0.000	0.780	0.067	11.646	0.000
Ethnicity	-0.134	0.571	-0.235	0.814	-0.106	0.572	-0.185	0.853	-0.106	0.572	-0.185	0.853
Mother warmth	1.121	0.985	1.138	0.255	0.731	0.704	1.038	0.299	0.731	0.704	1.038	0.299
Mother psychological control	-0.172	0.469	-0.367	0.714	-0.157	0.429	-0.367	0.714	-0.157	0.429	-0.367	0.714
Mother knowledge	-3.139	1.136	-2.764	0.006	-2.957	0.990	-2.986	0.003	-2.957	0.990	-2.986	0.003
Warmth x ethnicity	-0.719	1.266	-0.568	0.570	--	--	--	--	--	--	--	--
Psychological control x ethnicity	-0.001	0.929	-0.001	0.999	--	--	--	--	--	--	--	--
Knowledge x ethnicity	3.376	1.409	2.396	0.017	2.975	1.166	2.552	0.011	2.975	1.166	2.552	0.011
<i>Predicting grade 9 alcohol problems</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.512	0.492	-1.040	0.298	--	--	--	--	--	--	--	--
Gender	0.516	0.351	1.468	0.142	--	--	--	--	--	--	--	--
Mother drinking problems	0.614	0.607	1.012	0.312	--	--	--	--	--	--	--	--
Baseline alcohol problems	0.043	0.073	0.586	0.558	0.045	0.068	0.654	0.513	0.043	0.061	0.702	0.483
Grade 8 academic achievement	-0.876	0.290	-3.019	0.003	-0.720	0.287	-2.506	0.012	--	--	--	--
Grade 8 externalizing problems	0.086	0.036	2.431	0.015	0.076	0.038	2.020	0.043	0.107	0.032	3.340	0.001
Ethnicity	-1.792	0.481	-3.726	0.000	-1.466	0.568	-2.583	0.010	-1.169	0.499	-2.342	0.019
Mother warmth	0.886	0.542	1.635	0.102	1.068	0.518	2.063	0.039	--	--	--	--
Mother psychological control	1.014	0.334	3.041	0.002	1.058	0.293	3.614	0.000	0.950	0.286	3.321	0.001

Mother knowledge	-1.142	0.616	-1.855	0.064	-1.313	0.596	-2.201	0.028	-0.882	0.553	-1.594	0.111
Warmth x ethnicity	-2.305	1.055	-2.184	0.029	-2.795	0.891	-3.136	0.002	--	--	--	--
Psychological control x ethnicity	1.794	1.241	1.445	0.148	--	--	--	--	--	--	--	--
Knowledge x ethnicity	4.284	1.342	3.191	0.001	3.592	1.028	3.495	0.000	1.905	0.933	2.043	0.041

Note. Estimator is MLR. Unstandardized regression coefficients are shown. I removed all the non-significant covariates and interaction terms in the trimmed model. To ensure that the moderated mediation effect was not a spurious effect due to multicollinearity, I fitted a revised trimmed model focusing on the effect of grade 8 externalizing problems on grade 9 alcohol problems. I referenced the corresponding direct effect models (Table 4.3) and only included significant parenting effects in current revised trimmed model. Specifically, the main effect of mother warmth and the interaction effect between mother warmth and ethnicity were removed from the revised trimmed model because they were non-significant in the direct effect models. Conversely, mother psychological control, mother knowledge, and the mother knowledge x ethnicity interaction were included in the revised trimmed model because those effects were significant in the direct effect models. In this revised trimmed model, externalizing problems at grade 8 similarly predicted grade 9 alcohol problems ($b = 0.107$, $SE = 0.032$, $p = 0.001$), suggesting that this effect was not a spurious effect due to other variables in the same model.

Table 5.7. Indirect effects of mother parenting at grade 7 on alcohol problems at grade 12 via academic achievement and externalizing problems at grade 8 ($n = 352$)

	Full model				Trimmed model			
	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
<i>Predicting grade 8 academic achievement</i>								
Age	-0.081	0.083	-0.977	0.329	--	--	--	--
Gender	0.095	0.090	1.060	0.289	--	--	--	--
Mother drinking problems	0.092	0.183	0.501	0.616	--	--	--	--
Baseline alcohol problems	0.004	0.012	0.282	0.778	--	--	--	--
Baseline academic achievement	0.531	0.086	6.197	0.000	0.546	0.086	6.330	0.000
Ethnicity	0.069	0.100	0.690	0.490	0.061	0.101	0.603	0.546
Mother warmth	0.281	0.217	1.297	0.194	0.185	0.146	1.264	0.206
Mother psychological control	0.193	0.104	1.856	0.063	0.087	0.101	0.862	0.388
Mother knowledge	0.201	0.210	0.961	0.337	0.116	0.166	0.699	0.485
Warmth x ethnicity	-0.314	0.296	-1.061	0.289	--	--	--	--
Psychological control x ethnicity	-0.365	0.204	-1.793	0.073	--	--	--	--
Knowledge x ethnicity	-0.213	0.328	-0.648	0.517	--	--	--	--
<i>Predicting grade 8 externalizing problems</i>								
	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	0.048	0.622	0.078	0.938	--	--	--	--
Gender	-0.605	0.511	-1.183	0.237	--	--	--	--
Mother drinking problems	-0.502	0.898	-0.558	0.577	--	--	--	--
Baseline alcohol problems	0.016	0.093	0.170	0.865	--	--	--	--
Baseline externalizing problems	0.775	0.067	11.502	0.000	0.780	0.067	11.646	0.000
Ethnicity	-0.134	0.571	-0.235	0.814	-0.106	0.572	-0.185	0.853
Mother warmth	1.121	0.985	1.138	0.255	0.731	0.704	1.038	0.299
Mother psychological control	-0.172	0.469	-0.367	0.714	-0.157	0.429	-0.367	0.714
Mother knowledge	-3.139	1.136	-2.764	0.006	-2.957	0.990	-2.986	0.003
Warmth x ethnicity	-0.719	1.266	-0.568	0.570	--	--	--	--
Psychological control x ethnicity	-0.001	0.929	-0.001	0.999	--	--	--	--
Knowledge x ethnicity	3.376	1.409	2.396	0.017	2.975	1.166	2.552	0.011
<i>Predicting grade 12 alcohol problems</i>								
	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.445	0.353	-1.262	0.207	--	--	--	--
Gender	-0.356	0.257	-1.388	0.165	--	--	--	--
Mother drinking problems	1.096	0.514	2.134	0.033	0.965	0.456	2.117	0.034
Baseline alcohol problems	0.051	0.041	1.232	0.218	0.042	0.041	1.034	0.301
Grade 8 academic achievement	-0.344	0.175	-1.963	0.050	-0.243	0.165	-1.475	0.140
Grade 8 externalizing problems	0.066	0.025	2.598	0.009	0.072	0.024	2.945	0.003
Ethnicity	-0.203	0.328	-0.619	0.536	-0.387	0.299	-1.297	0.195
Mother warmth	-0.490	0.359	-1.363	0.173	-0.323	0.310	-1.043	0.297
Mother psychological control	0.097	0.234	0.415	0.678	0.020	0.230	0.087	0.930

Mother knowledge	0.638	0.433	1.476	0.140	0.576	0.341	1.688	0.091
Warmth x ethnicity	0.782	0.596	1.312	0.190	--	--	--	--
Psychological control x ethnicity	-0.317	0.649	-0.489	0.625	--	--	--	--
Knowledge x ethnicity	-0.059	0.752	-0.078	0.937	--	--	--	--

Note. Estimator is MLR. Unstandardized regression coefficients are shown.

Table 5.8. Indirect effects of mother parenting at grade 7 on CDISC alcohol dependence diagnosis at grade 12 via academic achievement and externalizing problems at grade 8 ($n = 352$)

<i>Predicting grade 8 academic achievement</i>	Full model				Trimmed model				Revised Trimmed Model			
	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.081	0.083	-0.977	0.329	--	--	--	--	--	--	--	--
Gender	0.095	0.090	1.060	0.289	--	--	--	--	--	--	--	--
Mother drinking problems	0.092	0.183	0.501	0.616	--	--	--	--	--	--	--	--
Baseline alcohol problems	0.004	0.012	0.282	0.778	--	--	--	--	--	--	--	--
Baseline academic achievement	0.531	0.086	6.197	0.000	0.546	0.086	6.330	0.000	0.546	0.086	6.330	0.000
Ethnicity	0.069	0.100	0.690	0.490	0.061	0.101	0.603	0.546	0.061	0.101	0.603	0.546
Mother warmth	0.281	0.217	1.297	0.194	0.185	0.146	1.264	0.206	0.185	0.146	1.264	0.206
Mother psychological control	<i>0.193</i>	<i>0.104</i>	<i>1.856</i>	<i>0.063</i>	0.087	0.101	0.862	0.388	0.087	0.101	0.862	0.388
Mother knowledge	0.201	0.210	0.961	0.337	0.116	0.166	0.699	0.485	0.116	0.166	0.699	0.485
Warmth x ethnicity	-0.314	0.296	-1.061	0.289	--	--	--	--	--	--	--	--
Psychological control x ethnicity	<i>-0.365</i>	<i>0.204</i>	<i>-1.793</i>	<i>0.073</i>	--	--	--	--	--	--	--	--
Knowledge x ethnicity	-0.213	0.328	-0.648	0.517	--	--	--	--	--	--	--	--
<i>Predicting grade 8 externalizing problems</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	0.048	0.622	0.078	0.938	--	--	--	--	--	--	--	--
Gender	-0.605	0.511	-1.183	0.237	--	--	--	--	--	--	--	--
Mother drinking problems	-0.502	0.898	-0.558	0.577	--	--	--	--	--	--	--	--
Baseline alcohol problems	0.016	0.093	0.170	0.865	--	--	--	--	--	--	--	--
Baseline externalizing problems	0.775	0.067	11.502	0.000	0.780	0.067	11.646	0.000	0.780	0.067	11.646	0.000
Ethnicity	-0.134	0.571	-0.235	0.814	-0.106	0.572	-0.185	0.853	-0.106	0.572	-0.185	0.853
Mother warmth	1.121	0.985	1.138	0.255	0.731	0.704	1.038	0.299	0.731	0.704	1.038	0.299
Mother psychological control	-0.172	0.469	-0.367	0.714	-0.157	0.429	-0.367	0.714	-0.157	0.429	-0.367	0.714
Mother knowledge	-3.139	1.136	-2.764	0.006	-2.957	0.990	-2.986	0.003	-2.957	0.990	-2.986	0.003
Warmth x ethnicity	-0.719	1.266	-0.568	0.570	--	--	--	--	--	--	--	--
Psychological control x ethnicity	-0.001	0.929	-0.001	0.999	--	--	--	--	--	--	--	--
Knowledge x ethnicity	3.376	1.409	2.396	0.017	2.975	1.166	2.552	0.011	2.975	1.166	2.552	0.011
<i>Predicting grade 12 alcohol dependence</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.552	0.493	-1.119	0.263	--	--	--	--	--	--	--	--
Gender	-0.433	0.345	-1.256	0.209	--	--	--	--	--	--	--	--
Mother drinking problems	0.568	0.614	0.925	0.355	--	--	--	--	--	--	--	--
Baseline alcohol problems	0.003	0.038	0.066	0.947	-0.012	0.034	-0.339	0.734	-0.011	0.036	-0.319	0.749
Grade 8 academic achievement	-0.482	0.204	-2.368	0.018	-0.480	0.198	-2.425	0.015	-0.481	0.198	-2.422	0.015
Grade 8 externalizing problems	0.038	0.025	1.538	0.124	0.034	0.025	1.347	0.178	0.037	0.024	1.538	0.124
Ethnicity	-0.891	0.422	-2.111	0.035	-0.810	0.381	-2.128	0.033	-0.884	0.393	-2.247	0.025
Mother warmth	-0.773	0.502	-1.539	0.124	-0.498	0.461	-1.081	0.280	-0.050	0.457	-0.110	0.912
Mother psychological control	-0.128	0.293	-0.438	0.662	0.042	0.257	0.163	0.870	0.004	0.255	0.014	0.989

Mother knowledge	0.382	0.544	0.702	0.483	0.014	0.496	0.028	0.978	-0.056	0.499	-0.112	0.911
Warmth x ethnicity	2.079	1.051	1.977	0.048	<i>1.394</i>	<i>0.828</i>	<i>1.683</i>	<i>0.092</i>	--	--	--	--
Psychological control x ethnicity	0.727	0.748	0.972	0.331	--	--	--	--	--	--	--	--
Knowledge x ethnicity	-0.988	1.071	-0.922	0.356	--	--	--	--	--	--	--	--

Note. Estimator is MLR. Unstandardized regression coefficients are shown.

Table 5.9. Indirect effects of mother parenting at grade 7 on CDISC marijuana dependence diagnosis at grade 12 via academic achievement and externalizing problems at grade 8 ($n = 352$)

<i>Predicting grade 8 academic achievement</i>	Full model				Trimmed model			
	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.074	0.081	-0.906	0.365	--	--	--	--
Gender	0.106	0.091	1.168	0.243	--	--	--	--
Parent drug problems	-0.246	0.148	-1.657	0.098	--	--	--	--
Baseline marijuana use	-0.007	0.447	-0.015	0.988	--	--	--	--
Baseline academic achievement	0.521	0.086	6.079	0.000	0.546	0.086	6.330	0.000
Ethnicity	0.040	0.099	0.403	0.687	0.061	0.101	0.603	0.546
Mother warmth	0.261	0.210	1.244	0.213	0.185	0.146	1.264	0.206
Mother psychological control	0.185	0.104	1.783	0.075	0.087	0.101	0.862	0.388
Mother knowledge	0.190	0.200	0.953	0.341	0.116	0.166	0.699	0.485
Warmth x ethnicity	-0.292	0.290	-1.008	0.314	--	--	--	--
Psychological control x ethnicity	-0.356	0.206	-1.729	0.084	--	--	--	--
Knowledge x ethnicity	-0.194	0.321	-0.605	0.545	--	--	--	--
<i>Predicting grade 8 externalizing problems</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	0.028	0.619	0.046	0.963	--	--	--	--
Gender	-0.594	0.505	-1.176	0.239	--	--	--	--
Parent drug problems	-0.154	0.871	-0.176	0.860	--	--	--	--
Baseline marijuana use	4.540	3.662	1.240	0.215	--	--	--	--
Baseline externalizing problems	0.771	0.066	11.727	0.000	0.780	0.067	11.646	0.000
Ethnicity	0.020	0.568	0.035	0.972	-0.106	0.572	-0.185	0.853
Mother warmth	0.986	0.969	1.018	0.309	0.731	0.704	1.038	0.299
Mother psychological control	-0.132	0.470	-0.281	0.779	-0.157	0.429	-0.367	0.714
Mother knowledge	-2.639	1.102	-2.396	0.017	-2.957	0.990	-2.986	0.003
Warmth x ethnicity	-0.579	1.257	-0.461	0.645	--	--	--	--
Psychological control x ethnicity	-0.022	0.937	-0.024	0.981	--	--	--	--
Knowledge x ethnicity	2.881	1.378	2.091	0.037	2.975	1.166	2.552	0.011
<i>Predicting grade 12 marijuana dependence</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	0.200	0.403	0.496	0.620	--	--	--	--
Gender	-0.755	0.368	-2.054	0.040	-0.757	0.352	-2.151	0.032
Parent drug problems	1.049	0.463	2.265	0.024	1.036	0.460	2.252	0.024
Baseline marijuana use	2.117	0.785	2.695	0.007	1.987	0.742	2.677	0.007
Grade 8 academic achievement	-0.366	0.186	-1.965	0.049	-0.370	0.188	-1.974	0.048
Grade 8 externalizing problems	0.026	0.028	0.926	0.355	0.023	0.027	0.865	0.387
Ethnicity	-0.858	0.463	-1.854	0.064	-0.721	0.408	-1.767	0.077
Mother warmth	0.024	0.511	0.046	0.963	-0.018	0.443	-0.042	0.967
Mother psychological control	0.245	0.263	0.934	0.350	0.325	0.237	1.372	0.170
Mother knowledge	0.437	0.565	0.775	0.438	0.248	0.501	0.494	0.622
Warmth x ethnicity	-0.078	0.897	-0.087	0.931	--	--	--	--
Psychological control x ethnicity	0.348	0.637	0.546	0.585	--	--	--	--
Knowledge x ethnicity	-0.462	1.053	-0.439	0.661	--	--	--	--

Note. Estimator is MLR. Unstandardized regression coefficients are shown.

Table 5.10. Indirect effects of father parenting at grade 7 on alcohol use at grade 9 via academic achievement and externalizing problems at grade 8 ($n = 352$)

<i>Predicting grade 8 academic achievement</i>	Full model				Trimmed model			
	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.017	0.082	-0.202	0.840	--	--	--	--
Gender	0.089	0.091	0.972	0.331	--	--	--	--
Father drinking	-0.080	0.101	-0.791	0.429	--	--	--	--
Baseline alcohol use	0.078	0.149	0.522	0.602	--	--	--	--
Baseline academic achievement	0.528	0.083	6.381	0.000	0.544	0.081	6.696	0.000
Ethnicity	0.051	0.099	0.520	0.603	0.049	0.098	0.499	0.618
Father warmth	0.637	0.198	3.211	0.001	0.561	0.173	3.235	0.001
Father psychological control	0.236	0.179	1.321	0.187	<i>0.216</i>	<i>0.125</i>	<i>1.725</i>	<i>0.085</i>
Father knowledge	-0.063	0.134	-0.473	0.636	0.033	0.120	0.276	0.783
Warmth x ethnicity	-0.576	0.274	-2.102	0.036	-0.404	0.182	-2.219	0.026
Psychological control x ethnicity	-0.055	0.266	-0.206	0.837	--	--	--	--
Knowledge x ethnicity	0.230	0.192	1.195	0.232	--	--	--	--
<i>Predicting grade 8 externalizing problems</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.216	0.614	-0.352	0.725	--	--	--	--
Gender	-0.635	0.503	-1.263	0.207	--	--	--	--
Father drinking	0.631	0.656	0.961	0.336	--	--	--	--
Baseline alcohol use	-0.760	1.129	-0.673	0.501	--	--	--	--
Baseline externalizing problems	0.765	0.068	11.234	0.000	0.783	0.068	11.507	0.000
Ethnicity	0.008	0.548	0.014	0.989	-0.125	0.560	-0.223	0.824
Father warmth	-0.828	0.754	-1.098	0.272	-0.095	0.567	-0.167	0.867
Father psychological control	0.392	0.914	0.429	0.668	-0.369	0.667	-0.553	0.580
Father knowledge	-0.390	0.654	-0.596	0.551	-0.739	0.479	-1.544	0.123
Warmth x ethnicity	1.744	1.186	1.471	0.141	--	--	--	--
Psychological control x ethnicity	-1.446	1.286	-1.125	0.261	--	--	--	--
Knowledge x ethnicity	-0.658	0.953	-0.691	0.489	--	--	--	--
<i>Predicting grade 9 alcohol use</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.725	0.427	-1.700	0.089	--	--	--	--
Gender	0.127	0.305	0.415	0.678	--	--	--	--
Father drinking	0.441	0.320	1.377	0.169	--	--	--	--
Baseline alcohol use	0.981	0.493	1.990	0.047	<i>0.950</i>	<i>0.495</i>	<i>1.921</i>	<i>0.055</i>
Grade 8 academic achievement	-0.314	0.201	-1.566	0.117	-0.292	0.189	-1.546	0.122
Grade 8 externalizing problems	<i>0.043</i>	<i>0.024</i>	<i>1.774</i>	<i>0.076</i>	<i>0.039</i>	<i>0.024</i>	<i>1.662</i>	<i>0.097</i>
Ethnicity	-0.281	0.376	-0.748	0.455	-0.333	0.351	-0.947	0.343
Father warmth	0.260	0.469	0.554	0.580	0.506	0.391	1.293	0.196
Father psychological control	-0.560	0.492	-1.138	0.255	-0.209	0.426	-0.492	0.623
Father knowledge	-0.586	0.358	-1.635	0.102	-0.521	0.320	-1.628	0.104
Warmth x ethnicity	0.563	0.883	0.638	0.524	--	--	--	--
Psychological control x ethnicity	0.951	0.864	1.101	0.271	--	--	--	--
Knowledge x ethnicity	0.017	0.714	0.024	0.981	--	--	--	--

Note. Estimator is MLR. Unstandardized regression coefficients are shown.

Table 5.11. Indirect effects of father parenting at grade 7 on alcohol problems at grade 9 via academic achievement and externalizing problems at grade 8 ($n = 352$)

<i>Predicting grade 8 academic achievement</i>	Full model				Trimmed model				Revised Trimmed Model			
	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.005	0.081	-0.064	0.949	--	--	--	--	--	--	--	--
Gender	0.101	0.094	1.081	0.280	--	--	--	--	--	--	--	--
Father drinking problems	-0.188	0.120	-1.560	0.119	--	--	--	--	--	--	--	--
Baseline alcohol problems	-0.002	0.009	-0.246	0.806	--	--	--	--	--	--	--	--
Baseline academic achievement	0.521	0.083	6.296	0.000	0.544	0.081	6.696	0.000	0.544	0.081	6.696	0.000
Ethnicity	0.027	0.102	0.268	0.789	0.049	0.098	0.499	0.618	0.049	0.098	0.499	0.618
Father warmth	0.634	0.197	3.218	0.001	0.561	0.173	3.235	0.001	0.561	0.173	3.235	0.001
Father psychological control	0.247	0.179	1.381	0.167	<i>0.216</i>	<i>0.125</i>	<i>1.725</i>	<i>0.085</i>	<i>0.216</i>	<i>0.125</i>	<i>1.725</i>	<i>0.085</i>
Father knowledge	-0.079	0.137	-0.573	0.566	0.033	0.120	0.276	0.783	0.033	0.120	0.276	0.783
Warmth x ethnicity	-0.579	0.272	-2.124	0.034	-0.404	0.182	-2.219	0.026	-0.404	0.182	-2.219	0.026
Psychological control x ethnicity	-0.071	0.266	-0.267	0.789	--	--	--	--	--	--	--	--
Knowledge x ethnicity	0.252	0.195	1.291	0.197	--	--	--	--	--	--	--	--
<i>Predicting grade 8 externalizing problems</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.270	0.612	-0.441	0.659	--	--	--	--	--	--	--	--
Gender	-0.705	0.512	-1.377	0.168	--	--	--	--	--	--	--	--
Father drinking problems	1.024	0.876	1.169	0.243	--	--	--	--	--	--	--	--
Baseline alcohol problems	0.084	0.089	0.947	0.344	--	--	--	--	--	--	--	--
Baseline externalizing problems	0.758	0.067	11.241	0.000	0.783	0.068	11.507	0.000	0.783	0.068	11.507	0.000
Ethnicity	0.172	0.571	0.302	0.763	-0.125	0.560	-0.223	0.824	-0.125	0.560	-0.223	0.824
Father warmth	-0.825	0.769	-1.072	0.284	-0.095	0.567	-0.167	0.867	-0.095	0.567	-0.167	0.867
Father psychological control	0.330	0.932	0.354	0.723	-0.369	0.667	-0.553	0.580	-0.369	0.667	-0.553	0.580
Father knowledge	-0.206	0.659	-0.313	0.754	-0.739	0.479	-1.544	0.123	-0.739	0.479	-1.544	0.123
Warmth x ethnicity	1.765	1.186	1.489	0.137	--	--	--	--	--	--	--	--
Psychological control x ethnicity	-1.389	1.307	-1.063	0.288	--	--	--	--	--	--	--	--
Knowledge x ethnicity	-0.897	0.934	-0.961	0.337	--	--	--	--	--	--	--	--
<i>Predicting grade 9 alcohol problems</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.618	0.625	-0.989	0.323	--	--	--	--	--	--	--	--
Gender	0.510	0.372	1.371	0.170	--	--	--	--	--	--	--	--
Father drinking problems	1.163	0.587	1.980	0.048	0.588	0.525	1.119	0.263	--	--	--	--
Baseline alcohol problems	0.104	0.090	1.166	0.244	0.034	0.070	0.487	0.626	0.006	0.059	0.105	0.917
Grade 8 academic achievement	-0.628	0.294	-2.134	0.033	<i>-0.507</i>	<i>0.271</i>	<i>-1.875</i>	<i>0.061</i>	-0.821	0.244	-3.366	0.001
Grade 8 externalizing problems	0.060	0.040	1.495	0.135	0.052	0.039	1.352	0.176	--	--	--	--
Ethnicity	-1.258	0.482	-2.609	0.009	-1.190	0.554	-2.149	0.032	-1.446	0.470	-3.076	0.002
Father warmth	<i>1.321</i>	<i>0.692</i>	<i>1.909</i>	<i>0.056</i>	0.912	0.610	1.495	0.135	--	--	--	--
Father psychological control	-0.319	0.580	-0.551	0.582	0.594	0.677	0.877	0.381	--	--	--	--
Father knowledge	-0.893	0.442	-2.022	0.043	-1.036	0.348	-2.978	0.003	-0.851	0.362	-2.354	0.019

Warmth x ethnicity	-0.306	1.200	-0.255	0.799	--	--	--	--	--	--	--	--
Psychological control x ethnicity	1.525	1.012	1.506	0.132	--	--	--	--	--	--	--	--
Knowledge x ethnicity	-0.453	0.746	-0.607	0.544	--	--	--	--	--	--	--	--

Note. Estimator is MLR. Unstandardized regression coefficients are shown.

Table 5.12. Indirect effects of father parenting at grade 7 on alcohol problems at grade 12 via academic achievement and externalizing problems at grade 8 ($n = 352$)

<i>Predicting grade 8 academic achievement</i>	Full model				Trimmed model				Revised Trimmed Model			
	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.005	0.081	-0.064	0.949	--	--	--	--	--	--	--	--
Gender	0.101	0.094	1.081	0.280	--	--	--	--	--	--	--	--
Father drinking problems	-0.188	0.120	-1.560	0.119	--	--	--	--	--	--	--	--
Baseline alcohol problems	-0.002	0.009	-0.246	0.806	--	--	--	--	--	--	--	--
Baseline academic achievement	0.521	0.083	6.296	0.000	0.544	0.081	6.696	0.000	0.544	0.081	6.696	0.000
Ethnicity	0.027	0.102	0.268	0.789	0.049	0.098	0.499	0.618	0.049	0.098	0.499	0.618
Father warmth	0.634	0.197	3.218	0.001	0.561	0.173	3.235	0.001	0.561	0.173	3.235	0.001
Father psychological control	0.247	0.179	1.381	0.167	<i>0.216</i>	<i>0.125</i>	<i>1.725</i>	<i>0.085</i>	<i>0.216</i>	<i>0.125</i>	<i>1.725</i>	<i>0.085</i>
Father knowledge	-0.079	0.137	-0.573	0.566	0.033	0.120	0.276	0.783	0.033	0.120	0.276	0.783
Warmth x ethnicity	-0.579	0.272	-2.124	0.034	-0.404	0.182	-2.219	0.026	-0.404	0.182	-2.219	0.026
Psychological control x ethnicity	-0.071	0.266	-0.267	0.789	--	--	--	--	--	--	--	--
Knowledge x ethnicity	0.252	0.195	1.291	0.197	--	--	--	--	--	--	--	--
<i>Predicting grade 8 externalizing problems</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.270	0.612	-0.441	0.659	--	--	--	--	--	--	--	--
Gender	-0.705	0.512	-1.377	0.168	--	--	--	--	--	--	--	--
Father drinking problems	1.024	0.876	1.169	0.243	--	--	--	--	--	--	--	--
Baseline alcohol problems	0.084	0.089	0.947	0.344	--	--	--	--	--	--	--	--
Baseline externalizing problems	0.758	0.067	11.241	0.000	0.783	0.068	11.507	0.000	0.783	0.068	11.507	0.000
Ethnicity	0.172	0.571	0.302	0.763	-0.125	0.560	-0.223	0.824	-0.125	0.560	-0.223	0.824
Father warmth	-0.825	0.769	-1.072	0.284	-0.095	0.567	-0.167	0.867	-0.095	0.567	-0.167	0.867
Father psychological control	0.330	0.932	0.354	0.723	-0.369	0.667	-0.553	0.580	-0.369	0.667	-0.553	0.580
Father knowledge	-0.206	0.659	-0.313	0.754	-0.739	0.479	-1.544	0.123	-0.739	0.479	-1.544	0.123
Warmth x ethnicity	1.765	1.186	1.489	0.137	--	--	--	--	--	--	--	--
Psychological control x ethnicity	-1.389	1.307	-1.063	0.288	--	--	--	--	--	--	--	--
Knowledge x ethnicity	-0.897	0.934	-0.961	0.337	--	--	--	--	--	--	--	--
<i>Predicting grade 12 alcohol problems</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.827	0.362	-2.286	0.022	<i>-0.645</i>	<i>0.361</i>	<i>-1.788</i>	<i>0.074</i>	<i>-0.643</i>	<i>0.330</i>	<i>-1.950</i>	<i>0.051</i>
Gender	<i>-0.459</i>	<i>0.252</i>	<i>-1.820</i>	<i>0.069</i>	--	--	--	--	--	--	--	--
Father drinking problems	<i>0.748</i>	<i>0.419</i>	<i>1.787</i>	<i>0.074</i>	--	--	--	--	--	--	--	--
Baseline alcohol problems	0.044	0.053	0.835	0.404	0.025	0.042	0.598	0.550	0.042	0.038	1.113	0.265
Grade 8 academic achievement	<i>-0.346</i>	<i>0.180</i>	<i>-1.915</i>	<i>0.055</i>	-0.388	0.178	-2.179	0.029	-0.464	0.157	-2.953	0.003
Grade 8 externalizing problems	<i>0.052</i>	<i>0.027</i>	<i>1.927</i>	<i>0.054</i>	0.055	0.024	2.248	0.025	--	--	--	--
Ethnicity	-0.500	0.308	-1.622	0.105	-0.533	0.328	-1.626	0.104	--	--	--	--
Father warmth	0.483	0.518	0.933	0.351	<i>0.643</i>	<i>0.349</i>	<i>1.842</i>	<i>0.065</i>	--	--	--	--
Father psychological control	0.165	0.517	0.318	0.750	0.465	0.393	1.183	0.237	--	--	--	--

Father knowledge	-0.396	0.329	-1.204	0.229	-0.402	0.261	-1.539	0.124	--	--	--	--
Warmth x ethnicity	0.217	0.744	0.292	0.770	--	--	--	--	--	--	--	--
Psychological control x ethnicity	0.424	0.801	0.530	0.596	--	--	--	--	--	--	--	--
Knowledge x ethnicity	-0.137	0.570	-0.240	0.810	--	--	--	--	--	--	--	--

Note. Estimator is MLR. Unstandardized regression coefficients are shown.

Table 5.13. Indirect effects of mother parenting at grade 7 on CDISC alcohol dependence diagnosis at grade 12 via academic achievement and externalizing problems at grade 8 ($n = 352$)

<i>Predicting grade 8 academic achievement</i>	Full model				Trimmed model				Revised Trimmed Model			
	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.005	0.081	-0.064	0.949	--	--	--	--	--	--	--	--
Gender	0.101	0.094	1.081	0.280	--	--	--	--	--	--	--	--
Father drinking problems	-0.188	0.120	-1.560	0.119	--	--	--	--	--	--	--	--
Baseline alcohol problems	-0.002	0.009	-0.246	0.806	--	--	--	--	--	--	--	--
Baseline academic achievement	0.521	0.083	6.296	0.000	0.544	0.081	6.696	0.000	0.544	0.081	6.696	0.000
Ethnicity	0.027	0.102	0.268	0.789	0.049	0.098	0.499	0.618	0.049	0.098	0.499	0.618
Father warmth	0.634	0.197	3.218	0.001	0.561	0.173	3.235	0.001	0.561	0.173	3.235	0.001
Father psychological control	0.247	0.179	1.381	0.167	<i>0.216</i>	<i>0.125</i>	<i>1.725</i>	<i>0.085</i>	<i>0.216</i>	<i>0.125</i>	<i>1.725</i>	<i>0.085</i>
Father knowledge	-0.079	0.137	-0.573	0.566	0.033	0.120	0.276	0.783	0.033	0.120	0.276	0.783
Warmth x ethnicity	-0.579	0.272	-2.124	0.034	-0.404	0.182	-2.219	0.026	-0.404	0.182	-2.219	0.026
Psychological control x ethnicity	-0.071	0.266	-0.267	0.789	--	--	--	--	--	--	--	--
Knowledge x ethnicity	0.252	0.195	1.291	0.197	--	--	--	--	--	--	--	--
<i>Predicting grade 8 externalizing problems</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.270	0.612	-0.441	0.659	--	--	--	--	--	--	--	--
Gender	-0.705	0.512	-1.377	0.168	--	--	--	--	--	--	--	--
Father drinking problems	1.024	0.876	1.169	0.243	--	--	--	--	--	--	--	--
Baseline alcohol problems	0.084	0.089	0.947	0.344	--	--	--	--	--	--	--	--
Baseline externalizing problems	0.758	0.067	11.241	0.000	0.783	0.068	11.507	0.000	0.783	0.068	11.507	0.000
Ethnicity	0.172	0.571	0.302	0.763	-0.125	0.560	-0.223	0.824	-0.125	0.560	-0.223	0.824
Father warmth	-0.825	0.769	-1.072	0.284	-0.095	0.567	-0.167	0.867	-0.095	0.567	-0.167	0.867
Father psychological control	0.330	0.932	0.354	0.723	-0.369	0.667	-0.553	0.580	-0.369	0.667	-0.553	0.580
Father knowledge	-0.206	0.659	-0.313	0.754	-0.739	0.479	-1.544	0.123	-0.739	0.479	-1.544	0.123
Warmth x ethnicity	1.765	1.186	1.489	0.137	--	--	--	--	--	--	--	--
Psychological control x ethnicity	-1.389	1.307	-1.063	0.288	--	--	--	--	--	--	--	--
Knowledge x ethnicity	-0.897	0.934	-0.961	0.337	--	--	--	--	--	--	--	--
<i>Predicting grade 12 alcohol dependence</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.838	0.488	-1.716	0.086	--	--	--	--	--	--	--	--
Gender	-0.517	0.341	-1.515	0.130	--	--	--	--	--	--	--	--
Father drinking problems	0.203	0.428	0.474	0.636	--	--	--	--	--	--	--	--
Baseline alcohol problems	-0.002	0.040	-0.046	0.963	-0.004	0.034	-0.112	0.911	-0.019	0.036	-0.533	0.594
Grade 8 academic achievement	-0.493	0.241	-2.043	0.041	-0.504	0.226	-2.226	0.026	-0.512	0.213	-2.403	0.016
Grade 8 externalizing problems	0.026	0.025	1.065	0.287	0.028	0.024	1.150	0.250	0.033	0.024	1.385	0.166
Ethnicity	-1.477	0.535	-2.763	0.006	-1.507	0.534	-2.821	0.005	-0.951	0.365	-2.606	0.009
Father warmth	-0.111	0.497	-0.224	0.823	-0.015	0.477	-0.032	0.975	0.699	0.438	1.595	0.111
Father psychological control	-0.078	0.494	-0.158	0.875	0.028	0.499	0.056	0.955	0.474	0.438	1.082	0.279

Father knowledge	-0.046	0.374	-0.123	0.902	0.068	0.354	0.192	0.848	-0.474	0.306	-1.552	0.121
Warmth x ethnicity	2.441	0.949	2.573	0.010	2.128	0.878	2.424	0.015	--	--	--	--
Psychological control x ethnicity	2.126	0.994	2.138	0.033	1.757	0.972	1.808	0.071	--	--	--	--
Knowledge x ethnicity	-1.690	0.697	-2.424	0.015	-1.629	0.666	-2.446	0.014	--	--	--	--

Note. Estimator is MLR. Unstandardized regression coefficients are shown. Given that none of the parenting by ethnicity interaction effects was significant in the direct effect model (Table 4.10), I removed all the interaction effects predicting grade 12 alcohol dependence in the revised trimmed model.

Table 5.14. Indirect effects of father parenting at grade 7 on CDISC marijuana dependence diagnosis at grade 12 via academic achievement and externalizing problems at grade 8 ($n = 352$)

<i>Predicting grade 8 academic achievement</i>	Full model				Trimmed model				Revised Trimmed Model			
	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.020	0.080	-0.252	0.801	--	--	--	--	--	--	--	--
Gender	0.095	0.091	1.042	0.297	--	--	--	--	--	--	--	--
Parent drug problems	-0.248	0.145	-1.708	0.088	--	--	--	--	--	--	--	--
Baseline marijuana use	0.018	0.359	0.049	0.961	--	--	--	--	--	--	--	--
Baseline academic achievement	0.520	0.082	6.316	0.000	0.544	0.081	6.696	0.000	0.544	0.081	6.696	0.000
Ethnicity	0.031	0.100	0.311	0.756	0.049	0.098	0.499	0.618	0.049	0.098	0.499	0.618
Father warmth	0.619	0.193	3.201	0.001	0.561	0.173	3.235	0.001	0.561	0.173	3.235	0.001
Father psychological control	0.221	0.178	1.241	0.214	0.216	0.125	1.725	0.085	0.216	0.125	1.725	0.085
Father knowledge	-0.067	0.134	-0.496	0.620	0.033	0.120	0.276	0.783	0.033	0.120	0.276	0.783
Warmth x ethnicity	-0.570	0.268	-2.125	0.034	-0.404	0.182	-2.219	0.026	-0.404	0.182	-2.219	0.026
Psychological control x ethnicity	-0.030	0.264	-0.113	0.910	--	--	--	--	--	--	--	--
Knowledge x ethnicity	0.244	0.192	1.273	0.203	--	--	--	--	--	--	--	--
<i>Predicting grade 8 externalizing problems</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	-0.145	0.611	-0.237	0.812	--	--	--	--	--	--	--	--
Gender	-0.591	0.499	-1.185	0.236	--	--	--	--	--	--	--	--
Parent drug problems	-0.144	0.858	-0.168	0.867	--	--	--	--	--	--	--	--
Baseline marijuana use	5.488	3.591	1.528	0.126	--	--	--	--	--	--	--	--
Baseline externalizing problems	0.760	0.066	11.479	0.000	0.783	0.068	11.507	0.000	0.783	0.068	11.507	0.000
Ethnicity	0.134	0.540	0.248	0.805	-0.125	0.560	-0.223	0.824	-0.125	0.560	-0.223	0.824
Father warmth	-0.665	0.772	-0.862	0.389	-0.095	0.567	-0.167	0.867	-0.095	0.567	-0.167	0.867
Father psychological control	0.418	0.929	0.450	0.653	-0.369	0.667	-0.553	0.580	-0.369	0.667	-0.553	0.580
Father knowledge	-0.216	0.625	-0.346	0.729	-0.739	0.479	-1.544	0.123	-0.739	0.479	-1.544	0.123
Warmth x ethnicity	1.566	1.183	1.324	0.185	--	--	--	--	--	--	--	--
Psychological control x ethnicity	-1.548	1.297	-1.194	0.232	--	--	--	--	--	--	--	--
Knowledge x ethnicity	-0.875	0.911	-0.961	0.337	--	--	--	--	--	--	--	--
<i>Predicting grade 12 marijuana dependence</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>	<i>b</i>	SE	<i>b</i> /SE	<i>p</i>
Age	0.014	0.435	0.032	0.974	--	--	--	--	--	--	--	--
Gender	-0.795	0.365	-2.181	0.029	-0.804	0.352	-2.287	0.022	-0.746	0.346	-2.158	0.031
Parent drug problems	1.120	0.460	2.434	0.015	1.071	0.458	2.337	0.019	1.009	0.447	2.259	0.024
Baseline marijuana use	2.043	0.655	3.121	0.002	1.878	0.635	2.959	0.003	1.748	0.611	2.860	0.004
Grade 8 academic achievement	-0.466	0.212	-2.197	0.028	-0.470	0.206	-2.281	0.023	-0.369	0.179	-2.064	0.039
Grade 8 externalizing problems	0.015	0.028	0.556	0.578	0.014	0.028	0.509	0.611	0.023	0.026	0.861	0.389

Ethnicity	-1.203	0.503	-2.391	0.017	-0.738	0.408	-1.810	0.070	-0.695	0.402	-1.730	0.084
Father warmth	0.774	0.507	1.528	0.126	1.198	0.531	2.257	0.024	--	--	--	--
Father psychological control	0.279	0.472	0.591	0.555	0.716	0.422	1.696	0.090	--	--	--	--
Father knowledge	-0.133	0.386	-0.344	0.731	-0.524	0.407	-1.288	0.198	--	--	--	--
Warmth x ethnicity	1.457	1.332	1.094	0.274	--	--	--	--	--	--	--	--
Psychological control x ethnicity	1.628	1.071	1.520	0.129	--	--	--	--	--	--	--	--
Knowledge x ethnicity	-1.309	0.994	-1.317	0.188	--	--	--	--	--	--	--	--

Note. Estimator is MLR. Unstandardized regression coefficients are shown. The parenting main effects were removed from the revised trimmed model as they were non-significant in the direct effect model (Table 4.11).

Table 5.15. Summary of indirect effects of mother parenting on substance use outcomes moderated by ethnicity

	Grade 9 alcohol use (Table 5.5)	Grade 9 alcohol problems (Table 5.6)	Grade 12 alcohol problems (Table 5.7)	Grade 12 alcohol dependence (Table 5.8)	Grade 12 marijuana dependence (Table 5.9)
a paths					
Mother warmth to GPA	✘	✘	✘	✘	✘
Mother psychological control to GPA	✘	✘	✘	✘	✘
Mother knowledge to GPA	✘	✘	✘	✘	✘
Warmth x ethnicity to GPA	✘	✘	✘	✘	✘
Psychological control x ethnicity to GPA	✘	✘	✘	✘	✘
Knowledge x ethnicity to GPA	✘	✘	✘	✘	✘
Mother warmth to EXT	✘	✘	✘	✘	✘
Mother psychological control to EXT	✘	✘	✘	✘	✘
Mother knowledge to EXT	✓	✓	✓	✓	✓
Warmth x ethnicity to EXT	✘	✘	✘	✘	✘
Psychological control x ethnicity to EXT	✘	✘	✘	✘	✘
Knowledge x ethnicity to EXT	✓	✓	✓	✓	✓
b paths					
GPA to outcome	✘	✓	✘	✓	✓
EXT to outcome	✘	✓	✓	✘	✘
Evidence of moderated mediation?	no	yes	yes	no	no

Note. GPA = Academic achievement, EXT = Externalizing problems. ✓ = significant effect ($p < .05$), ✘ = non-significant effect ($p \geq .05$).

Table 5.16. Summary of indirect effects of father parenting on substance use outcomes moderated by ethnicity

	Grade 9 alcohol use (Table 5.10)	Grade 9 alcohol problems (Table 5.11)	Grade 12 alcohol problems (Table 5.12)	Grade 12 alcohol dependence (Table 5.13)	Grade 12 marijuana dependence (Table 5.14)
a paths					
Father warmth to GPA	✓	✓	✓	✓	✓
Father psychological control to GPA	✗	✗	✗	✗	✗
Father knowledge to GPA	✗	✗	✗	✗	✗
Warmth x ethnicity to GPA	✓	✓	✓	✓	✓
Psychological control x ethnicity to GPA	✗	✗	✗	✗	✗
Knowledge x ethnicity to GPA	✗	✗	✗	✗	✗
Father warmth to EXT	✗	✗	✗	✗	✗
Father psychological control to EXT	✗	✗	✗	✗	✗
Father knowledge to EXT	✗	✗	✗	✗	✗
Warmth x ethnicity to EXT	✗	✗	✗	✗	✗
Psychological control x ethnicity to EXT	✗	✗	✗	✗	✗
Knowledge x ethnicity to EXT	✗	✗	✗	✗	✗
b paths					
GPA to outcome	✗	✓	✓	✓	✓
EXT to outcome	✗	✗	✓	✗	✗
Evidence of moderated mediation?	no	yes	yes	yes	yes

Note. GPA = Academic achievement, EXT = Externalizing problems. ✓ = significant effect ($p < .05$), ✗ = non-significant effect ($p \geq .05$).

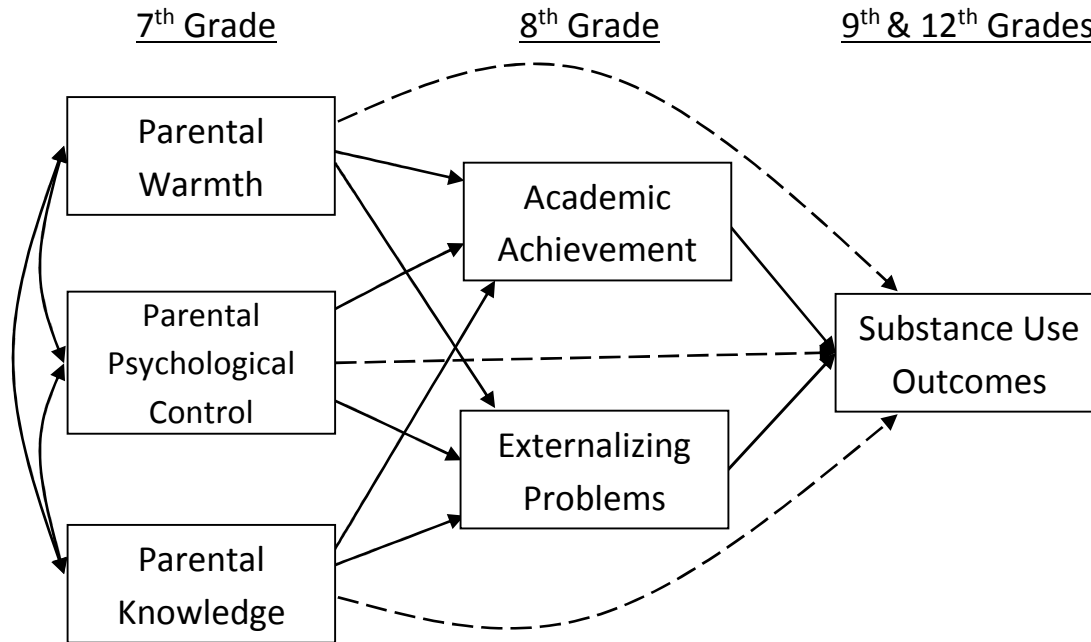
Table 5.17. Estimates and confidence intervals of the mediated effects for parenting models by ethnicity (n = 352)

Indirect Effects	European Americans			Asian Americans		
	Lower 95%CI	Estimate	Upper 95%CI	Lower 95%CI	Estimate	Upper 95%CI
Mother Knowledge → EXT → Grade 9 Alcohol Problems						
Full model	-0.594	-0.265	-0.029	-0.163	0.019	0.207
Trimmed model	-0.526	-0.222	-0.001	-0.165	0.000	0.162
Revised trimmed model	-0.626	-0.314	-0.081	-0.209	0.001	0.206
Mother Knowledge → EXT → Grade 12 Alcohol Problems						
Full model	-0.448	-0.205	-0.031	-0.112	0.018	0.168
Trimmed model	-0.429	-0.210	-0.049	-0.137	0.002	0.147
Father Warmth → GPA → Grade 9 Alcohol Problems						
Full model	-0.875	-0.391	-0.027	-0.307	-0.026	0.267
Trimmed model	-0.650	-0.277	0.015	-0.314	-0.074	0.112
Revised trimmed model	-0.899	-0.459	-0.130	-0.227	-0.023	0.189
Father Warmth → GPA → Grade 12 Alcohol Problems						
Full model	-0.553	-0.224	0.004	-0.217	-0.026	0.117
Trimmed model	-0.526	-0.223	-0.014	-0.273	-0.068	0.062
Revised trimmed model	-0.529	-0.259	-0.062	-0.283	-0.076	0.081
Father Warmth → GPA → Grade 12 Alcohol Dependence						
Full model	-0.745	-0.314	-0.009	-0.274	-0.028	0.188
Trimmed model	-0.652	-0.285	-0.025	-0.317	-0.079	0.097
Revised trimmed model	-0.659	-0.292	-0.036	-0.320	-0.082	0.095
Father Warmth → GPA → Grade 12 Marijuana Dependence						
Full model						
Trimmed model	-0.646	-0.286	-0.024	-0.255	-0.026	0.170
Revised trimmed model	-0.592	-0.264	-0.028	-0.318	-0.080	0.079
	-0.450	-0.201	-0.009	-0.236	-0.058	0.073

Note. GPA = Academic achievement, EXT = Externalizing problems. Significant mediation effects are in **bold**.

Figure 1. Conceptual developmental pathway model to substance use outcomes:

Academic achievement and externalizing problems as putative mediators



Note. Ethnicity was tested as a moderator of the paths from parenting to the two mediators.