Young Adult Maturing Out of Alcohol Involvement: Moderated Effects among Marriage, Developmental Changes in Personality, and Late Adolescent Alcohol Involvement

by

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ABSTRACT

Research has shown that a developmental process of "maturing out" of alcohol involvement occurs during young adulthood, and that this process is related to both young adult role transitions (e.g., marriage) and personality developmental (e.g., decreased disinhibition and neuroticism). The current study extended past research by testing whether protective marriage and personality effects on maturing out were stronger among more severe late adolescent drinkers, and whether protective marriage effects were stronger among those who experienced more personality development. Parental alcoholism and gender were tested as moderators of marriage, personality, and late adolescent drinking effects on maturing out; and as distal predictors mediated by these effects. Participants were a subsample (N = 844; 51% children of alcoholics; 53% male, 71% non-Hispanic Caucasian, 27% Hispanic; Chassin, Barrera, Bech, & Kossak-Fuller, 1992) from a larger longitudinal study of familial alcoholism. Hypotheses were tested with latent growth models characterizing alcohol consumption and drinking consequence trajectories from late adolescence to adulthood (age 17-40). Past findings were replicated by showing protective effects of becoming married, sensation-seeking reductions, and neuroticism reductions on the drinking trajectories. Moderation tests showed that protective marriage effects on the drinking trajectories were stronger among those with higher pre-marriage drinking in late adolescence (i.e., higher growth intercepts). This might reflect role socialization mechanisms such that more severe drinking produces more conflict with the demands of new roles (i.e., role incompatibility), thus requiring greater drinking reductions to resolve this conflict. In contrast, little evidence was found for moderation of personality effects by late adolescent drinking or for moderation of

marriage effects by personality. Parental alcoholism findings suggested complex moderated mediation pathways. Parental alcoholism predicted less drinking reduction through decreasing the likelihood of marriage (mediation) and muting marriage's effect on the drinking trajectories (moderation), but parental alcoholism also predicted more drinking reduction through increasing initial drinking in late adolescence (mediation). The current study provides new insights into naturally occurring processes of recovery during young adulthood and suggests that developmentally-tailored interventions for young adults could harness these natural recovery processes (e.g., by integrating role incompatibility themes and addressing factors that block role effects among those with familial alcoholism).

TABLE OF CONTENTS

Page

Page

Page

Page

Page

Page

Page

LIST OF TABLES

Table Page

Table Page

Table Page

Table Page

LIST OF FIGURES

Figure Page

Figure Page

Introduction

Research on young adult alcohol involvement is an important area of study, given the variety of risky behaviors and consequences associated with it. For example, epidemiologic data has shown that, among young adults who report drinking on a monthly basis (about 71%), about 49% reported heavy drinking at least once in a two week period (i.e., having 5 or more drinks in a row; Johnston, O'Malley, Bachman, & Schulenberg, 2007a). Further, heavy drinking young adults are at an elevated risk for experiencing drinking-related social consequences (e.g., injury, risky sexual behavior, interpersonal conflict) relative to those who drink at more moderate levels, with risk for five or more past-year consequences increasing by 5 times as a result of occasional heavy drinking (once or twice in two weeks) and by 21 times as a result of frequent heavy drinking (three or more times in two weeks; Wechsler, Lee, Kuo, & Lee, 2000). Beyond, short-term risk for social consequences, heavy young adult drinkers have also been shown to have increased long-term risk for the development or maintenance of clinically significant drinking problems (O'Neill, Parra, & Sher, 2001). This is noteworthy from a public policy standpoint, given that problem drinking is associated with an annual public cost of $185 billion in the United States alone (e.g., due to costs of alcohol-related treatments, medical consequences, and lost earnings; Harwood, 2000).

Multiple streams of evidence suggest that alcohol involvement should be considered from a developmental perspective (e.g., see Masten, Faden, Zucker, & Spear, 2008; Sher & Gotham, 1999). For example, there is clear evidence of age-related changes in the prevalence of alcohol involvement as individuals move in and out of different developmental stages. More specifically, studies show that alcohol involvement typically

begins and escalates during adolescence, peaks in late adolescence (ages 20 to 23), declines dramatically during young adulthood, and decline at a more gradual rate thereafter (e.g., Chen & Kandel, 1995; Harford, Grant, Yi, & Chen, 2005; Johnston, O'Malley, Bachman, & Schulenberg, 2007a, 2007b; Rohde & Andrews, 2006). The current study focused on the relatively dramatic declines in alcohol involvement that occur during young adulthood; a developmental phenomenon that has been termed *maturing out* in previous literature. This pattern of maturing out during young adulthood suggests that, despite the risk for persistence or escalation of young adult drinking (e.g., O'Neill et al., 2001), there is also great potential for declines in drinking among many young adults.

Consistent with the potential for persistence or escalation, but also for maturing out of young adult alcohol involvement, some previous research has characterized developmental heterogeneity of young adult alcohol involvement by identifying subgroups of young adults with different age-related trajectories. These studies commonly identify a subgroup that follows the maturing out pattern of alcohol involvement described above, but they also commonly identify a "chronic" subgroup that persists at high levels of alcohol involvement beyond young adulthood, as well as low-risk groups that persist as light drinkers or abstainers (e.g., Caswell, Pledger, & Pratap, 2002; Jackson & Sher, 2005; Windle, Mun, & Windle, 2005). Given this developmental heterogeneity, an important task for researchers has been to identify factors that distinguish those who mature out from those who do not. The identification of such factors will provide insights into processes that drive natural recovery from problem drinking in young adulthood, and these insights could hold clinical implications for

prevention and intervention efforts targeting problem drinkers who persist into young adulthood (Watson & Sher, 1998).

In the following five sections, theories and past research on etiological factors that drive maturing out of alcohol involvement will be reviewed, and different pertinent aims of the current study will be discussed in each section. The first two sections will review theories and evidence regarding effects of young adult role transitions (e.g., marriage) and developmental personality change (respectively) on maturing out, and both sections will conclude by discussing the current study's aims to replicate past evidence for these effects (along with some extensions of past personality research). The third section will consider late adolescent levels of alcohol involvement as a potential moderator of both adult role transition and personality development effects on maturing out, and will conclude by discussing the current study's aims to provide the first tests of such moderated effects. The fourth section will consider how personality development may moderate effects of adult role transitions on maturing out, and will conclude by discussing the current study's aim to provide the first tests of such moderated effects. Finally, the fifth section will consider the potential relevance of parental alcoholism and gender as third variables, mediated distal predictors, and moderators within the context of the above hypotheses, and will conclude by discussing the current study's aims to account for these possibilities.

Young Adult Role Transitions and Maturing Out

One commonly offered explanation for maturing out of alcohol involvement is that declines in drinking are particularly likely during young adulthood because of the acquisition of new adult roles that occurs during this developmental period (e.g.,

transitions into marriage, parenthood, and full-time employment; Bachman, Wadsworth, O'Malley, & Johnston, 1997). This is consistent with an emphasis in developmental psychopathology on developmental-stage specific tasks and transitions (Cicchetti, 1993; Sher & Gotham, 1999). From this perspective, various influences often serve to reinforce high-risk behaviors and thus contribute to stability of high-risk developmental trajectories over time, but certain transitions such as the adoption of adult roles can create "turning points" in these trajectories that are characterized by shifts toward lower levels of risk (Rutter, 1996; Schulenberg, Maggs, & O'Malley, 2003). Further, the theory of role socialization offers one explanation for these "turning point" effects of adult role transitions by suggesting that incompatibility of a pre-existing behavior (e.g., drinking) with the norms and obligations of a new social role will result in a state of conflict called *role incompatibility*. This may initiate a process called *role socialization* in which role incompatibility is resolved through declines in the pre-existing behavior. Alternatively, role incompatibility may be resolved through departure from the role (Thornton & Nardi, 1975; Turner, 2001; Yamaguchi & Kandel, 1985a, 1985b).

However, when discussing potential effects of role transitions on problem behaviors, researchers also commonly warn that apparent effects of social roles may actually reflect confounding third variable effects of pre-existing characteristics. In other words, the association of an adult role with lower levels of a problem behavior may reflect an effect of the role on reductions in the problem behavior, but it may instead reflect the fact that those at lower risk for the problem behavior are also more likely to adopt the role. In the context of the developmental psychopathology conceptualization of transitions and turning points, this means that the adoption of new roles or the avoidance

of new roles may often merely reflect continuity or even reinforcement of pre-existing low- or high-risk developmental trajectories of problem behaviors, as opposed to reflecting potential turning points in these trajectories (Rutter, 1996; Schulenberg et al., 2003). This alternative explanation is referred to as *role selection*, a process in which individuals are more likely to transition into certain roles when their pre-existing characteristics are already consistent with the demands of those roles (Thornton & Nardi, 1975; Turner, 2001; Yamaguchi & Kandel, 1985a, 1985b). Further, note that role selection includes but is not limited to processes through which individuals actively seek out roles that are consistent with their pre-existing characteristics. Rather, role selection more broadly reflects any processes through which pre-existing characteristics influence the likelihood of subsequent role transitions. For example, heavier drinkers may be presented with fewer opportunities to transition into adult roles.

This potential for both role selection and role socialization is important to note from a methodological standpoint, because only studies with certain methodological features can differentiate socialization from selection effects. To demonstrate that effects represent socialization and not selection, longitudinal research designs are of fundamental importance, and longitudinal data analysis must also test role effects on subsequent problem behaviors while accounting for any background variables that may predict both. For instance, tests of marriage effects on subsequent drinking must control for pre-marriage levels of drinking, given that lower pre-marriage drinkers may be more likely to select into marriage (and also to have lower post-marriage drinking). Of course, there are likely other factors that predict both marriage and post-marriage drinking unique from effects of pre-marriage drinking, and these additional factors must also be controlled to

exclusively capture role socialization effects. Previous studies have varied widely in the extent to which these methodological considerations have been addressed when investigating socialization effects of young adult roles on maturing out of alcohol involvement, and the following review places greater emphasis on studies that have more thoroughly accomplished this.[1] Following this review of evidence for socialization effects of adult roles is a review of studies that have directly tested selection effects on adult role entry via earlier alcohol involvement, given that this pertains to the plausibility of role selection as an alternative explanation of apparent role socialization effects.

Evidence for socialization effects of adult roles on maturing out. With few exceptions (Chilcoat & Breslau, 1996; Gotham, Sher, & Wood, 1997), both becoming married and having children during young adulthood have been consistently shown to predict subsequent maturing out of alcohol involvement after adjusting for earlier (pre-role) levels of alcohol involvement. Further, although some studies have tested only effects of marriage (Bogart, Collins, Ellickson, Martino, & Klein, 2005; Curran, Muthen, & Harford, 1998; Gotham, Sher, & Wood, 2003; Lee, Chassin, & MacKinnon, 2010), a number of studies have shown that both marriage and parenthood contribute uniquely to maturing out (Bachman et al., 1997; Labouvie, 1996; Staff et al., 2010; Little, Handley, Leuthe, & Chassin, 2009; Power, Rodgers, & Hope, 1999). These effects of marriage and

[1] This review also focuses exclusively on studies that have tested effects of role transitions during the specific developmental period of young adulthood, given the current study's interest in effects of role transitions on young adult maturing out of alcohol involvement. Young adulthood is a particularly normative developmental period for these role transitions to occur (e.g., Bachman et al., 1997), and it should not be assumed that the same role transitions have the same effects on alcohol involvement when occurring in other developmental periods. For instance, early parenthood during adolescence has been shown to predict subsequent *increases* in alcohol involvement (Little, Handley, Leuth, & Chassin, 2009), and marriage before age 20 has been shown to less consistently predict decreased alcohol involvement (although this may be primarily attributable to a greater likelihood of eventual divorce; Bogart, Collins, Ellickson, Martino, & Klein, 2005).

parenthood on maturing out have been shown for a variety of drinking-related outcomes including levels of typical alcohol consumption, frequency of binge/heavy drinking, drinking-related consequences, and clinical alcohol use disorders (AUDs).

In contrast, previous research has typically failed to demonstrate socialization effects of full-time employment on subsequent maturing out of alcohol involvement (Bachman et al., 1997; Gotham et al., 2003; Neve, Lemmens, & Drop, 2000 Staff et al., 2010), although with at least one exception (Gotham et al., 1997). From the perspective of role socialization theory, this may be because full-time employment does not necessarily conflict with alcohol involvement as much as marriage and parenthood do. For instance, the role of employment may be more heterogeneous, with only certain types of employment conflicting with common patterns of drinking. Providing some support for this notion, Staff et al. (2010) found no effects of full-time employment overall but did find full-time employment in professional jobs (e.g., lawyer, physician, teacher, social worker) to predict subsequent declines in heavy drinking, although these effects were not maintained when controlling for marriage and parenthood effects.

It is important to note that two studies stand out as providing particularly strong support for socialization effects of marriage and parenthood (but not employment) on maturing out, given that they demonstrated role socialization effects while controlling for earlier alcohol involvement *and* a variety of other conceptually important potential role selection processes. In the context of a latent state-trait model of alcohol use disorder, Gotham et al. (2003) showed effects of young adult marriage (but not employment) on later state-specific alcohol use disorder while controlling for trait alcohol disorder and a variety of pre-adulthood covariates including family history of alcoholism, extraversion,

psychoticism, neuroticism, stressful life events, educational performance, and religious involvement. Also, Staff et al. (2010) found unique effects of marriage and parenthood (but not employment) on maturing out of alcohol use and heavy drinking through hierarchical models testing within-person effects (Raudenbush & Bryk, 2002), which thereby accounted for any time-stable individual differences that may have influenced roles selection. In summary, these and the other studies reviewed above provide strong evidence for role socialization effects of marriage and parenthood but not employment on young adult maturing out of alcohol involvement.

Evidence for selection effects of earlier alcohol involvement on adult role adoption. A subset of past studies has explicitly tested selection into adult roles as a function of late adolescent alcohol involvement, with surprisingly little evidence for this specific mechanism of selection. Regarding selection effects on entry into marriage, although at least one study found that lower late adolescent alcohol involvement predicted a greater likelihood of marriage in young adulthood (Gotham et al., 1997), a number of studies have failed to find such effects (Bogart et al., 2005; Chilcoat & Breslau, 1996; Curran et al., 1998; Lee et al., 2010; Miller-Tutzauer, Leonard, & Windle, 1991). In fact, some studies have even shown that *higher* alcohol involvement predicted subsequent marriage (Fleming, White, & Catalano, 2010; Power et al., 1999). Fewer past studies pertain to selection effects on entry into parenthood and employment, but descriptive results from Bachman et al.'s (1997) national data clearly failed to support late adolescent alcohol involvement as a mechanism of selection into marriage, parenthood, or full-time employment, given that those who adopted these roles in young adulthood had earlier rates of late adolescent alcohol use and heavy drinking that

appeared either extremely close to or even higher than average. In addition, Labouvie (1996) failed to show that late adolescent alcohol consumption predicted young adult marriage or parenthood, and Gotham et al.'s (2003) state-trait model (described above) did not find trait alcohol use disorder to predict either young adult marriage or employment. Thus, previous research provides surprisingly little evidence for effects of late adolescent alcohol involvement on entry into adult roles, therefore calling into question the feasibility of at least this specific role selection mechanism as an alternative explanation for socialization effects of adult roles on maturing out of alcohol involvement. However, there are of course various other potential selection mechanisms that could bias these apparent role socialization effects that are beyond the scope of the current review.

Summary and current study hypotheses. As reviewed above, in attempting to explain young adult maturing out of alcohol involvement, a great deal of previous research has provided strong support for socialization effects of adult role transitions like marriage and parenthood (but not employment), with surprisingly little support for the alternative explanation of lower late adolescent alcohol involvement driving greater selection into these adult roles. Toward replicating this past research, the current study used longitudinal growth models (see Figure 1) to estimate changes in both alcohol consumption and drinking consequences (in two separate models) from late adolescence to adulthood (ages 17 to 40), and to test whether these drinking-related changes were predicted by becoming married between late adolescence (age 17 to 22) and young adulthood (age 23 to 28). Consistent with previous theory and research, it was expected that marriage would predict greater age-related declines in both alcohol consumption and

drinking consequences. The alternative explanation of selection into marriage as a function of earlier alcohol involvement was also investigated by testing whether marriage by young adulthood was related to growth intercepts reflecting late adolescent levels of alcohol consumption and drinking consequences. Although previous theory suggests the potential for selection, it was hypothesized that selection effects of late adolescent alcohol involvement on marriage would not be detected, given the consistent lack of empirical evidence for such effects in past research.

Young Adult Developmental Personality Changes and Maturing Out

With most previous research focusing on social-contextual explanations for young adult maturing out of alcohol involvement (e.g., young adult roles), some research has also begun to investigate effects of intrapersonal factors such as developmental changes in personality characteristics. Although this specific line of research is relatively new, in the broader literature there has been a great deal of previous theory and research on personality characteristics and how they relate to alcohol involvement in general. Personality is most commonly characterized as encompassing the *big five* personality traits (e.g., Costa & McCrae, 1992), but past theories of personality and alcohol involvement have tended to instead rely upon traits that correspond to the *big three* models of personality (Sher, 1991; Sher, Grekin, & Williams, 2005 and Littlefield & Sher, 2010a). These models vary in their terminology but can generally be said to include *behavioral disinhibition* (i.e., tendencies toward being impulsive, quick-tempered, and thrill/novelty seeking), *neuroticism* (i.e., proneness to negative affect), and *extraversion* (i.e., sociability; Cloninger, 1987; Eysenck, 1994; Sher et al., 2005; Sher, Trull,

Bartholow, & Vieth, 1999; Tellegen, 1994).[2] This review will focus on behavioral disinhibition and neuroticism, given that these traits relate most closely to existing personality theories of alcohol involvement.

Personality theories of behavioral disinhibition and alcohol involvement. Deviance proneness models of alcohol involvement argue that behavioral disinhibition underlies a general tendency toward deviance, elevating risk for alcohol involvement as well as a variety of other externalizing behaviors (e.g., drug problems, conduct disorder, antisociality). There is a great deal of empirical support for this perspective, including factor analytic models showing that various externalizing behaviors can be viewed as separate facets of a general externalizing construct, and that this general externalizing construct is predicted by behavioral disinhibition (e.g., Cooper, Wood, Orcutt, & Albino, 2003; Krueger et al., 2002; Krueger, Markon, Patrick, & Iacono, 2005). Further, disinhibition has been a consistent cross-sectional and prospective predictor of various alcohol involvement indices ranging from use to disorder (Sher et al., 2005; Littlefield & Sher, 2010a).

However, although previous theories tend to speak generally of behavioral disinhibition, there is strong evidence that there are distinct facets of disinhibition and that these facets differ in their relations to alcohol involvement, thus contributing to

[2] The *Big five* personality models are thought to encompass the *big three* models. *Big five* model traits include *neuroticism* (i.e., proneness to negative affect), *extraversion* (i.e., sociability), *openness* (i.e., receptivity toward novel experiences and ideas), *conscientiousness* (i.e., responsibility, organization, and meticulousness), and *agreeableness* (i.e., being trusting, cooperative, and compassionate toward others). Neuroticism and extraversion are also found in *big three* models, and are generally defined similarly as in the *big five* models (e.g., see Sher et al., 1999). The third trait of the *big three* models, behavioral disinhibition, is thought to be represented within multiple traits of the *big five* models, consistent with findings showing that disinhibition is reflected by the deliberation and self-discipline facets of conscientiousness, the impulsiveness facet of neuroticism, and the excitement/seeking-facet of extraversion (Whiteside & Lynam, 2001).

theoretical refinements in this area. Specifically, factor analytic research has identified at least five facets of disinhibition including *lack of planning* (i.e., acting quickly without considering consequences), *lack of perseverance* (i.e., difficulty remaining engaged in boring or challenging tasks), *sensation-seeking* (i.e., enjoyment, openness to, and pursuit of exciting or novel experiences with little regard for associated risks), *negative urgency* (i.e., impulsivity under conditions of negative affect), and *positive urgency* (i.e., impulsivity under conditions of intense positive affect; Cyders, & Smith, 2007; Cyders et al., 2007; Whiteside & Lynam, 2001). Regarding differences among these facets in their relations to alcohol involvement, studies have found that sensation-seeking primarily predicts alcohol consumption (e.g., drinking frequency and quantity), negative and positive urgency primarily predict problem drinking (e.g., consequences and alcohol use disorder), and premeditation and perseverance often fail to predict either type of alcohol involvement when controlling for the other three facets (Cyders, Flory, Rainer, & Smith, 2009; Cyders et al., 2007; Fischer & Smith, 2008; Smith et al., 2007). Thus, studies of disinhibition effects on alcohol involvement should carefully consider the facets of disinhibition and the types of drinking-related behaviors that are reflected in their outcome measures.

Personality theories of neuroticism and alcohol involvement. Affect regulation models of alcohol involvement argue that some individuals who are prone to experiencing negative affect use alcohol as a coping or self-medication strategy (Sher, 1991; Sher et al., 2005). Empirical support for this perspective includes evidence linking higher negative affect to higher coping-related drinking motives (i.e., drinking to cope with negative affect), which in turn relates to higher alcohol use (for a review, see

Kuntsche, Knibbe, Gmel, & Engels, 2005). However, neuroticism may relate more closely to problem drinking than to alcohol consumption per se, given that coping motives primarily relate to drinking outcomes like social consequences and alcohol use disorder, whereas other drinking motives (e.g., enhancement motives) relate more closely to outcomes like frequency and quantity of use (for a review, see Littlefiel & Sher, 2010a). Further, a recent meta-analysis (Malouff et al., 2007) showed that, although neuroticism had significant effects across various drinking outcomes (both cross-sectionally and prospectively), it most strongly predicted outcomes related to problem drinking. Thus, as was stated above for disinhibition, studies of neuroticism effects on alcohol involvement should carefully consider the types of drinking-related behaviors that are reflected in their outcome measures.

The role of personality in the specific context of maturing out. As mentioned above, despite longstanding theories and a vast empirical literature on how personality relates to alcohol involvement in general, research has only recently begun to specifically investigate how developmental changes in personality relate to maturing out of alcohol involvement. This is likely because personality traits have been traditionally viewed as highly stable throughout the life course (Caspi, Roberts, & Shiner, 2005; Littlefield & Sher, 2010b). However, more recent research has shown that, despite a high degree of rank-order stability (for a meta-analysis, see Roberts, & DelVecchio, 2000), personality characteristics show consistent patterns of mean-level changes as individuals move in and out of different developmental stages (for a review, see Caspi et al., 2005; for a meta-analysis, see Roberts, Walton, & Viechtbauer, 2006). Further, developmental personality changes are often most dramatic during the transition from late adolescence to young

adulthood (i.e., the normative developmental period for maturing out; Caspi et al., 2005; Roberts et al., 2006), including in those personality traits that are most closely linked to alcohol involvement both theoretically and empirically (e.g., behavioral disinhibition and neuroticism; Johnson, Hicks, McGue, & Iacono, 2007; McGue, Bacon, & Lykken, 1993; Roberts, Caspi, & Moffitt, 2001; Robins, Fraley, Roberts, & Trzesniewski, 2001).[3] This acknowledgement of developmental changes in alcohol-related personality traits begs questions regarding how these developmental personality changes relate to developmental changes in alcohol involvement, including the young adult drinking-related declines that represent the phenomenon of maturing out.

Earlier, it was noted that adult roles may be associated with lower drinking either because those roles reduce drinking or because lower-risk early drinkers more often subsequently select into those roles. Similarly, an association between developmental personality maturation and lower drinking may indicate that personality maturation reduces drinking, but it may instead indicate that higher-risk early drinking limits subsequent personality maturation. Further, although it is highly plausible from a theoretical standpoint that personality maturation could influence subsequent reductions in alcohol involvement (see above), it is also quite plausible that high early levels of alcohol involvement could prevent subsequent personality maturation. For instance, heavy drinking may have pharmacological effects that interfere with the neurological processes that typically mediate personality development (Crews, He, & Hodge, 2007;

[3] Additional developmental changes in personality that are observed in young adulthood include decreased extroversion and increased conscientiousness, openness, and agreeableness. However, as mentioned above, the current study focused on behavioral disinhibition and neuroticism because these two personality traits are most closely related to theories of personality and alcohol involvement, thus providing the clearest basis for hypotheses.

White et al., 2011). Further, heavy drinking may be associated with environmental influences that work in opposition of normative personality maturation (e.g., the *corresponsive principle*; Quinn, Stappenbeck, & Fromme, 2011; Roberts & Bogg, 2004). Thus, the following review of evidence for personality development effects on maturing out of alcohol involvement will note the extent to which the alternative explanation of earlier drinking effects on decreased personality development was accounted for. Further, this will be followed by a review of studies that have directly tested effects of earlier drinking on subsequent personality development, given that this pertains to the plausibility of such effects as an alternative explanation for personality development effects on maturing out.

Evidence for personality development effects on maturing out. Using parallel process growth models spanning ages 18 to 35, two studies by Littlefield, Sher, and Wood (2009, 2010) showed that decreases in problem drinking (a composite of drinking consequences and dependence symptoms) were correlated with decreases in a multifaceted measure of behavioral disinhibition (termed *impulsivity* in their study), with developmental decreases in neuroticism, and with developmental increases in conscientiousness (but were unrelated to changes in extraversion, openness, and agreeableness). The authors acknowledged a lack of temporal precedence, but argued on theoretical grounds that their results likely at least partially reflected effects of personality development on maturing out. However, in another study with the same data, Littlefield, Sher, and Steinley (2010) used growth mixture models to capture multiple trajectories of disinhibition from age 18 to 35, and they noted that decreased disinhibition appeared to

precede decreased alcohol involvement in certain trajectory groups, thus indicating prospective disinhibition effects on maturing out.

This work represents a major advance in understanding young adult maturing out, but there is a need for attempts to replicate their findings, given that only three studies have been done to date and they all used the same sample. Further, there are ways that future attempts at replication could also extent beyond these studies, in particular by accounting for some of the recent insights in the broader literature regarding the structure of personality and how it relates to alcohol involvement (reviewed above). For instance, all of these past studies used a broad measure of dinhibition that likely represented a combination of multiple disinhibition facets. However, given evidence for differences across disinhibition facets in how they relate to alcohol involvement, research should test *specific* disinhibition facets as they relate specifically to maturing out. Further, all of these past studies tested personality effects on problem drinking only, and given evidence that certain disinhibition facets and neuroticism relate differently to alcohol consumption versus problem drinking, research should test whether *specific* disinhibition facets and neuroticism differentially predict maturing out of alcohol consumption versus problem drinking. Beyond exploring the implications of recent insights in the broader literature on personality and alcohol involvement, this will also advance the important task of clarifying which specific personality characteristics are most closely related to relatively risky forms of alcohol involvement (i.e., problem drinking).

Evidence for effects of earlier alcohol involvement on personality development. Relatively few studies have explicitly tested whether greater late adolescent alcohol involvement predicts a decreased likelihood of young adult

personality maturation. In one of Littlefield et al.'s (2009) parallel process growth modeling studies of correlated change between personality and problem drinking, they surprisingly found that higher age 18 problem drinking (the intercept) predicted *greater* subsequent declines in disinhibition and neuroticism (the slopes). In contrast, in Littlefield, Sher, and Steinley's (2010) growth mixture modeling study, when comparing a persistently high-disinhibition trajectory group to a decreasing disinhibition trajectory group, the two groups did not differ on pre-trajectory (age 18) alcohol involvement. Other studies have found shorter-term effects (e.g., over 6 or 12 months) of higher alcohol involvement on less personality maturation *during adolescence* (e.g., less disinhibition decrease, less psychosocial maturity increase; Chassin, et al., 2010; Littlefield, Vergés, Wood & Sher, 2012; White et al., 2011; Quinn et al., 2011), but with mixed evidence for longer-term effects of adolescent alcohol involvement on young adult levels of personality maturation (Littlefield et al., 2012; Quinn et al., 2011). Thus, despite clear evidence for short-term effects earlier in development, there is little evidence that higher late adolescent alcohol involvement prevents personality maturation during the transition to young adulthood, thus calling into question this alternative explanation for personality development effects on maturing out of alcohol involvement. However, there are of course other potential third variable alternative explanations for these effects that are beyond the scope of the current review.

Summary and current study hypotheses. As reviewed above, recent research has shown support for effects of young adult developmental personality changes on maturing out of alcohol involvement, with little evidence for the alternative explanation that higher late adolescent alcohol involvement causes less young adult personality

maturation. However, additional work is needed to (a) replicate the few previous studies to date, (b) test effects of *specific* disinhibition facets on maturing out, and (c) explore whether *specific* disinhibition facets and neuroticism have different effects on maturing out of alcohol use versus problem drinking. Thus, the current study tested changes in both sensation-seeking (a specific disinhibition facet) and neuroticism between late adolescence (age 17 to 22) and young adulthood (age 23 to 28) as predictors of changes in both alcohol consumption and drinking consequences from late adolescence to adulthood (age 17 to 40; within the context of the current study's aforementioned longitudinal growth models; see Figure 1). Consistent with previous theory and research, it was expected that decreases in both personality variables would predict decreases in alcohol involvement, but with sensation-seeking relating most closely to alcohol consumption, and neuroticism relating most closely to drinking consequences. The alternative explanation of higher late adolescent alcohol involvement predicting decreased personality maturation was also investigated by testing whether changes in the personality variables by young adulthood were related to growth intercepts reflecting late adolescent levels of alcohol consumption and drinking consequences. Although previous theory suggests the potential for these effects, it was hypothesized that they would not be detected, given the lack of empirical evidence for such effects in previous research.

Moderation of Adult Role and Personality Effects by Late Adolescent Alcohol Involvement

In addition to late adolescent alcohol involvement representing a potentially important third variable that could bias estimates of young adult role and personality change effects on maturing out, there could also be moderation such that these role and

personality effects vary as a function of late adolescent alcohol involvement levels. Previous research has yet to investigate this possibility, and in fact, there has even been little research asking the simpler question of whether the likelihood of young adult maturing out varies as a function of earlier late adolescent alcohol involvement levels. Maturing out has typically been viewed as a general developmental phenomenon, but it is possible that maturing out may be better conceptualized as a subgroup-specific phenomenon that differentially affects particular types of initial drinkers. For instance, maturing out may primarily reflect declines among already low-risk drinkers or may primarily reflect declines among relatively heavy or problematic drinkers, and only the latter would suggest that maturing out truly reflects decreases in risky forms of alcohol involvement. Further, if maturing out does primarily affect initially high-risk drinkers, this would suggest that an understanding of the causes of maturing out may be critically useful for tailoring clinical interventions for young adult problem drinkers, whereas maturing out would likely have limited clinical relevance if declines occurred primarily among already low-risk drinkers.

Perhaps surprisingly, the limited previous research on this topic appears to suggest that maturing out is more likely among those with relatively severe forms of initial alcohol involvement. This may be reflected indirectly by findings suggesting that young adult declines are more dramatic for drinking-related variables that reflect heavy or problematic use. For instance, it has been shown that young adult declines occur for drinking quantity but not for drinking frequency (Caswell, Pledger, & Pratap, 2002; see also Figures 4 and 5 in Masten et al., 2008), perhaps because drinking quantity more closely reflects problematic heavy drinking. Similarly, when compared to declines in

drinking quantity, declines appear steeper for measures that explicitly assess problematic drinking such as drinking-related consequences or alcohol use disorder diagnoses (Jackson & Sher, 2005). Beyond these studies, more direct evidence for greater maturing out among more severe initial drinkers comes from previous growth modeling studies that have found higher levels of late adolescent drinking to predict greater rates of drinking declines over the course of young adulthood (i.e., effects of growth intercepts on growth slopes; Curran et al., 1998; Littlefield, Sher, & Wood, 2009), although these studies did not emphasize this finding. Finally, two studies have addressed this question by using person-centered latent transition analysis to analyze transitions in and out of different latent drinking "groups" over time, with one study modeling transitions primarily during late adolescence (Jackson, Sher, Gotham, & Wood, 2001) and the other study modeling transitions over the course of late adolescence to adulthood (Lee, Chassin, & Villalta, in press). Findings from both studies suggested that declines into less severe drinking groups over time were most common among those who were initially in the most severe drinking group (with severity reflected by both heavy use and problem drinking), although only Lee et al. (in press) confirmed this finding through statistical significance testing.

Thus, it appears that heavier and more problematic late adolescent drinkers experience more dramatic subsequent declines upon transitioning to young adulthood, but previous research has yet to explore potential explanations for this. Lee et al. (in press) suggested that this may occur because more severe late adolescent drinkers are more strongly affected by young adult roles transitions and personality development. For instance, role socialization theory suggests that a new role will motivate changes in a pre-

existing problem behavior to the extent that there are conflicts between the demands of the new role and the problem behavior (i.e., role incompatibility; Yamaguchi & Kandel, 1985a, 1985b). Thus, perhaps relatively severe late adolescent drinkers are more affected by young adult roles because their relatively severe form of drinking conflicts more with the demands of these new roles (i.e., creates role incompatibility). Similarly, among young adults who experience personality-related increases in their self-regulatory abilities (e.g., decreased behavioral disinhibition and neuroticism), relatively severe drinkers may be more motivated to utilize their newfound self-regulatory abilities toward changing their drinking behaviors, given their more frequent past experiences with drinking-related consequences.

The current study is the first to test the type of moderated effects suggested above. Specifically, within the context of the aforementioned longitudinal growth models of alcohol consumption and problem drinking (see Figure 1), late adolescent alcohol consumption and problem drinking (represented by the growth intercepts) were tested as moderators of effects of marriage, sensation-seeking change, and neuroticism change (all between late adolescence and young adulthood) when predicting alcohol consumption and problem drinking changes from late adolescence to adulthood. It was hypothesized that effects of becoming married, decreased sensation-seeking, and decreased neuroticism on maturing out would be more pronounced among both heavier and more problematic late adolescent drinkers.

Integrative Models of Adult Role and Personality Effects on Maturing Out

Toward the integration of research on role transition and personality development effects on maturing out of alcohol involvement, Littlefield, Sher, and Wood (2009, 2010)

importantly showed that maturing out is *uniquely* predicted by both young adult role transitions (marriage and parenthood) and young adult personality development (decreased behavioral disinhibition and neuroticism, and increased conscientiousness). However, beyond this, research has yet to test more complex models of interplay between role transitions and personality development as they influence maturing out. For instance, research has yet to consider the potential for moderation where effects of young adult role transitions may vary as a function of developmental changes in personality, thus failing to acknowledge that influences of social-contextual factors may vary as a function of intrapersonal characteristics. There is also a lack of theoretical consideration of such issues both within the context of role socialization theory and within the context of the developmental pychopathology perspective's conceptualization of transitions and turning points (Rutter, 1996; Schulenberg et al., 2003; Thornton & Nardi, 1975; Turner, 2001; Yamaguchi & Kandel, 1985a, 1985b), given that these theoretical models instead tend to focus on how role effects may vary as a function of the characteristics of the roles that are adopted.

Nonetheless, there is reason to suspect that young adult role transitions may be more likely to cause maturing out of alcohol involvement among young adults who have also experienced developmental personality maturation. For instance, role socialization theory suggests that a new role will motivate changes in a pre-existing problem behavior to the extent that there are conflicts between the demands of the new role and the problem behavior (i.e., role incompatibility; Yamaguchi & Kandel, 1985a, 1985b). However, for young adults who experience role-incompatibility-related motivation to change their behaviors, there will likely be challenges associated with efforts to successfully carry out

these changes, and they may be better prepared to effectively navigate these challenges to the extent that they have also experienced personality-related maturation. For instance, sensation seeking (a disinhibition facet) is characterized by pursuit of exciting experiences despite potential for associated consequences (Whiteside & Lynam, 2001), so developmental decreases in sensation seeking may better prepare young adults to follow through on role-incompatibility-related motivation to avoid exciting but risky behaviors (e.g., drinking) because of how they now conflict with their new adult roles. Similarly, developmental decreases in neuroticism would likely serve to decrease emotional reactivity to challenges that arise through efforts to change behaviors in response to role incompatibility, and in the specific context of efforts to reduce drinking, this might even prevent neuroticism-driven coping-related drinking motives from overriding role-incompatibility-related motives to avoid drinking. Thus, in summary, while previous research suggests that maturing out is driven both by new roles that provide *motivation* to change drinking behaviors and by personality changes that provide a newfound *capability* to successfully make such changes, the current study argues and tests the hypothesis that these two factors together may more effectively spur maturing out than either factor in isolation.

The current study is the first to test the type of moderated effects suggested above, thereby contributing substantially to the development of integrative models of young adult role transitions and personality development effects on maturing out. Specifically, the current study tested interactions of marriage with sensation-seeking change and neuroticism change (all between late adolescence and young adulthood) when predicting alcohol consumption and problem drinking changes from late adolescence to adulthood

(within the context of the aforementioned longitudinal growth models of alcohol consumption and problem drinking; see Figure 1). It was hypothesized that marriage effects on maturing out would be more pronounced among those who also decreased in sensation-seeking and neuroticism.

Parental Alcoholism and Gender in the Context of Earlier Study Hypotheses

Given the clear evidence for the importance of parental alcoholism and gender as influences on alcohol involvement, these represent important additional factors to consider within the context of the current study. Thus, the following review considers the multiple ways that parental alcoholism and gender may relate to the other study hypotheses that were developed above.

Parental alcoholism. Family history of alcohol disorders is a robust predictor of alcohol involvement (for a review, see Chassin, Beltran, Lee, Haller, & Bountress, in press). However, there have been mixed results from studies that have investigated its effects on the likelihood of maturing out of alcohol involvement. Jackson, Sher, and Wood (2000) found more parental alcoholism in a group with chronic AUDs than in a group with AUDs that remitted during young adulthood. Also, Jackson et al. (2001) found that parental alcoholism predicted a decreased likelihood of declining from a relatively severe latent drinking "group". However, other studies have found that, although parental alcoholism predicted greater initial escalation of alcohol involvement, it was unrelated to the likelihood of later decline (Jackson & Sher, 2005; Lee et al., under review; Warner, White, & Johnson, 2007). Although previous research is mixed, the past evidence supporting parental alcoholism effects on maturing out suggests that parental alcoholism should at least be considered as a potential third variable to be controlled for

when predicting maturing out. Further, if parental alcoholism does influence mature out, this may be explained by moderation such that parental alcoholism reduces the protective effects of role transitions and personality development on maturing out, or this may be explained by mediation such that parental alcoholism limits role transitions and personality development, which in turn limit maturing out. These moderation and mediation hypotheses are not mutually exclusive, and they have yet to be investigated in previous research.

Gender. Not only do males show greater initial escalation than do females in various indices of alcohol involvement; they also tend to show less dramatic declines over the course of young adulthood (i.e., less maturing out). For example, a number of studies have shown that drinking either decreases less for males than for females during young adulthood or persists longer for males than for females before declining (Bartholow, Sher, & Krull, 2003; Harford, Grant, Yi, & Chen, 2005; Marmorstein, 2009; Wells, Horwood, & Fergusson, 2006; see also Figure 3 in Masten et al., 2008). In addition, some studies have found more males among groups with chronically high levels of alcohol involvement than among groups with alcohol involvement that declined during young adulthood (Jackson & Sher, 2005; Schulenberg, Wadsworth, O'Malley, Bachman, & Johnston, 1996). Finally, Jackson et al. (2001) found that males were less likely than were females to decline from a relatively severe latent drinking "group". Note, however, that there is a minority of studies that have not found gender effects on maturing out (Chassin, Flora, & King, 2004; Lee et al., under review; Tanner et al., 2007; Warner et al., 2007). As with parental alcoholism, past evidence for gender effects on maturing out suggests that gender should at least be considered as a potential third variable to be

controlled for when predicting maturing out. Further, gender influences on maturing out may be explained by moderation such that male gender reduces/delays the protective effects of role transitions and personality development on maturing out, or this may be explained by mediation such that male gender limits/delays role transitions and personality development, which in turn limits/delays maturing out. These moderation and mediation hypotheses are not mutually exclusive, and they have gone largely untested in past research, with the exception of studies testing marriage moderation where just one of three studies has found gender differences in marriage effects (Curran et al., 1998; Labouvie, 1996; Power et al., 1999).

Summary and current study hypotheses. Given the above evidence for the potential importance of parental alcoholism and gender when predicting maturing out, the current study accounted for parental alcoholism and gender in three different ways within the context of the longitudinal growth models described above (see Figure 1). First, their importance as potential third variables was accounted for by including them as covariates in all models (but see Appendix B for supplemental models that test hypotheses without controlling for parental alcoholism and gender). Second, they were tested as moderators of the effects of late adolescent alcohol involvement, marriage, and personality change when predicting maturing out. Third and finally, they were tested as distal predictors of maturing out with mediated effects through late adolescent alcohol involvement, marriage, and personality change.

The current study is the first to test these moderated and mediated effects of parental alcoholism and gender in predicting maturing out, with the exception of previous work on gender moderation of marriage effects (as noted earlier). Regarding moderation

hypotheses, it was hypothesized that both parental alcoholism and male gender would be associated with weaker protective effects of marriage, decreased sensation-seeking, and decreased neuroticism when predicting maturing out. Regarding mediation hypotheses, it was hypothesized that both parental alcoholism and male gender would predict less marriage, less sensation-seeking decline, and less neuroticism decline, all of which would in turn predict decreased maturing out. Hypotheses were not made regarding how effects of late adolescent alcohol involvement might be moderated by or might mediate effects of parental alcoholism and gender.

Summary of All Current Study Hypotheses

In summary, the current study tested a number of hypotheses pertaining to effects of marriage and personality development on maturing out of alcohol involvement. All of these hypotheses were tested separately within the context of longitudinal growth models of changes in alcohol consumption and drinking consequences from late adolescence to adulthood (ages 17 to 40; see Figure 1). It was hypothesized that marriage and personality maturation between late adolescence and young adulthood (between ages 17-22 and ages 23-28) would predict alcohol consumption and drinking consequence reductions from late adolescence to adulthood (i.e., the growth slopes). Models also tested whether higher late adolescent alcohol consumption and drinking consequences (i.e., the growth intercepts) predicted less marriage and less personality maturation, although these effects were not hypothesized, given little evidence for such effects in past research.

A novel hypothesis of the current study was that protective effects of marriage and personality maturation on drinking-related changes would be more pronounced

among those with higher late adolescent alcohol involvement (for both consumption and consequences), given that higher-risk drinking may conflict more with new adult roles and personality maturation, thus requiring greater drinking-related changes to address these conflicts. Another novel hypothesis was that protective effects of marriage on drinking-related changes would be more pronounced among those who had experienced greater personality maturation, given that personality maturation may facilitate more effective responding to role-related motivations to change drinking behaviors. Finally, to account for the influences of parental alcoholism and gender, these two variables were included as covariates in all models; were tested as moderators of effects of marriage, personality change, and late adolescent alcohol involvement on drinking-related changes; and were tested as distal predictors of drinking-related changes with mediated effects through marriage, personality change, and late adolescent alcohol involvement.

Method

Participants

Original study participants. Participants for the current study were drawn from a larger ongoing longitudinal study of familial alcoholism (Chassin & Barrera, 1993; Chassin et al., 2004; Chassin, Pitts, DeLucia, & Todd, 1999; Chassin, Rogosch & Barrera, 1991). At Wave 1, the total sample ($N = 454$; $M_{age} = 12.7$; $SD_{age} = 1.45$) consisted of 246 children of alcoholics (COAs) and 208 demographically matched non-COAs. Initial eligibility requirements for participation included that potential participants lived in the state of Arizona, were of non-Hispanic Caucasian or Hispanic ethnicity, had no severe cognitive limitations that would preclude an interview, were between the ages of 11 and 15, had parents born between 1926 and 1960, and had at least one parent who

was willing to participate in the study. Data were collected annually for Waves 1 through 3, and then at five year intervals for Waves 4 through 6. Full-biological siblings were included as additional participants at Waves 4 (n = 327), 5 (n = 346), and 6 (n = 349) if they were within the same age range as the original participants. Sample retention was excellent at Waves 4, 5, and 6 with 90% of original participants retained at Wave 4 (N = 407), 91% of original participants and previously recruited siblings retained at Wave 5 (N = 708), and 90% (N = 737) of living original participants and previously recruited siblings retained at Wave 6. Retention at Waves 4, 5, and 6 was unbiased by gender or ethnicity. However, retention was slightly poorer for COAs than for non-COAs at Waves 4 and 5 (χ^2 = 5.43[1], p = .02, Cramer's V = .11; χ^2 = 4.20[1], p = .04, Cramer's V = .07; respectively), but not at Wave 6.

Current study participants. The current sample included all original adolescents and siblings who were interviewed at Wave 4, Wave 5, or Wave 6 (N = 844). This sample ranged in age from 17 to 27 at Wave 4 (M = 21.1; SD = 2.3), from 22 to 33 at Wave 5 (M = 26.6; SD = 2.6), and from 27 to 40 at Wave 6 (M = 32.9; SD = 2.7). Also, 51% were COAs, 53% were male, 71% were non-Hispanic Caucasian, 27% were Hispanic, and 29% had graduated college by Wave 6. For analyses, to increase developmental homogeneity within the current study's longitudinal time points, data from Waves 4, 5, and 6 were restructured into three longitudinal age bands: 17 to 22 (age band 1), 23 to 28 (age band 2), and 29 to 40 (age band 3). These age bands were chosen on the basis of previous epidemiologic studies (e.g., Chen & Kandel, 1995; Harford, Grant, Yi, & Chen, 2005; Johnston, O'Malley, Bachman, & Schulenberg, 2007), which have shown that ages 17 to 22 (age band 1) are associated with increasing and peaking alcohol involvement,

ages 23 to 28 (age band 2) are associated with decreasing alcohol involvement (i.e., maturing out), and ages 29 to 40 (age band 3) are associated with relative stabilization of alcohol involvement.[4] Age bands 1, 2, and 3 are subsequently referred to as late adolescence, young adulthood, and adulthood, respectively. Note that, although these terms are often used to describe developmental stages characterized by specific social-contextual circumstances, and although opinions vary regarding the specific age ranges of these stages, they are used here simply as terms to refer to our three age bands and the age ranges that they roughly represent.

Missing data. Of the current sample, 52.0% (n = 439) had data for Waves 4, 5, and 6 that fit into all three age bands (late adolescence, young adulthood, and adulthood). The remaining 48.0% (n = 409) were missing data for at least one age band either due to attrition (although data loss from attrition was minimal; see above) or due to having measurements at ages that did not fit into each of the three age bands. For example, participants who were already older than age 22 at Wave 4 had no data that fit into age band 1. Thus, they were treated as missing at age band 1 and their Wave 4 data were instead used for age band 2. When participants had two waves of data fitting into the same age band, the wave was chosen at which the participant was closest to the age band's midpoint age. To more specifically characterize the 48% of the current sample with some missing data, 36.7% of the current sample (n = 310) had data that fit two of the three age bands and 11.3% (n = 95) had data that fit one of the three age bands. Also,

[4] Prior to constructing these age bands, the pattern of age-related changes in drinking commonly observed in epidemiologic studies was confirmed in the current sample in the age-specific means for alcohol consumption and drinking-related consequences. Further, a variety of alternative age bands were initially constructed, but they showed similar patterns of changes in drinking variables and similar overall levels of missing data, so the initial age bands were retained.

69.0% (n = 582) of the current sample had data that fit age band 1, 85.2% (n = 719) had data that fit age band 2, and 86.6% (n = 731) had data that fit age band 3. Analyses used full information maximum likelihood estimation to include participants with one or two missing age bands.

Recruitment

Methods that were used to recruit COA and non-COA families are described below, but for further details see Chassin, Barrera, Bech and Kossak-Fuller (1992).

Recruitment of children of alcoholic families. Potential COA families were identified through four different methods. First, potential COA families were identified through reviewing court records for individuals who were convicted of driving while intoxicated between 1984 and 1988. Records were examined for indicators of alcoholism including blood alcohol content of at least .15 at the time of arrest, prior alcohol-related arrests, a score of seven or higher on the Michigan Alcohol Screening Test (Selzer, 1971), and diagnosis of probable alcoholism by a court substance abuse screening center. Second, potential COA families were identified by reviewing HMO wellness questionnaires of members joining a large HMO between 1986 and 1988. Wellness questionnaires were screened for alcoholism indicators including consuming 26 or more alcoholic drinks per week, reporting three or more alcohol-related social consequences, and self-labeling as an alcoholic. Third, potential COA families were identified through community telephone surveys. Telephone surveys screened for alcoholism indicators including attending an Alcoholics Anonymous meeting, hospitalization for a drinking problem, and reports of having an alcoholic spouse. Fourth, one potential COA family was identified through a referral from a local Veteran's Administration (VA) outpatient

alcohol treatment program. Potential COA families identified through the recruitment methods described above were subsequently subjected to a formal assessment for parental alcohol abuse or dependence (see Measures), and these assessments resulted in a final sample of 246 COA families, with 219 alcoholic biological fathers and 59 alcoholic biological mothers. Of this final sample of COA families, the study initially identified 103 from court records, 22 from HMO wellness questionnaires, 120 from telephone surveys, and one from a VA alcohol treatment program.

Recruitment of demographically matched Non-children of alcoholic families. Reverse directories were used to identify potential non-COA families that lived in the same neighborhoods as recruited COA families. Telephone screening was then used to match potential non-COA families with COA families according to child's age (within one year), family composition (one-parent vs. two-parent), ethnicity, and socioeconomic status (based on property value codes or reports of parental income). Potential non-COA families who met these criteria were subsequently subjected to a formal assessment for parental alcohol abuse or dependence (see Measures). Based on these assessments, families were excluded if either parent met diagnostic criteria for alcohol abuse or dependence, and 17 additional families were excluded because a parent reported drinking problems close to the diagnostic threshold (to reduce risk of later "crossover" into the COA group). These assessments resulted in a final total of 208 demographically matched non-COA families.

Recruitment biases. Two main sources of potential recruitment bias were selective contact with COA participants and subject refusal to participate. The impact of not contacting all potential participants (i.e., selective contact) was assessed by

comparing available archival records between adults who were and were not contacted. This was done only for those recruited through court records and HMO wellness questionnaires because no archival data were available for other participants. No differences between contacted and non-contacted adults were found with respect to blood alcohol level at time of arrest, number of prior alcohol-related arrests, self-labeling as alcoholic, or MAST scores. However, slight but statistically significant biases included that non-contacted adults, when compared to contacted adults, were younger (means of 37 vs. 39), more often recruited from court sources (90% vs. 87%), and more often of Hispanic ethnicity (22% vs. 18%). In addition, a more substantial bias was that contacted adults were more likely than non-contacted adults to be married.

To address the second potential source of recruitment bias, refusal to participate, adults who agreed to participate (73% of COAs and 77% of non-COAs) were compared to those who refused to participate separately for COAs and non-COA families. Among adults from potential COA families, those who agreed to participate did not differ from those who refused on alcoholism indicators, age, gender, or SES, although those who refused were more often Hispanic (24% vs.18%) and more often married (69% vs. 50%) compared to those who agreed. Among adults from potential non-COA families, no differences were found in family composition or SES, but those who refused were more often Hispanic (41% vs. 18% for mothers; 40% vs. 22% for fathers) compared to those who agreed. For more on potential contact and recruitment bias, see Chassin et al. (1992).

Procedure

The Adolescent and Family Development Project was explained to families as a study supported by the National Institute on Drug Abuse that was designed to explore

reasons why certain adolescents develop problems, such as alcohol and drug problems, whereas others do not. Although parental alcoholism was not mentioned as a selection criterion, participants were informed that they would be interviewed about drug and alcohol use. After parents provided informed consent and adolescents provided assent, interviews were conducted either at the family's residence or at the Arizona State University campus. Trained interviewers used laptops to read items aloud to participants, who could either enter responses themselves using a laptop computer or respond verbally and allow interviewers to enter the data. Family members were typically interviewed simultaneously and in separate rooms to avoid contamination and to increase privacy. In addition, confidentiality was reinforced with a Department of Health and Human Services Certificate of Confidentiality. Telephone interviews were used for participants who had relocated out-of-state. Interviews typically lasted 1-3 hours, and participants were paid up to $70 for each interview.

Measures

Measures used in the current study are described below. For more on item phrasing and response options, see Appendix A.

Alcohol consumption. Alcohol consumption was measured at Waves 4, 5, and 6 with two items asking participants how frequently in the past year they drank hard liquor and beer or wine, respectively. Response options ranged from (0) *never* to (7) *every day*. In addition, two items asked participants how much hard liquor and beer or wine they drank, respectively, on a typical drinking occasion, with response options ranging from (1) *one drink* to (8) *nine or more drinks*. Separately for hard liquor and beer or wine, frequency-by-quantity products were calculated, and then the two products were summed

to index overall past-year alcohol consumption. See Appendix A for items and response options.

Drinking consequences. Drinking consequences were measured at Waves 4, 5, and 6 by asking participants if they had ever experienced thirteen different drinking-related consequences (e.g., complaints from family, financial problems, getting arrested). In addition, if participants responded affirmatively for a given consequence, they were asked how recently they experienced that consequence with response options ranging from (1) within the past three months to (5) more than 5 years ago. Based on these reports, the current study used counts of drinking-related consequences occurring in the past year. Analyses accounted for the non-normal distribution of this variable through zero-inflated Poisson modeling (see Analyses and Results section). See Appendix A for items and response options.

Marriage. The current study's sample was trichotomized into a *never married* group who had never been married across the three age bands (n = 198), a *became married* group who became married between age bands 1 and 2 and remained married at age band 3 (n = 143), and an *other* group including all others in the sample (n = 503). When testing effects of marriage with multiple-group models, comparisons were made only between the *never married* group and the *became married* group, while the *other* group was included as a third group to increase statistical power (e.g., by increasing reliability of growth slope estimates).

Potential members of the *never married* group were identified using participants' age band 3 reports of whether or not they had ever been married. In total, 207 participants reported never being married by age band 3, but 9 of these participants reported being

married at one of the three age bands based on a marital status item which was administered at all three age bands. Due to this conflicting data, these 9 participants were classified in the *other* group, leaving a total *never married* group of $N = 198$. See Appendix A for more on marriage-related items and how they were used to create the *never married* group.

In creating the *became married* group, 126 potential members were identified based on their marital status reports at each of the three age bands. Based on these reports, 95 of these participants went from single to married to married ($n = 95$) across the three age bands, and 31 went from engaged to married to married ($n = 31$). However, 17 of these participants were excluded from the final *became married* group (i.e., classified in the *other* group) because they reported getting divorced and then remarried either prior to their age band 2 marriage ($n = 9$) or between age bands 2 and 3 ($n = 8$). An additional 70 participants were identified as potential members of the *became married* group based on their age band 3 marital status report, despite their having missing marriage data for either age band 1 or age band 2. Of these 70 participants, 36 were excluded from the final *became married* group because they either reported getting divorced and then remarried prior to age band 3 ($n = 10$) or reported becoming married for the first time either earlier ($n = 24$) or later ($n = 2$) than age band 2. Thus, the final sample size for the *became married* group was $N = 143$. See Appendix A for more on marriage-related items and how they were used to create the *became married* group.

The *other* group was highly heterogeneous and thus is difficult to characterize. Among this group, 9.1% were married at age band 1, 36.6% were married at age band 2, and 70.3% were married at age band 3. This group's most common marital transitions

across age bands 1, 2, and 3 included unmarried to unmarried to married (n = 99), missing to married to married (n = 56), missing to unmarried to married (n = 52), and unmarried to unmarried to missing (n = 49). See Table A1 in Appendix A for all marital transitions among this group. Note that the characteristics of this *other* group are less important than the characteristics of the *never married* group and the *became married* group, because marriage effects were tested by comparing the *never married* group to the *became married* group only, while the *other* group was included in models only to increase statistical power.

Sensation-seeking and neuroticism. To assess sensation-seeking, participants were administered six items that were adapted from Zuckerman's (1979) Sensation-seeking Scale, although one item ("I like wild parties") was not used to avoid spurious overlap with the construct of alcohol use (see Appendix A for all items and response options). To assess neuroticism, participants were administered 12 items from the 60-item NEO-Five Factor Inventory (NEO-FFI; Costa & McCrae, 1992; items administered with permission from the publisher). All sensation-seeking and neuroticism items were administered at Waves 4, 5, and 6 with response options ranging from (1) strongly disagree to (5) strongly agree. Reliability of these scales was supported in the current sample by latent factor models demonstrating (a) their unitary factor structure and (b) their strong autocorrelations between age bands 1 and 2 (see Tables C1 and C2 in Appendix C). Predictive validity has been demonstrated in past research with the current sample by showing effects of these scales on young adult alcohol and drug involvement ranging from use to diagnoses (e.g., Chassin, Flora, & King, 2004; King & Chassin, 2004). Analyses used simple sensation-seeking and neuroticism change scores computed

to reflect change between age bands 1 and 2 (e.g., by subtracting age band 1 sensation-seeking from age band 2 sensation-seeking; but see Appendix C for supplemental analyses using other methods to test personality change effects).

Parental alcoholism. Lifetime alcoholism diagnoses (abuse or dependence) were obtained from both parents at Wave 1 with a computerized structured interview (Diagnostic Interview Schedule, version III; Robins, Helzer, Croughan, & Ratcliff, 1981) using *Diagnostic and Statistical Manual of Mental Disorders* criteria (3rd Ed.; American Psychiatric Association, 1980). For non-interviewed parents, alcoholism diagnoses were established using Family History Research Diagnostic Criteria (Endicott, Anderson, & Spitzer, 1975) on the basis of spousal reports. Participants who were classified as COAs had at least one biological, custodial parent who was alcoholic at Wave 1, and participants who were classified as non-COAs had no biological or custodial parents who were alcoholic at Wave 1.

Gender. At Waves 4, 5, and 6, participants reported their gender with response options including (1) female and (2) male. In rare cases where gender self-reports were in disagreement across waves (0.9%; $n = 3$), gender was determined based on other available information (e.g., interviewer notes).

Analyses

All models were estimated using MPlus version 6.0 (Muthén & Muthén, 1998-2010). All models used full information maximum likelihood estimation to include participants with incomplete data. To account for the clustering of sibling participants within families, all models used a robust sandwich estimator (i.e., Mplus option TYPE=COMPLEX) to obtain adjusted standard errors and fit statistics.

Growth Model Estimation

For all growth models, change was modeled as a function of age using the Mplus option T-SCORES. This allowed models to account for individually-varying ages within and across the three age bands of the current study, thereby allowing the estimation of both linear and quadratic growth slopes. Also, for all growth models, age was centered at 21.5 (i.e., 21.5 was subtracted from all raw age values) so that growth intercepts would reflect model-implied levels at age 21.5 (i.e., the midpoint of the age band 1 age range). Thus, regression effects of growth intercepts on growth slopes can be interpreted as effects of late adolescent levels of the drinking outcomes (alcohol consumption or drinking-related consequences) on changes in the drinking outcomes from late adolescence to adulthood.

Note that centering age at 21.5 also affects the interpretation of the linear and quadratic slopes. In quadratic growth models, the linear slope indicates the direction of the growth trajectory at the intercept (i.e., at an age value of zero) and the quadratic slope indicates how that direction of the growth trajectory changes with changes in age away from the intercept (e.g., see Singer & Willett, 2003). Thus, because age was centered at 21.5 (i.e., because the intercept was located at age 21.5), the linear slope indicates the direction of the growth trajectory at an age value of 21.5, and the quadratic slope indicates the amount that this initial direction of the growth trajectory changes for every one unit increase in age away from an age value of 21.5.[5]

[5] This is precisely analogous to the interpretation of quadratic and interaction effects in other regression analysis contexts. For example, in a regression testing two main effect variables and their interaction, the main effect estimate of the first variable indicates this variable's effect at a value of zero for the second variable, and the interaction term estimate indicates the amount that the first variable's effect changes with each one unit change away from zero for the second variable. However, in this interaction context, both

Regarding the growth models' distributional assumptions, the alcohol consumption growth models simply treated the alcohol consumption variables as continuous and normally distributed, whereas the drinking consequence growth models treated the drinking consequence variables as count variables with excessive zeros using zero-inflated Poisson models (see hypothesis-testing step 1 for support of this method). Zero-inflated Poisson models distinguish between a class of individuals whose values can only be zero (i.e., a structural zero class) and a class of individuals with count values that can range from zero to any other positive integer. Thus, these models can be used to simultaneously estimate both a logistic regression distinguishing the two classes and a Poisson regression predicting count values among the non-structural-zero class. However, given the current study's focus on predicting *declines* in drinking consequences (i.e., maturing out), only Poisson regressions predicting count values within the non-structural-zero class were modeled (i.e., models did not predict the likelihood of membership in the structural zero class relative to the non-structural-zero class).

Note that in these zero-inflated Poisson models, effects of predictors on drinking consequences controlled for alcohol consumption to the extent that non-drinkers can be considered excluded when effects on drinking consequences were estimated. This is because non-drinkers were represented within the structural zero class and thus do not influence the Poisson regressions predicting count values within the non-structural-zero class. Thus, the current study's estimates of effects on drinking consequences

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main effect variables would typically be centered *at their means*, which gives the main effect estimate of the first variable the additional interpretation of indicating the average of this variable's effects across all levels of the second variable. In contrast, in the current study's growth models, this additional interpretation does not apply analogously to the linear slope (i.e., the linear slope does not indicate the average direction of the growth trajectory across all ages) because in the current study's models age was centered at 21.5 rather than at the mean.

appropriately exclude individuals with no potential for drinking consequences due to a lack of exposure to alcohol. However, models attempting to further control for alcohol use by including alcohol consumption as a time-varying covariate frequently failed to converge, so this approach was not used. Thus, effects on changes in drinking consequence may be mediated to some extent by changes in alcohol consumption.

Testing marriage and personality effects on alcohol consumption and drinking consequence slopes. The interpretation of marriage and personality effects on the drinking-related slopes was aided by the initial restructuring of data from waves into age bands (see Method section) because this provided more age homogeneity in the marriage and personality variables. For instance, interpretation of marriage effects is aided by the knowledge that the *became married* group was unmarried from ages 17 to 22 (i.e., at age band 1) and married from ages 23 to 40 (i.e., at age bands 2 and 3). Similarly, interpretation of personality change effects is aided by the knowledge that personality change variables reflect changes between an age range of 17 to 22 and an age range of 23 to 28 (i.e., between age bands 1 and 2).

Main and interaction effects of marriage between age bands 1 and 2 were tested through multiple group growth models including the *never married* group (n = 198), the *became married* group (n = 143), and the *other* group (n = 503; see Measures). Main effects of marriage were tested with Wald χ^2 tests of differences between the *never married* group and the *became married* group (e.g., slope differences between the two groups). Moderation of marriage effects was tested by including the moderator as a model predictor and conducting Wald χ^2 tests of whether the moderator's effect differed

significantly between the two marriage groups (e.g., whether personality effects on the slopes differed between the two groups).

Main effects of personality change were simply tested by including personality change scores (see Measures) as predictors in the alcohol consumption and drinking consequence growth models (e.g., predicting the slopes; but see Appendix C for supplemental analyses using other methods to test personality change effects). Interactions of personality change scores with marriage were tested as is described in the previous paragraph, and all other interactions involving the personality change scores were tested by simply including interaction terms as additional models predictors. For interactions with late adolescent alcohol involvement, latent interaction terms were specified using the Mplus command XWITH, because late adolescent levels of the drinking outcomes were reflected by the latent growth model intercepts.

Hypothesis testing steps and procedures. Ten steps of hypothesis testing were carried out. Step 1 involved developing unconditional growth models of alcohol consumption and drinking consequences. Step 2 involved testing main effects of parental alcoholism and gender on the alcohol consumption and drinking consequence intercepts and slopes, given an interest in first characterizing their full effects as covariates before including additional predictors (they will be included as covariates in all subsequent models, but see Appendix B for supplemental models conducting steps 3 through 8 without controlling for parental alcoholism and gender). Steps 3 through 5 involved testing main effects of late adolescent alcohol involvement (i.e., the intercepts), marriage, and personality change (respectively) on the alcohol consumption and drinking consequence slopes. Steps 6 through 8 involved testing interactions among late

adolescent alcohol involvement (i.e., the intercepts), marriage, and personality change when predicting the slopes.[6] Finally, step 9 involved testing whether the above main effects of late adolescent alcohol involvement (i.e., the intercepts), marriage, and personality change were moderated by parental alcoholism or gender, and step 10 involved testing late adolescent alcohol involvement, marriage, and personality change as mediators of parental alcoholism and gender effects on the slopes.

For all hypothesis tests of either main or interaction effects on the drinking-related slopes, effects were tested on the linear slope, on the quadratic slope, and on both of these slopes simultaneously (through Wald χ^2 tests of reduction in model fit when both effects were constrained to zero simultaneously). However, only significant effects on the quadratic slope or significant effects on both slopes simultaneously were taken as affirmative evidence for effects on the overall drinking-related trajectory. Significant effects on the linear slope only were not taken as affirmative evidence because, as was explained above, in the current study's quadratic models the linear slope merely represents the direction of the growth trajectory at the age value of the intercept (i.e., at age 21.5). Thus, significant effects on the linear slope *alone* are difficult to interpret and may be of minimal importance. In contrast, either significant effects on the quadratic slope alone or significant effects on both slopes simultaneously were taken as affirmative evidence because either result would likely reflect a considerable influence on the overall drinking-related trajectory. For instance, two marriage groups may have the same quadratic slope (i.e., the same degree of curvature in their overall trajectories), but

[6] Separate analyses also tested interactions of sensation-seeking with neuroticism predicting the drinking-related slopes, but no significant or marginally interactions were detected. Results of these analyses are presented and discussed in Appendix D.

different linear slopes between the two groups would set their trajectories off in two different directions beginning at the intercept, thus resulting in two very different overall trajectories. This demonstrates the potential importance of effects on both slopes simultaneously, because in this scenario the quadratic slope alone would not differ significantly but the combination of the linear and quadratic slope would. In contrast, two marriage groups may have similar linear slopes but different quadratic slopes, and the difference in quadratic slopes alone may produce very different overall trajectories. This demonstrates the potential importance of effects on the quadratic slope alone, because in this scenario the similarity of the two groups' linear slopes may unduly deflate a test of effects on both slopes simultaneously, thus under-representing the fact that the overall trajectories are in fact quite different.

Effect probing was conducted for all significant ($p < .05$) main and interaction effects on the drinking-related slopes. Main effects on the slopes were probed by obtaining conditional slope estimates at different levels of the main effect predictor and then using these conditional slope estimates to plot corresponding conditional model-implied overall trajectories (e.g., obtaining alcohol consumption slope estimates and plotting model-implied alcohol consumption trajectories separately for the *never married* group and the *became married* group). Interaction effects on the slopes were probed by obtaining conditional effects of one interaction variable at different levels of the other interaction variable (e.g., marriage effects on the two slopes at low, mean, and high levels of personality change), and by obtaining conditional slope estimates at different combinations of the two interaction variables and then using these conditional slope estimates to plot corresponding conditional model-implied overall trajectories (e.g.,

obtaining alcohol consumption slope estimates and plotting model-implied alcohol consumption trajectories at the six different combinations of the two marriage groups and low, mean, and high personality change). These probing procedures were essential for the current study as the visualization of effects through plotting conditional overall drinking-related trajectories greatly facilitated the interpretation of significant results.

Results

Hypothesis-testing Step 1: Building Unconditional Growth Models of Alcohol Consumption and Drinking-related Consequences

Alcohol consumption model results. For alcohol consumption, unconditional intercept-only (i.e., no growth), linear, and quadratic models were estimated. These models assumed a normal distribution of alcohol consumption, given a skewness ranging from 1.28 to 1.60 and a kurtosis ranging from 1.34 to 3.216 across the three age bands. Of these three models, the quadratic model was retained based on loglikelihood ratio nested model comparisons (see Table 1). See Table 2 for results of the intercept-only, linear slope, and quadratic slope models, and see Figure 2 for plotted model-implied growth curves from each model.

Drinking consequence model results. For drinking consequences, due to the non-normal distribution of this variable (see Table 3), a variety of alternative model types with different distributional assumptions were considered including continuous variable models, negative binomial models, Poisson count models, and multiple types of zero-inflated Poisson count models. First, it was confirmed through loglikelihood ratio nested model comparisons that, for each of these model types, a quadratic model fit better than a linear or an intercept-only model (see Table 4). Then, quadratic models of each type were

compared using AIC and BIC fit indices (see Table 5). The result of these various model comparisons was that the quadratic zero-inflated Poisson count model was retained (with no growth slope for the zero-inflation part of the model). See Table 6 for results of the intercept-only, linear slope, and quadratic slope zero-inflated Poisson models, and see Figure 3 for plotted model-implied growth curves from each model.

Conclusions. For alcohol consumption, upon comparing intercept-only, linear slope, and quadratic slope models assuming a normal distribution, the quadratic slope model of alcohol consumption was retained. For drinking consequences, upon comparing intercept-only, linear slope, and quadratic slope models, as well as comparing various model types with different distributional assumptions, the quadratic zero-inflated Poisson count model of drinking consequences was retained. All subsequent models built upon these two unconditional quadratic growth models.

Hypothesis-testing Step 2: Testing Parental Alcoholism and Gender Effects on the Alcohol Involvement Intercepts and Slopes

The final quadratic alcohol consumption and drinking consequence models from hypothesis-testing step 1 were modified to include effects of parental alcoholism and gender on the intercepts and on the linear and quadratic slopes. These analyses were performed because parental alcoholism and gender were planned to be included as covariates in all subsequent models, so there was interest in first determining their effects on the intercepts and slopes when modeled alone. Note that parental alcoholism and gender effects are likely very close to fully independent from one another, given that the correlation between them is very minimal ($r = .014$; $p = .692$).

Alcohol consumption model results. Both parental alcoholism and gender significantly predicted the alcohol consumption intercept ($b = 4.603$, $p < .001$; $b = 8.743$, $p < .001$; respectively). Parental alcoholism did not predict the linear or the quadratic alcohol consumption slope either when tested separately ($b = .276$, $p = .273$; $b = -.032$, $p = .107$; respectively) or when tested simultaneously ($\chi^2[2] = 3.58$; $p = .167$). Although gender did not predict either alcohol consumption slope when tested separately ($b = -.369$, $p = .115$; $b = .012$, $p = .488$, respectively), it did predict both slopes simultaneously ($\chi^2[2] = 6.00$; $p = .0499$). See Figure 4 for plotted gender effects on the alcohol consumption slopes.

Drinking consequence model results. Results for drinking consequences were similar to the above results for alcohol consumption. Both parental alcoholism and gender significantly predicted the drinking consequence intercept ($b = .733$, $p < .001$; $b = .882$, $p < .001$; respectively). Parental alcoholism did not predict the linear or the quadratic drinking consequence slope either when tested separately ($b = .040$, $p = .446$; $b = .000$, $p = 0.992$; respectively) or when tested simultaneously ($\chi^2[2] = 1.82$; $p = .403$). Gender marginally significantly predicted the drinking consequence linear slope ($b = -.108$, $p = .056$), significantly predicted the quadratic drinking consequence slope ($b = .013$; $p = .021$), and marginally significantly predicted both slopes simultaneously ($\chi^2[2] = 5.30$; $p = .071$). See Figure 5 for plotted gender effects on the drinking consequence slopes.

Conclusions. When testing effects of parental alcoholism and gender without other predictors, both parental alcoholism and male gender significantly predicted higher late adolescent levels of both alcohol consumption and drinking consequences (i.e., the

intercepts). In contrast, parental alcoholism consistently did not to predict changes in either alcohol consumption or drinking consequences from late adolescence to adulthood (i.e., the slopes), whereas gender predicted these change for both drinking outcomes. Figures 4 and 5 show that gender effects on the slopes were primarily characterized such that males showed earlier and higher escalation in both alcohol consumption and drinking consequences, although effects on the alcohol consumption slopes appear to be of surprisingly small magnitude.

Hypothesis-testing Step 3: Testing Effects of Late Adolescent Alcohol Involvement Intercepts on the Alcohol Involvement Linear and Quadratic Slopes

The alcohol consumption and drinking consequence models with effects of parental alcoholism and gender from hypothesis-testing step 2 were modified to also test effects of late adolescent alcohol involvemt (represented by the growth intercept) on the linear and quadratic slopes. These analyses were designed to replicate the findings of Lee et. al (in press) by testing whether higher late adolescent alcohol consumption and drinking consequences predict more dramatic subsequent declines in these drinking outcomes from late adolescence to adulthood.

Alcohol consumption model results. The alcohol consumption growth intercept significantly predicted the linear slope and the quadratic slope both when tested separately and when tested simultaneously (see Table 7). To probe these effects (see Table 7 notes for details of the probing procedures), conditional alcohol consumption slopes at three different levels of the growth intercept were obtained (see Table 7) and plotted (see Figure 6). Consistent with hypotheses, Figure 6 shows that higher levels of the alcohol consumption intercept predicted greater subsequent declines in alcohol

consumption, although initial escalation was also greater until declines began at around age 25.

Drinking consequence model results. Contrary to hypotheses, the drinking consequence growth intercept did not significantly predict the linear slope or the quadratic slope either when tested separately or when tested simultaneously (see Table 8). Thus, this effect was not probed.

Conclusions. As hypothesized, higher late adolescent alcohol consumption predicted greater eventual declines in alcohol consumption beginning in young adulthood (around age 25), although initial escalation prior to these declines was also greater. Contrary to hypotheses, similar effects were not found for drinking consequences, given a non-significant effect of late adolescent consequences on subsequent changes in consequences from late adolescence to adulthood.

Hypothesis-testing Step 4: Testing Marriage Effects on the Alcohol Involvement Intercept and Linear and Quadratic Slopes

The alcohol consumption and drinking consequence models with effects of parental alcoholism and gender from hypothesis-testing step 2 were modified to also test effects of marriage on the growth intercept and on the linear and quadratic slopes. Specifically, as explained in the Analyses section, these models were re-estimated as multiple-group models with three groups including the *never married* group (n = 198), the *became married* group (n = 143), and the *other* group (n = 503; see Measures). Wald χ^2 tests were then used to test differences between the *never married* group and the *became married* group on their intercepts and slopes. These analyses were designed to test the hypothesis that becoming married between late adolescence and young adulthood

would predict greater decreases in alcohol consumption and drinking consequences from late adolescence to adulthood (between-marriage-group differences in the slopes), and to test the alternative hypothesis of selection effects of lower late adolescent alcohol consumption and drinking consequences on subsequently becoming married between late adolescence and young adulthood (between-marriage-group differences in the intercept).

Alcohol consumption model results. Wald χ^2 tests showed that the *never married* group and the *became married* group differed significantly on the linear slope and the quadratic slope both when tested separately and when tested simultaneously (see Table 9). Consistent with hypotheses, growth curves plotted separately for the two marriage groups (see Figure 7) showed a lower-risk alcohol consumption trajectory for the *became married* group relative to the *never married* group (see Conclusions subsection for a more detailed characterization). Regarding selection, the two marriage groups differed only marginally significantly ($p = .061$) on their growth intercepts, with a lower intercept for the *became married* group (consistent with selection).

Drinking consequence model results. As with the above results for alcohol consumption, the marriage groups differed significantly on the two drinking consequence slopes when tested both separately and simultaneously (see Table 10), and plotted growth curves (see Figure 8) showed a lower-risk drinking consequence trajectory for the *became married* group than for the *never married* group (see Conclusions subsection for a more detailed characterization). Regarding selection, the marriage groups differed only marginally significantly ($p = .084$) on their growth intercepts, with a lower intercept for the *became married* group (consistent with selection).

Conclusions. Results showed evidence for protective effects of marriage between late adolescence and young adulthood on trajectories of both alcohol consumption and drinking consequences from late adolescence to adulthood. However, upon probing these effects by plotting model-implied alcohol consumption and drinking consequence slopes separately for the two marriage groups, it was revealed that the nature of marriage's protective effect appears to differ between the two drinking outcomes. Closer to expectations, for drinking consequences, both marriage groups showed a curvilinear trajectory, but with earlier and more rapid declines among the never married group. In contrast, for alcohol consumption, the *never married* group showed a very protracted curvilinear trajectory which peaked around age 28, whereas the *became married* group showed a surprisingly flat and relatively low-level trajectory with no indication of early escalation prior to marriage. Results also showed evidence for selection effects of lower late adolescent alcohol involvement predicting subsequently becoming married by young adulthood, although these effects were only marginally significant ($p < .10$) for both alcohol consumption and drinking consequences.[7]

Hypothesis-testing Step 5: Testing Personality Effects on the Alcohol Involvement Intercept and Linear and Quadratic Slopes

The alcohol consumption and drinking consequence models with effects of parental alcoholism and gender from hypothesis-testing step 2 were modified to also test effects of personality change between age bands 1 and 2 on the growth intercept and on

[7] To test for other selection effects on marriage, the two marriage groups were compared on a variety of potential selection variables. Additional analyses compared the marriage groups on these variables while controlling for parental alcoholism, gender, and late adolescent alcohol involvement in order to test for selection processes that were unique from those accounted for in the current study's analyses. After controlling for these variables (see right column of Table 11), becoming married was associated with lower pre-marriage (age band 1) drug use and consequences, peer substance use, and internalizing, although all of these effects were small.

the linear and quadratic slopes. Specifically, as explained in the analyses section, simple observed sensation-seeking and neuroticism change scores were tested (in separate models[8]) as predictors of the intercepts and slopes (but see Appendix C for supplemental analyses testing personality change effects with other methods). These analyses were designed to test the hypothesis that decreased sensation-seeking and decreased neuroticism between late adolescence and young adulthood would predict decreased alcohol consumption and decreased drinking consequences from late adolescence to adulthood (i.e., personality change effects on slopes), and to test the alternative hypotheses of higher late adolescent alcohol involvement predicting less subsequent personality decline between late adolescence and young adulthood (i.e., personality change effects on intercepts).

Alcohol consumption and sensation-seeking model results. Sensation-seeking change predicted the linear slope and marginally significantly predicted the quadratic slope, and a Wald χ^2 test of both effects simultaneously was significant (see Table 12). Consistent with hypotheses, conditional growth curves plotted at three different levels of sensation-seeking change (see Figure 9) showed that greater decreases in sensation-seeking were associated with earlier and more dramatic decreases in alcohol consumption (see Conclusions subsection for a more detailed characterization). In contrast, the growth intercept was not associated with sensation-seeking change (see Table 12).

Alcohol consumption and neuroticism model results. Neuroticism change did not predict either the linear or the quadratic slope, but a Wald χ^2 test of both effects

[8] Note that separate models for the two personality variables are warranted, given that sensation-seeking and neuroticism were uncorrelated at age bands 1 and 2 and in their change scores between these age bands.

simultaneously was significant (see Table 12). Consistent with hypotheses, probing this interaction (see Figure 10) showed that greater decreases in neuroticism were associated with earlier and more dramatic decreases in alcohol consumption (see Conclusions subsection for a more detailed characterization). In contrast, the growth intercept was not associated with neuroticism change (see Table 12).

Drinking consequences and sensation-seeking model results. Sensation-seeking change did not predict the linear or quadratic slope when tested either separately or simultaneously (see Table 13), so these effects were not probed. In contrast, the growth intercept was not associated with sensation-seeking change (see Table 13).

Drinking consequences and neuroticism model results. Neuroticism change marginally significantly predicted the linear slope and did not predict the quadratic slope, but a Wald χ^2 test of both effects simultaneously was significant (see Table 13). Consistent with hypotheses, probing this interaction (see Figure 11) showed that greater decreases in neuroticism were associated with earlier decreases (but not more dramatic decreases) in drinking consequences (see Conclusions subsection for a more detailed characterization). In contrast, the growth intercept was not associated with neuroticism change (see Table 13).

Conclusions. Both decreased sensation-seeking and decreased neuroticism between late adolescence and young adulthood predicted more dramatic decreases in alcohol consumption from late adolescence to adulthood, whereas this was only found for neuroticism when predicting drinking consequences. For alcohol consumption, those experiencing relatively large decreases in either of the two personality variables showed steady reductions in alcohol consumption beginning as early as late adolescence

(sensation-seeking) or early young adulthood (neuroticism), whereas those experiencing relatively large increases in either personality variables showed far more protracted curvilinear trajectories with more modest declines beginning after young adulthood (around age 28 or 29). In contrast, the neuroticism effect on drinking consequences appeared less substantial, given that similar curvilinear trajectories of consequences were observed across different levels of neuroticism change, although relatively large decreases in neuroticism *were* associated with earlier peaks and earlier declines in drinking consequences. It is noteworthy that sensation-seeking did not predict drinking consequences, given that this is consistent with the hypothesis (based on previous research) that sensation-seeking would be most closely related to alcohol consumption and neuroticism would be most closely related to drinking consequences. Regarding the alternative hypotheses that higher late adolescent alcohol involvement would predict less subsequent personality decline, there was consistently no evidence that late adolescent levels of either alcohol consumption or drinking consequences were associated with either sensation-seeking or neuroticism changes from late adolescence to young adulthood**.**

Hypothesis-testing Step 6: Testing Marriage Interactions with Late Adolescent Alcohol Involvement Intercepts Predicting the Linear and Quadratic Slopes

The alcohol consumption and drinking consequence models with effects of parental alcoholism and gender from hypothesis-testing step 2 were modified to also test interactions of marriage with late adolescent alcohol involvement (represented by the growth intercept) predicting the linear and quadratic slopes. Specifically, as was done when testing main effects of marriage in hypothesis-testing step 4, multiple-group models

were estimated with three groups including the *never married* group (n = 198), the *became married* group (n = 143), and the *other* group (n = 503; see Measures). However, unlike in hypothesis-testing step 4, the growth intercept was modeled as a predictor of the linear and quadratic slopes. Thus, the interaction of marriage with late adolescent alcohol involvement was tested through Wald χ^2 tests of whether the growth intercept's effects on the slopes differed between the *never married* group and the *became married* group. These analyses were designed to test the hypothesis that marriage between late adolescence and young adulthood would more strongly predict decreased alcohol involvement from late adolescence to adulthood among those with higher initial alcohol involvement in late adolescent.

Alcohol consumption model results. Wald χ^2 tests showed that the growth intercept's effects on both the linear and the quadratic slope differed significantly between the *never married* group and the *became married* group, and a Wald χ^2 test of both of these between-group differences simultaneously was marginally significant (see Table 14). Thus, this interaction was probed by obtaining linear and quadratic slope estimates for both marriage groups at three different levels of the growth intercept (see Table 14), and by using these conditional slope estimates to plot conditional growth curves for the two marriage groups at three different levels of the growth intercept (see Figure 12). Consistent with hypotheses, marriage effects were stronger at higher levels of the growth intercept, and the plotted conditional growth curves are consistent with the expectation of greater protective effects of marriage with higher late adolescent alcohol consumption.

Drinking consequence model results. Wald χ^2 tests showed a difference between the two marriage groups in the intercept's effect on the quadratic slope but not on the linear slope, and a Wald χ^2 test of both of these between-group differences simultaneously was marginally significant (see Table 15). Thus, this interaction was probed by characterizing marriage effects at different levels of the growth intercept as was done above for alcohol consumption (see Table 15 and Figure 13), except that the "high" growth intercept level was represented by a value of 1 drinking consequence rather than using a full standard deviation above the mean (1.83 consequences), given concerns about the sparseness of consequences values higher than 1 among the *became married* group (see Table 15). As with alcohol consumption, results were consistent with the hypothesis that marriage effects would be stronger at higher levels of the growth intercept, and the plotted conditional growth curves confirmed the expectation of greater protective effects of marriage with higher late adolescent drinking consequences.

Conclusions. Consistent with hypotheses, for both alcohol consumption and drinking consequences, there was evidence for stronger effects of marriage on drinking-related declines from late adolescence to adulthood among those with higher pre-marriage levels of late adolescent alcohol involvement. However, as with *main* effects of marriage, probing these interactions again indicated that the nature of marriage effects differed between alcohol consumption and drinking consequences. For alcohol consumption, at particularly high late adolescent consumption levels, the *became married* group showed slight but steady decreases in consumption across late adolescence to adulthood, whereas the *never married* group showed a protracted period of particularly dramatic escalation with declines occurring only in late young adulthood. In contrast, for

drinking consequences, at particularly high late adolescent consequence levels, both marriage groups showed dramatic declines beginning in late adolescence, but with earlier and more rapid declines for the *became married* group.

Hypothesis-testing Step 7: Testing Personality Change Interactions with Late Adolescent Alcohol Involvement Intercepts Predicting the Linear and Quadratic Slopes

The alcohol consumption and drinking consequence models with effects of parental alcoholism and gender from hypothesis-testing step 2 were modified to also test interactions of sensation-seeking change and neuroticism change with late adolescent alcohol involvement (i.e., the growth intercepts) when predicting the linear and quadratic slopes. Specifically, the linear and quadratic slopes were predicted by the growth intercept, the personality change score (separate models for sensation-seeking and neuroticism), and their interaction term (but see Appendix C for supplemental analyses testing personality change effects with other methods). These analyses were designed to test the hypothesis that decreased sensation-seeking and decreased neuroticism from late adolescence to young adulthood would more strongly predict decreased alcohol involvement from late adolescence to adulthood among those with higher initial alcohol involvement in late adolescent.

Across the four models that were estimated, there was a consistent lack of evidence for personality change interactions with growth intercepts when predicting the slopes. These interactions did not significantly predict any linear or quadratic slopes when tested separately, and Wald χ^2 tests of interaction effects on linear and quadratic

slopes simultaneously were consistently non-significant (see Tables 17 and 18). Given this complete lack of affirmative evidence, none of these interactions were probed.

Hypothesis-testing Step 8: Testing Marriage Interactions with Personality Change Predicting the Linear and Quadratic Slopes

The alcohol consumption and drinking consequence models with effects of parental alcoholism and gender from hypothesis-testing step 2 were modified to also test interactions of marriage with personality change when predicting the linear and quadratic slopes. Specifically, as was done when testing main effects of marriage in hypothesis-testing step 4, multiple-group models were estimated with three groups including the *never married* group (n = 198), the *became married* group (n = 143), and the *other* group (n = 503; see Measures). However, unlike in hypothesis-testing step 4, personality change scores were included as predictors of the linear and quadratic slopes (separate models for sensation-seeking and neuroticism; see Appendix C for supplemental analyses testing personality change effects with other methods). Thus, marriage-by-personality-change interactions were tested through Wald χ^2 tests of whether personality effects on the slopes differed between the *never married* group and the *became married* group. These analyses were designed to test the hypothesis that marriage between late adolescence and young adulthood would more strongly predict decreased alcohol involvement from late adolescence to adulthood among those who also experienced greater decreases in sensation-seeking and neuroticism between late adolescence and young adulthood.

Across the four models that were tested, there was very minimal evidence for marriage interactions with personality change when predicting the slopes. Specifically, the marriage-by-neuroticism-change interaction marginally significantly (p = .072)

predicted the quadratic alcohol consumption slope only when tested alone (see Table 19), and the marriage-by-sensation-seeking interaction marginally significantly (p = .077) predicted the two drinking consequence slopes only when tested simultaneously (see Table 20). No other interaction effects were significant or marginally significant. Given the weak evidence, none of these interactions were probed.

Hypothesis-testing Step 9: Testing Parental Alcoholism and Gender Moderation of Effects of Late Adolescent Alcohol Involvement Growth Intercepts, Marriage, and Personality Change Predicting the Alcohol Involvement Slopes

To test parental alcoholism and gender as moderators of late adolescent alcohol involvement (i.e., the growth intercepts) and personality change effects on the slopes, the models that tested main effects of late adolescent alcohol involvement and personality change from hypothesis testing steps 3 and 5 were modified to include interaction terms with parental alcoholism and gender (tested in separate models). To test parental alcoholism and gender as moderators of marriage effects, the multiple-group models that tested main effects of marriage in hypothesis testing step 4 were modified to include parental alcoholism and gender as a predictors of the slopes (tested in separate models). Thus, moderation of marriage effects was tested through Wald χ^2 tests of whether parental alcoholism and gender effects on the slopes differed between the *never married* group and the *became married* group.

Parental alcoholism moderation. When predicting the alcohol consumption slopes (see Table 21), parental alcoholism moderated the effect of late adolescent alcohol consumption (i.e., the growth intercept) such that the effect of late adolescent alcohol consumption was significant and in the same direction for both groups but stronger

among COAs (χ^2[2] = 19.26, p = .0001) than among non-COAs (χ^2[2] = 6.38, p = .041). Parental alcoholism also marginally significantly moderated effects of marriage on the two slopes such that the marriage effect was significant among non-COAs (χ^2[2] = 15.30, p = .0005) but non-significant among COAs (χ^2[2] = .949, p = .622). Finally, parental alcoholism moderated effects of neuroticism change (but not sensation-seeking change) on the two slopes such that the neuroticism change effect was non-significant among non-COAs (χ^2[2] = .415, p = .813) but significant among COAs (χ^2[2] = 11.782, p = .003).

When predicting the drinking consequence slopes (see Table 21), parental alcoholism moderated the effect of late adolescent drinking consequences (i.e., the growth intercept) such that the effect of late adolescent drinking consequences was significant among non-COAs (χ^2[2] = 12.63, p = .002) but non-significant among COAs (χ^2[2] = 2.012, p = .366). Parental alcoholism also moderated the effect of marriage on the two slopes such that the marriage effect was significant among non-COAs (χ^2[2] = 6.80, p = .033) but non-significant among COAs (χ^2[2] = 2.77, p = .251). Finally, parental alcoholism did not moderate effects of either sensation-seeking change or neuroticism change on the drinking consequence slopes.

Gender moderation. When predicting the alcohol consumption slopes (see Table 22), gender moderated the effect of late adolescent alcohol consumption (i.e., the growth intercept) such that the effect of late adolescent alcohol consumption was significant and in the same direction for both groups but stronger among females (χ^2[2] = 7.53, p = .023) than among males (χ^2[2] = 6.43, p = .040). In contrast, gender did not moderate effects of marriage, sensation-seeking change, or neuroticism change on the alcohol consumption

slopes. Also, when predicting the drinking consequence slopes (see Table 22), gender did not moderate effects of late adolescent drinking consequences (i.e., the growth intercept), marriage, sensation-seeking change, or neuroticism change.

Hypothesis-testing Step 10: Mediated Effects of Parental Alcoholism and Gender on the Alcohol Involvement Slopes through Late Adolescent Alcohol Involvement Growth Intercepts, Marriage, and Personality Change

Models were estimated to test parental alcoholism and gender as distal predictors of the alcohol consumption and drinking consequence slopes, with mediated effects through late adolescent alcohol involvement (i.e., the growth intercepts), marriage, and personality change. Note that, while other analyses treated marriage as a three-level grouping variable, to test marriage as a mediator, it was necessary to exclude the *other* group (n = 503) from analyses to treat marriage as a binary endogenous variable including only the *never married* group (n = 198) and the *became married* group (n = 143). In all mediation analyses, mediation was evaluated using the joint significance test (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002) where the mediated effect is considered to be significant simply if both paths are significant. This method has acceptable statistical power and controls Type 1 error at or below its nominal level (MacKinnon et al., 2002).

Parental alcoholism mediation model results. When predicting the alcohol consumption slopes, there was evidence for mediated effects of parental alcoholism through late adolescent alcohol consumption (i.e., the growth intercept) and marriage, but not through either sensation-seeking change or neuroticism change (see Table 23). Specifically, parental alcoholism predicted higher late adolescent alcohol consumption

and a decreased likelihood of marriage, both of which in turn predicted the alcohol consumption slopes. There was little evidence for direct effects of parental alcoholism unique from these mediated effects.

When predicting the drinking consequence slopes, there was at least some evidence for the same two mediated effects reported above for alcohol consumption (see Table 23). Specifically, parental alcoholism predicted higher late adolescent drinking consequences and a decreased likelihood of marriage. However, only marriage in turn significantly predicted the drinking consequence slopes, with late adolescent drinking consequences only marginally significantly predicting the quadratic slope. There was again little evidence for direct effects of parental alcoholism unique from these mediated effects.

Gender mediation model results. When predicting the alcohol consumption slopes, there was evidence for mediated effects of gender through late adolescent alcohol consumption (i.e., the growth intercept), marriage, and sensation-seeking change (see Table 24). Specifically, male gender predicted higher late adolescent alcohol consumption, a decreased likelihood of marriage, and less sensation-seeking decline, and these three variables in turn predicted the alcohol consumption slopes. There was also evidence for direct effects of gender unique from these mediated effects except for the mediated effect of marriage.

In contrast, when predicting the drinking consequence slopes, there was evidence for mediated effects of gender only through late adolescent drinking consequences (i.e., the growth intercept) and marriage (see Table 24). Specifically, male gender predicted higher late adolescent drinking consequences, a decreased likelihood of marriage, and

less sensation-seeking decline. However, only marriage in turn significantly predicted the drinking consequence slopes, with late adolescent drinking consequences only marginally significantly predicting the quadratic slope, and sensation-seeking change failing to predict either slope. There was little evidence for direct effects of gender unique from these mediated effects.

Discussion

Previous research has shown that there is a developmental process of "maturing out" of alcohol involvement beginning in young adulthood and that this process appears to be driven by both young adult role transitions (e.g., marriage) and developmental personality maturation (e.g., decreased disinhibition and neuroticism). Providing a deeper understanding of the mechanisms that drive maturing out is an important objective, given the potential to explain the marked divergence between chronic and developmentally-limited drinking trajectories during young adulthood, and to thereby provide insights into processes of natural recovery from problem drinking. Further, advancing this line of inquiry may also uncover useful insights toward informing prevention and intervention efforts targeting young adult problem drinkers (Watson & Sher, 1998). Thus, the current study aimed to replicate and extend past research on the processes that drive young adult maturing out of alcohol involvement in a number of ways.

Findings replicated past evidence for marriage and personality maturation effects on maturing out. In addition, the current study is the first to show that late adolescent drinking moderates effects of later marriage on maturing out, supporting the hypothesis of stronger protective effects of marriage among heavier and more problematic pre-marriage drinkers. In contrast, little evidence was found for the similar moderation

hypothesis of stronger sensation-seeking and neuroticism effects on maturing out among heavier late adolescent drinkers, or for the moderation hypothesis of stronger marriage effects on maturing out among those also experiencing greater sensation-seeking and neuroticism reductions (both novel hypotheses). Finally, the current study tested parental alcoholism and gender as moderators of effects of marriage, personality, and late adolescent drinking on maturing out; and also as distal predictors that were mediated by these effects. Findings with parental alcoholism in particular suggested complex moderated mediation pathways that may provide important new insights into how familial risk relates to maturing out.

Marriage Effects on Maturing Out of Alcohol Involvement

Consistent with a great deal of previous research, the current study showed effects of marriage during the transition to young adulthood on reductions in both alcohol consumption and drinking consequences from late adolescence to adulthood. The robust evidence in the literature for such effects is not surprising, given that hypotheses for these effects are firmly rooted in both role socialization theory and in the developmental psychopathology conceptualization of transitions and turning points (e.g., Rutter, 1996; Schulenberg, Maggs, & O'Malley, 2003; Yamaguchi & Kandel, 1985a, 1985b). Conversely, the consistent evidence in past research and in the current study for these effects serves to support these theoretical models. Further, these models are also more broadly supported in other work demonstrating role transition effects on maturing out of other problem behaviors such as drug use and delinquency (e.g., Bachman et al., 1997; Laub & Sampson, 2003; for a review, see Rhule-Louie & McMahon, 2007).

Different marriage effects for alcohol consumption versus drinking consequences. It is noteworthy that, although the current study found effects of marriage on maturing out for both alcohol consumption and drinking consequences, the nature of marriage effects differed between these two drinking outcomes (see Figure 7 vs. Figure 8). The marriage effect on *alcohol consumption* was such that those who never married showed a curvilinear model-implied trajectory peaking around age 28 (i.e., late young adulthood), whereas those who became married between late adolescence and young adulthood showed a relatively flat but slightly decreasing model-implied trajectory from late adolescence to adulthood. In contrast, the marriage effect on drinking consequences was such that both marriage groups showed curvilinear model-implied trajectories, but the curve was less protracted (i.e., more developmentally-limited) for those who became married relative to those who never married.

This difference in marriage effects on alcohol consumption versus drinking consequences may relate to differences in these drinking indices in their overall patterns of age-related changes, given that alcohol consumption peaked in young adulthood, whereas drinking consequences peaked earlier in late adolescence (see Figure 2 vs. Figure 3; a distinction consistent with some epidemiological findings[9]; e.g., Harford et al., 2005; Johnston, et al., 2007b). Thus, for drinking consequences, marriage may have had the more expected effect of causing reductions following earlier escalation, whereas for alcohol consumption, marriage may have instead acted largely by preventing

[9] Some epidemiologic research suggests that drinking indices reflecting problem drinking peak earlier than drinking indices reflecting alcohol use (the pattern found in the current study). For example, national data shows that monthly alcohol consumption peaks around age 23 to 24 (Monitoring the Future; Johnston, et al., 2007b), whereas alcohol use disorder symptomatology generally peaks around age 21 (National Household Survey on Drug Abuse; Harford et al., 2005). However, other studies have shown that peak ages are similar across alcohol use and problem drinking indices, but with earlier and more dramatic declines for problem drinking indices (Jackson & Sher, 2005; Chen & Kandel, 1995).

escalation that would have otherwise occurred during young adulthood. This interpretation is consistent with observed alcohol consumption means-by-age for the two marriage groups (see right panel of Figure 7), given that the *became married* group showed initial escalation until age 22 and then dropped back down when marriage occurred at age 23 (diverging at this point from the *never married* group's continued escalation). Of course, this brief initial rise in the *became married* group's alcohol consumption was not reflected in their flat model-implied trajectory (see left panel of Figure 6), but this is likely because it was merely too small a deviation from their mostly flat pattern of alcohol consumption to be captured by the growth model's quadratic parameterization.

Importantly, if the above interpretation is correct regarding how marriage effects differed between the consumption and consequence outcomes, this would indicate a robustness and generality of marriage's protective influence by demonstrating its effectiveness in both preventing future alcohol involvement escalation and intervening to reduce already elevated alcohol involvement. Future research should continue to explore the generality of marriage effects by further investigating the potential for different types of marriage effects to occur at different stages of normative alcohol involvement trajectories. For instance, effects of *later* marriage on alcohol consumption might more closely resemble the current study's *intervening* effects on drinking consequences, given that marriage would be taking place following a great deal of normative alcohol consumption escalation. Similarly, effects of *earlier* marriage on drinking consequences might more closely resemble the current study's *preventative* effects on alcohol

consumption, given that marriage would be taking place prior to most normative drinking consequence escalation.

More broadly, it has been noted that when studying alcohol involvement from a developmental perspective, both stages of alcohol involvement development and stages of human development should be taken into consideration (Brown, 2004). While the current study's findings may pertain to the generality of role effects across different stages of alcohol involvement (pre- vs. post-normative-escalation), other research has pertained to human developmental factors in role effects, for instance by showing a lack of protective effects of the parenthood role among those who became parents earlier than is developmentally normative (i.e., in late adolescence; Little et al., 2009). Future research should continue to advance a developmentally-informed understanding of marriage and other role effects on alcohol involvement by continuing to investigate the generality and variability of these role effects across different stages of both alcohol involvement and human development.

Role selection effects of late adolescent alcohol involvement on marriage. As explained earlier, apparent effects of marriage on maturing out of alcohol involvement can, in fact, be caused by role selection processes where lower-risk drinkers more often select into marriage. In this context, it is important to note that the current study did find evidence for role selection such that lower late adolescence alcohol involvement predicted an increased likelihood of young adult marriage (albeit only marginally significantly for both drinking outcomes). However, marriage effects on maturing out were demonstrated after accounting for these selection processes, given that marriage effects on the drinking-related slopes persisted after including late adolescent levels of

drinking (i.e., the intercepts) as additional slope predictors. Importantly, this evidence for both role selection and role socialization effects between marriage and alcohol involvement suggests a bidirectional cascading risk pathway. That is, initially high-risk drinkers are less likely to become married which in turn further increases their risk by decreasing their likelihood of maturing out (but see below for the additional moderating impact of late adolescent drinking). Such cascading processes that result in the accumulation and perhaps exacerbation of multiple risk factors across different domains of functioning likely contribute to an explanation of the marked divergence between chronic and developmentally-limited drinking trajectories during young adulthood (Dodge et al., 2009; Masten et al., 2005; Schulenberg & Maslowsky, 2009).

Although very plausible from a theoretical standpoint, the current study's evidence for role selection into marriage via late adolescent alcohol involvement was surprising because most previous research has failed to detect such effects. Thus, the current study highlights the importance of accounting for potential role selection processes when testing role effects. It should also be noted that, in addition to controlling for the selection mechanism of late adolescent drinking, the current study also controlled for potential selection into marriage via parental alcoholism and gender, and supplemental analyses showed limited feasibility of a number of other alternative selection explanations (see Footnote 7 and Table 11). Specifically, while controlling for parental alcoholism, gender, and late adolescent drinking, marriage was not related to age of drinking onset, early externalizing, early life stress, college attendance, or employment; and only small effects on marriage were found for lower early drug involvement, peer substance use, and internalizing. Further, confidence in the current

study's evidence for socialization effects of marriage is bolstered by the fact that a number of past studies have also found such effects while controlling for various potential selection mechanisms.

Nonetheless, there are ways that future research could more thoroughly account for role selection in order to further bolster confidence in role socialization effects on maturing out. For instance, future studies should make this an explicit primary objective, and should therefore comprehensively review the literature for factors that may influence both selection into marriage and young adult drinking. Future research should also consider alternative analytic approaches such as propensity score analysis, which has many advantages when the aim is to establish causal inference while adjusting for a multitude of potential third variables (i.e., selection effects; e.g., see Little & Rubin, 2000; Morgan & Winship, 2007; Rosenbaum, 2002; West & Thoemmes, 2008). Such techniques have been employed toward bolstering confidence in marriage effects on other outcomes (e.g., delinquency; Sampson, Laub, & Wimer, 2006), but have yet to be employed in testing adult role effects on maturing out of alcohol involvement.

Late Adolescent Alcohol Involvement as a Moderator of Marriage Effects on Maturing Out

The current study is the first to test and support the hypothesis that young adult marriage effects on maturing out are stronger among those with higher pre-marriage levels of alcohol involvement in late adolescence. This hypothesis was based on previous research showing that maturing out occurs primarily among those with relatively heavy and problematic earlier forms of drinking (Jackson et al., 2001; Lee et al., in press). In fact, upon finding this pattern of greater maturing out among more severe initial drinkers,

Lee et al. suggested that this pattern might occur because more severe earlier drinkers are more strongly affected by the young adult roles that drive maturing out (e.g., marriage and parenthood), and this is precisely what was found in the current study. Thus, results of the current study serve to support Lee et al.'s interpretation of their findings. Further, the current study's findings also serve to rule out an important alternative interpretation for Lee et al.'s findings, which was that their evidence for greater maturing out among more severe initial drinkers was merely an artifact of regression to the mean. Specifically, the current study showed that late adolescent drinking effects varied as a function of marriage, and regression to the mean would not vary as a function of other variables in the way. Thus, in two different ways, the current study supported Lee et al.'s argument that more severe initial drinkers may mature out more because they are more strongly impacted by young adult role transitions.

This notion of stronger role effects among more severe drinkers is also consistent with role socialization theory. This theory argues that a new role will affect a problem behavior to the extent that the demands of the new role conflict with the problem behavior (i.e., to the extent role incompatibility occurs; Yamaguchi & Kandel, 1985a, 1985b), and it is logical to suspect that heavier and more problematic drinking would generally create more conflict with the demands of the marital role (i.e., create more role incompatibility). Thus, the current study's support for this hypothesis can be taken as additional validation of role socialization theory, and also as a potential clarification of a specific process that relates to the theory's more broadly stated mechanisms (i.e., findings are consistent with the idea that more severe alcohol involvement may lead to greater role incompatibility).

Future research should directly test this interpretation that the current study's findings support role socialization theory. For instance, by directly measuring the construct of role incompatibility (i.e., conflicts between drinking and new roles), future research could show that high-risk drinkers are more affected by new roles *because* they experience greater role incompatibility. Further, such work could also more broadly validate role socialization theory by confirming the theory's assertion that role incompatibility is the mechanism that drives role effects on problem behaviors. In addition, the development of a role incompatibility measure would require investigation of how this construct should be operationalized, thus potentially clarifying the more broadly stated definition of role incompatibility that is offered by role socialization theory. A role incompatibility measure could also help to explain findings that may currently appear to contradict role socialization theory, such as the evidence that maturing out is influenced by marriage and parenthood *but not employment*. For instance, if it was found that only marriage and parenthood strongly drive role incompatibility (i.e., that employment creates fewer conflicts with drinking), this would in fact provide strong discriminant validation of role socialization theory by confirming that only roles that affect the theory's proposed mechanism in turn produce the theory's predicted behavioral changes.

Considering the moderating effect of late adolescent drinking together with its role selection effect on marriage. Earlier, when discussing the current study's bidirectional evidence for both selection and socialization effects between marriage and drinking, it was noted that this suggests a bidirectional cascading risk pathway where heavier late adolescent drinkers are less likely to marry, which further increases their risk

by decreasing their likelihood of maturing out. However, late adolescent drinking also moderated marriage effects such that heavier late adolescent drinkers experienced the strongest marriage effects on maturing out. Taken together, these results suggest moderated mediation where heavier late adolescent drinking has two different opposing effects on maturing out: A distal mediated influence that decreases the likelihood of maturing out by decreasing the likelihood of marriage, and a moderating influence that increases the likelihood of maturing out by increasing marriage's effect *when marriage does occur*.

These two opposing ways that late adolescent alcohol involvement can influence maturing out may provide an important example of how developmental changes in alcohol involvement should be conceptualized. For instance, these two influences of late adolescent alcohol involvement can be viewed together within the context of the developmental psychopathology conceptualization of transitions and turning points. As discussed earlier, this perspective argues that high-risk individuals are more likely to experience influences and events that serve to maintain their high-risk developmental trajectories (similar to cascading risk processes), but it also emphasizes that certain developmental transitions (e.g., role acquisition) can cause "turning points" characterized by dramatic shifts away from high-risk trajectories (Rutter, 1996; Schulenberg, Maggs, & O'Malley, 2003). From this perspective, the bidirectional combination of selection and socialization effects between marriage and drinking may represent a series of processes that maintain a high-risk developmental trajectory. Further, the moderation of marriage effects by late adolescent drinking may represent how developmental transitions can spark dramatic turning points away from high-risk trajectories, given that when marriage

does occur among higher-risk late adolescent drinkers (despite being less likely), its protective effects on subsequent drinking trajectories are particularly substantial. Thus, the current study demonstrates the utility of this view of transitions and turning points for understanding interplay between developmental risk and protective factors for alcohol involvement.

Clinical implications of marriage effect moderation by late adolescent drinking. Past research has supported the clinical importance of maturing out by showing declines even for highly severe drinking indices (e.g., symptomatology and AUDs; e.g., Harford et al., 2005; Rohde & Andrews, 2006), and by showing that more severe initial drinkers in fact mature out the most (Jackson et al., 2001; Lee et al., in press). The current study extends this by highlighting the clinical relevance of marriage-driven maturing out specifically, given the evidence for stronger marriage effects among more severe initial drinkers. This suggests that much of the marriage-driven maturing out that occurs may represent natural recovery from relatively high-risk drinking (although future studies should confirm this using more severe drinking indices), so understanding this process could hold implications for clinical efforts to foster similar changes.

For instance, Lee et al.'s (in press) findings suggested that maturing out among initially severe late adolescent drinkers is often characterized by substantial but nonetheless incomplete reductions in problem drinking, thus suggesting that clinical interventions should attempt to harness the mechanisms of these partial declines toward spurring more complete reductions in problem drinking. Because the current study supports the notion that some of these partial declines may be driven by adult role transitions (e.g., marriage), an efficient clinical strategy may be to harness the role-

incompatibility-related motivation that drives these partial declines to foster more complete reductions in problem drinking. Beyond the obvious immediate benefits of achieving fuller problem drinking reductions, this could also have other long-term positive effects such as reducing risk for later re-escalation (i.e., relapse).

This integration into clinical practice of themes related to role incompatibility (i.e., role-related motivation to decrease drinking) would be highly consistent with certain well-supported treatments in the vein of Motivational Interviewing, given that such treatments aim to increase clients' motivations to change problem behaviors by raising their awareness of how their problem behaviors conflict with their values, goals, and priorities (e.g., how drinking interferes with their role-related obligations; Miller & Rollnick, 2002). Further, given that a key developmental task of young adulthood is to successfully transition into new adult roles (Bachman, Wadsworth, O'Malley, & Johnston, 1997), integrating themes related to these role transitions would contribute toward developmentally-tailoring interventions for young adult problem drinkers. This potential application is another reason why research should continue to clarify the specific mechanisms of adult role transition effects on maturing out, given that this will provide more precise insights into the specific ways that naturally occurring processes of role socialization can be utilized in clinical practice during young adulthood. If better understood, this normative period for maturing out of alcohol involvement could represent a developmental stage with unique opportunities for clinical interventions to converge with naturally occurring developmental processes to produce particularly dramatic and lasting reductions in problem drinking.

Parental Alcoholism in the Context of Marriage and Late Adolescent Drinking Effects

Whereas past research has focused almost exclusively on main effects of parental alcoholism on maturing out of alcohol involvement, the current study advanced beyond this in potentially important ways by testing a variety of novel mediation and moderation hypotheses. As explained earlier, although some studies have found main effects showing that COAs are less likely to mature out, other studies have found that COAs have higher earlier alcohol involvement but do not differ from non-COAs on later maturing out. This latter pattern of findings is in fact consistent with the current study's main effects of parental alcoholism on late adolescent alcohol involvement but not on subsequent changes (i.e., main effects on growth intercepts but not slopes). Importantly, this suggests that COAs have a consistently higher overall trajectory of alcohol involvement across late adolescence to adulthood, given that they initially escalate higher than non-COAs and their subsequent rates of decline are similar (at least not significantly different). Without contradicting this interpretation, the current study's mediation and moderation analyses extend it by revealing multiple specific indirect ways that parental alcoholism *does* appear to influence maturing out. The detection of these indirect influences may be especially important because the non-significant overall effects in past research may have falsely underrepresented the relevance of parental alcoholism to maturing out.

The nature of parental alcoholism's indirect influences on maturing out. Some indirect influences of parental alcoholism decreased the likelihood of maturing among COAs, and perhaps surprisingly, others had the opposite effect. Regarding influences that decreased COAs' likelihood of maturing out, mediation was found such

that COAs were less likely to become married (perhaps via increased late adolescent drinking, although not tested here), which in turn predicted less maturing out. In addition, moderation was found such that, among COAs, marriage did not significantly predict maturing out (although moderation was only marginally significant for alcohol consumption). Interestingly, when considering these two findings together as a moderated mediation process (although they were tested separately here), the mediation part is rendered irrelevant among COAs because the moderation was such that marriage effects on maturing out were non-significant among COAs. Thus, for COAs, it does not matter how much less likely they are to become married because even those who *do* become married do not appear to experience subsequent protective effects of marriage on maturing out.

Regarding influences that *increased* COAs' likelihood of maturing out, an additional mediation process was detected such that COAs had higher late adolescent drinking, which in turn predicted greater subsequent drinking decreases (although only marginally significantly for drinking consequences). Moderation was also found such that COAs experienced stronger effects of higher late adolescent alcohol consumption on subsequent reductions in alcohol consumption, but the opposite was found for drinking consequences, thus making these moderated effects difficult to interpret.

Theoretical implications of parental alcoholism findings. Regarding the lack of overall main effects of parental alcoholism on maturing out in this and in many (but not all) previous studies, an important question thus becomes whether this truly means that COAs mature out to the same extent as non-COAs. The answer to this question may depend upon the specific definition of maturing out. If defined only as decreased alcohol

involvement, then perhaps it can be said that COAs and non-COAs mature out similarly. However, maturing out should likely be defined as reductions to a less risky form of alcohol involvement, and given the higher starting point of COAs, their reductions may represent less substantial shifts toward lower-risk drinking. Lee et al.'s (in press) findings pertain to this issue as they found no differences among those with and without parental alcoholism in transitions out of a highly severe latent drinking "group", but their ability to interpret this null findings was hindered by limited statistical power. In fact, limited statistical power, or at least a lack of evidence for adequate power, is a pervasive issue in past research with regard to this type of null hypothesis question. Studies can only confidently interpret the lack of a significant difference between COAs and non-COAs if there is evidence that any true difference would have been detected (conventionally with an 80% likelihood), so future research on this topic should carefully account for statistical power issues.

More pertinent to the novel advancements made by the current study, findings do appear to distinguish those with and without parental alcoholism with regard to differences in the specific mechanisms that drive maturing out. In particular, marriage appears to be a far less important influence on maturing out among COAs. This adds to the cascading conceptualization offered earlier regarding the bidirectional selection and socialization effects between marriage and drinking. Cascading processes are characterized by the accumulation and exacerbation of risk factors across different domains of functioning, and this is well typified by the finding that the early risk factor of parental alcoholism increases later risk by both preventing protective marital transitions and muting the protective effects of those transitions.

Marriage may have weaker effects among COAs for a number of reasons including the fact that COAs tend to have heavier drinking spouses or that their alcoholic parent(s) may have modeled drinking in the context of marriage (Flora & Chassin, 2005; Harter, 2000; Schuckit et al., 1994; Watt, 2002). Future research should investigate these and other potential explanations from a role socialization theory perspective, thus conceptualizing them as possible reasons why COAs do not experience role incompatibility as a result of marriage. As advocated earlier, a measure of role incompatibility could provide useful insights in this regard. For instance, future research could test whether role incompatibility is not affected by marriage among COAs, and whether this lack of marriage effects on role incompatibility is explained by such factors as higher spousal alcohol involvement or early parental modeling of marital alcohol involvement. Further, strong discriminant validation of role socialization theory could be achieved if it was shown that, among COAs, marriage does not influence maturing out because it does not affect the theoretical mechanism of role incompatibility (as was suggested earlier regarding marriage and parenthood vs. employment effects).

Because results suggest that both COAs and non-COAs mature out, but also that marriage explains maturing out only for non-COAs, results beg the question of whether there are other mechanisms that explain maturing out only for COAs. One such mechanism may be aversive transmission (Harburg, Davis, & Caplan, 1982), where COAs limit their alcohol involvement to avoid negative consequences that they have perceived their alcohol parent(s) as having experienced. Indeed, past research has shown an indirect effect of parental alcoholism on reduced drinking through increased perceived risk for drinking problems, including with samples that roughly captured the transition

from late adolescence to young adulthood (Haller & Chassin, 2010; Trim & Chassin, 2004). This suggests that aversive transmission may be a mechanism of maturing among COAs. Interestingly, if aversive transmission drives maturing out, this suggests that its role is not to prevent initial escalation of alcohol involvement during adolescence, but rather to drive later reductions in young adulthood following adolescent escalation. One explanation for this delayed effect of aversive transmission may be that aversive transmission is activated during adolescence as a result of adolescent drinking experiences. Perhaps, for some COAs, adolescent drinking leads to consequences that they perceive as resembling the consequences of their alcoholic parent(s), and this in turn activates or intensified their perceived risk and their related motives to limit their drinking. By driving maturing out reductions following initial escalation, aversive transmission may relate specifically to developmentally-limited trajectories of problem drinking among COAs, and may be an important factor that distinguishes these from more chronic problem drinking trajectories.

Clinical implications of indirect influences of parental alcoholism on maturing out. The current study's novel evidence for multiple indirect influences of parental alcoholism on maturing out has important potential clinical implications, given that a better understanding of these indirect influences may help to tailor interventions for the clinically-important population of young adults with familial alcoholism. For instance, by showing that protective effects of young adult role transitions (e.g., marriage) may be somehow blocked among COAs, the current findings suggest that an efficient clinical strategy may involve attempts to unblock these natural protective effects in order to facilitate drinking reductions among high-risk young adults (e.g., by

addressing how parental modeling may have influenced COAs' attitudes about drinking in the context of marriage). Also, by showing that there may in fact be some mechanisms of parental alcoholism that operate by *increasing* the likelihood of maturing out, the current findings suggest that an efficient clinical strategy may involve enhancing and harnessing these protective mechanisms of parental alcoholism in order to magnify their influences on drinking reductions (e.g., by reinforcing attitudes that relate to aversive transmission of parental alcoholism). Of course, far more research is needed to better understand the nature of these indirect mechanisms of parental alcoholism, in part to determine if they represent modifiable factors that would lend themselves to clinical intervention. However, by providing the first evidence for these indirect mechanisms, the current study may represent an important step toward uncovering new ways that interventions can be tailored to account for clinical barriers and even opportunities that uniquely pertain to young adult COAs.

Personality Development and Maturing Out of Alcohol Involvement

The current study largely replicated past evidence for effects of developmental personality decreases in behavioral disinhibition and neuroticism on maturing out of alcohol involvement. As discussed earlier, these results are consistent with broad theories of personality and alcohol involvement and with a large empirical literature supporting these theories, although few studies to date have specifically investigated developmental changes in personality and how they relate to maturing out of alcohol involvement. Thus, the current study provides an important replication, given that past evidence for effects of personality development on maturing out was based on only three previous studies all of

which used the same sample (Littlefield, Sher, & Steinley, 2010; Littlefield, Sher, & Wood, 2009, 2010).

Beyond replication, the current study also extended past research on personality development and maturing out in two ways. First, because different facets of disinhibition may vary in how they relate to alcohol involvement, the current study used a unidimensional measure of sensation-seeking, thus providing the first tests of how developmental changes in one specific disinhibition facet influence maturing out. Second, the current study tested effects of sensation-seeking and neuroticism on both alcohol use and problem drinking, thus exploring for the first time whether developmental change in sensation-seeking and neuroticism relate differently to maturing out of alcohol use versus problem drinking.

Stemming from these contributions of the current study, one potentially important pattern of findings was that decreases in sensation-seeking predicted maturing out of alcohol consumption but not drinking consequences. This is consistent with other research showing effects of sensation-seeking on indices of alcohol use but not on indices of problem drinking, although this is the first study to demonstrate this distinction in the context of personality development and maturing out. Further, this finding stands in contrast to the three past studies of personality development and maturing out, which found that decreases in their broad disinhibition measure were in fact related to maturing out of *problem drinking*. This suggests that their disinhibition effects on problem drinking were likely driven by disinhibition facets other than sensation seeking that were also captured by their broad disinhibition measure. It also supports the current study's interpretation that its pattern of effects on alcohol use but not problem drinking was due

specifically to its use of a precise measure of only sensation-seeking. Thus, findings regarding sensation-seeking effects on maturing out are consistent with the broader literature on how disinhibition relates to alcohol involvement, and findings differ from those of past studies on personality development and maturing out in a way that is also consistent with this past literature.

In contrast, it was somewhat surprising that neuroticism predicted maturing out of both alcohol use and problem drinking. However, a recent meta-analysis (Malouff et al., 2007) did show that neuroticism relates to both types of drinking outcomes in the broader literature, but with stronger effects when predicting outcomes of problem drinking. The current study's results do appear consistent with this meta-analysis in that neuroticism effects appeared more statistically robust when predicting drinking consequences, but to the contrary, plotted drinking trajectories appeared to indicate a much greater magnitude of neuroticism effect when predicting alcohol consumption (see Figure 10 vs. Figure 11). Thus, future studies should continue to investigate whether neuroticism relates to maturing out of alcohol involvement differently than how it relates to alcohol involvement in other contexts.

Studies aimed at determining which personality dimensions relate most closely to *problem* drinking as opposed to alcohol use have important conceptual and practical implications, given that such work serves to identify the aspects of personality that most strongly influence development and alleviation of risky forms of drinking. For instance, by finding that only neuroticism predicted decreased drinking consequences, the current findings suggest that neuroticism-related personality development may be more influential than sensation-seeking-related personality development in driving maturing

out of high-risk drinking. Also pertinent to understanding how important certain personality dimensions are to maturing out of high-risk drinking was the current study's investigation of late adolescent drinking as a moderator of personality effects on maturing out. Surprisingly, there was no support for the hypothesis that protective effects of personality maturation would be stronger among heavier late adolescent drinkers, thus failing to suggest that personality development is a particularly important mechanism of maturing out among relatively high-risk initial drinkers. However, the opposite was also not found, meaning that there was also no evidence for *weaker* protective effects of personality maturation among higher-risk initial drinkers. In this way, the current study did not suggest that personality development is a *less* important mechanism of maturing out among higher-risk initial drinkers. Further, because late adolescent drinking did not significantly predict subsequent personality change, there was no evidence that higher-risk early drinkers experienced less personality maturation, which is another way that the current study could have suggested that personality maturation is a less important mechanism of maturing out among higher-risk initial drinkers. Thus, although it was not shown that personality development has a particularly dramatic influence on maturing out among higher-risk initial drinkers (as *was* found for marriage), in two different ways the current study also failed to show that higher-risk early drinking diminishes the influence of personality development on maturing out.

Given the few pertinent studies to date, there is far more work to be done toward understanding how personality development influences maturing out. Further, given the important recent insights into the structure of personality, many important advances could be made by continuing to explore this work's implications with regard to personality

effects on alcohol involvement in general and for maturing out. For instance, there may be important implications of measurement work which has shown that the different facets of disinhibition are all nested within broader traits of the *big five* model of personality (Whiteside & Lynam, 2001). For instance, given evidence that the disinhibition facet of negative urgency is nested within the broad trait of neuroticism, future studies should investigate the extent to which neuroticism's particularly strong effects on *problem* drinking are driven more precisely by negative urgency. This would have broad implications, as it would support refinements of the affect regulation model to acknowledge that neuroticism's influence on alcohol involvement is mediated by negative-affect-driven impulsivity (i.e., negative urgency), in addition to (or perhaps even instead of) being mediated by coping-related drinking motives. In other words, to some extent, negative affect may be a necessary but not sufficient condition for driving neuroticism-related alcohol involvement, given that it may also require negative urgency such that this negative affect drives impulsivity.

Integrative Models of Young Adult Role Transitions and Personality Development

Beyond studies modeling young adult role transitions and personality development together as independent predictors, the current study represents the first attempt to test an integrative model of interplay between these two developmental influences on maturing out. However, no support was found for the moderation hypothesis that protective effects of marriage on maturing out would be more pronounced among those who had also experienced personality-related maturation. Considering role socialization theory, this hypothesis was made based on the notion that, despite new roles causing role-incompatibility-related motivation to change drinking behaviors, the

likelihood of successfully following through on this motivation may depend upon the extent to which personality-related maturation has occurred (see Introduction). Regarding why this hypothesis was not supported, role socialization theory discusses two different ways that role incompatibility between a problem behavior and a new role can be resolved, the first being that the problem behavior is reduced, and the second being that the role is exited (Yamaguchi & Kandel, 1985a, 1985b). Thus, it may be true that those who had experienced less personality maturation did have greater difficulty responding to marriage-related role incompatibility by changing their drinking behaviors, but role socialization theory suggests that role incompatibility might then be resolved through divorce, rather than these individuals remaining married without changing their drinking behaviors. This possibility was not captured by the current study's analyses because the *became married* group included only those who were stably married after age band 1 (see Limitations section).

This possibility should be investigated in future research by testing whether, among those who become married, greater personality maturation distinguishes individuals who mature out and remain married from individuals who do not mature out and become divorced. As was advocated for other purposes above, a validated measure of role incompatibility could be useful in this regard, because only those who truly experience role incompatibility as a result of marriage should be expected to either reduce their drinking or become divorced. Those who do not experience role incompatibility should not necessarily be expected to do either. Such work would also have important implications toward further validating role socialization theory by supporting the theory's argument that role incompatibility is resolved through either

behavioral change or leaving the role. This would be strongly supported through evidence that, among those who truly experience role incompatibility, it is highly uncommon for individuals to neither change their behavior nor leave the role.

Beyond continuing to study moderation, future research should also test other integrative models, such as those investigating the directionality of mediating processes among young adult roles and personality development as they influence maturing out. Interestingly, there are theoretical perspectives to support both potential directions of effect. For instance, one perspective on developmental changes in personality is *the maturity principle* (Caspi et al., 2005; Littlefield & Sher, 2010b), which parallels role socialization theory by suggesting that individuals undergo developmental personality maturation in young adulthood to adapt to demands of new roles and responsibilities. From this perspective, young adult transitions into adult roles may operate as distal influences on more proximal changes in personality, which may in turn more directly influence maturing out of alcohol involvement. However, in support of the opposite direction of effect, it has also been suggested that certain developmental changes in personality characteristics (e.g., decreases in behavioral disinhibition and neuroticism) may be driven directly by neurological maturation of cognitive control systems during the transition from adolescence to young adulthood (Littlefield & Sher, 2010b; Steinberg, 2007). From this perspective, developmental changes in personality may operate as a distal influence on more proximal changes in young adult roles, which may in turn more directly influence maturing out of alcohol involvement. Of course, these are not mutually exclusive possibilities, given the potential for bidirectional effects among young adult role transitions, personality development, and even alcohol involvement.

Limitations and Conclusions

Although the current study advanced prior research on maturing out of alcohol involvement in a number of potentially important ways, there are also limitations of the current study that should be noted. One such limitation was that the quadratic parameterization of the current study's growth models may have sometimes failed to capture certain features of the drinking-related trajectories under investigation, given some apparent discrepancies between plotted model-implied trajectories and plotted means-by-age. The consequences of this are perhaps best exemplified by marriage's effect on alcohol consumption. For this effect, observed means-by age indicated a potentially important early rise in alcohol consumption before marriage, perhaps suggesting that initial escalation had begun but was quickly disrupted by marriage. However, this interpretation was made more speculative by the fact that this initial escalation was not also captured in the *model-implied* trajectory for those who became married. This may have been captured if marriage was more appropriately modeled as having a sharp diverting effect at a specific point on the drinking-related trajectories. Modeling approaches that could have achieved this were initially considered (e.g., two-part-growth models with pre- and post-marriage trajectories), but these models were not pursued due to concerns about model complexity, particularly given sample size issues and other complex aspects of the current study's analyses. It is likely that this failure to optimally specify models to match the phenomenon of interest merely hindered the precise characterization of effects (e.g., in plots of model-implied trajectories), rather than threatening the broad conclusions of the current study, given that the true effects of marriage are likely roughly approximated through quadratic parameterization. Given the

novel findings of the current study, future research should attempt to replicate this work as well as extend it through more precise modeling of marriage effects.

There were also some limitations associated with the approaches chosen to operationalize the current study's constructs of interest. For instance, marriage effects were tested by comparing those who became *stably* married after age band 1 to those who never married across the three age bands, which afforded internal validity at the expense of some degree of external validity. Internal validity was afforded by decreasing heterogeneity in marital transitions, thus eliminating influences of other less pertinent marital transitions (e.g., divorce, remarriage), as well as influences of developmental variability in marriage effects. Otherwise, it may have been necessary to account for such influences analytically, perhaps greatly increasing model complexity. External validity was decreased by this decision because results of comparing the two homogeneous marriage groups may not generalize to many individuals in the population, given that the marital transition patterns of these two groups may be relatively uncommon. Further, as discussed earlier, an additional unanticipated limitation of this approach was its failure to account for divorce as an alternative way that marriage-related role incompatibility can be resolved (other than reduced drinking), and it was argued earlier that this may be why personality development was not found to moderate marriage effects. However, it would have been highly challenging to account for divorce as another potential outcome of marriage-related role incompatibility within the context of the current study's already complex analyses, so this should instead be viewed as a distinct important topic of investigation for future research.

A limitation related to the current study's personality variables was that disinhibition facets other than sensation-seeking were unavailable for analysis. Future research should thus extend the current study by further exploring the influences of various disinhibition facets on maturing out. The current study may have also been limited by how personality development effects were modeled, given that analyses tested main and interaction effects of personality *change* without considering the initial levels prior to change or the resulting levels following change. For example, perhaps only reductions from relatively high initial levels of sensation-seeking and neuroticism strongly influence maturing out. Further, regarding potential moderation of young adult marriage effects, beyond considering the amount of sensation-seeking and neuroticism decline that has occurred by the time of marriage, it is likely also important to consider the levels of sensation-seeking and neuroticism that have been reached by the time o marriage. Again, it would have been challenging to account for these additional considerations within the context of the current study's already complex analyses, so this should be viewed as a distinct important topic of investigation for future research.

There were both limitations and advantages associated with the drinking outcomes that were chosen to represent alcohol use and problem drinking in the current study. Alcohol consumption and drinking consequences were chosen as opposed to more severe drinking indices (e.g., binge drinking and AUD symptoms), given an interest in capturing a relatively broad range of variability. This was particularly important given the current study's hypothesized main and moderated effects of late adolescent alcohol use and problem drinking, because using more severe indices might have obscured these moderated effects by restricting the ranges of the late adolescent drinking variables (i.e.,

by failing to capture variability at relatively low levels of these variables). Further, from an analytic standpoint, it is advantageous for outcome variables to be closer to normally-distributed (in the case of alcohol consumption) or to at least have less extreme zero-inflation (in the case of drinking consequences). However, a limitation of this choice was that these drinking outcomes are less directly pertinent to high-risk and severe problem drinking, thus calling for caution when drawing conclusions about the clinical implications of the current study's findings. Therefore, toward further investigating the clinical relevance of maturing out, future studies should attempt to replicate the current study's findings with more severe drinking measures.

Many of these limitations reflect potential shortcomings of the current study in attempting to construct precise models of the etiology of maturing out, and future research should be guided by the aim of refining and broadening these and other models of maturing out to more accurately reflect the phenomena of interest (Rodgers, 2010). However, despite these shortcomings, the current study did make important advances in the empirical modeling of maturing out, and thereby contributed in important ways to an understanding of this developmental process. Findings (a) contributed new insights regarding the precise ways that personality development influences maturing out, (b) supported the novel hypothesis that marriage-driven maturing out of alcohol involvement is most substantial among relatively heavy and problematic initial drinkers, and (c) provided new evidence for multiple potentially important indirect ways that parental alcoholism influences the process of maturing out. These findings have important implications toward understanding the etiological processes that drive maturing out, and toward informing clinical efforts to harness these natural etiological processes.

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Table 1

Comparing Intercept-only, Linear, and Quadratic Alcohol Consumption Models using Loglikelihood Difference Tests

Model comparison	Nested model		Full model		Combined correction factor	Adjusted $-2_{\Delta}L$	$_{\Delta}df$	*p*-value
	L (df)	Correction factor	L (df)	Correction factor				
Intercept-only vs. linear model	-8141.06 (5)	2.359	-8134.59 (8)	2.246	2.058	6.289	3	.098
Linear vs. quadratic model	-8134.59 (8)	2.246	-8110.21 (12)	1.940	1.328	36.717	4	< .00001

Table 2

Results of the Unconditional Intercept-only, Linear Slope, and Quadratic Slope Alcohol Consumption Growth Models

	Intercept-only model		Linear slope model		Quadratic slope model	
	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value
Means						
Intercept	13.242	.000	13.516	.000	13.199	.000
Linear slope	--	--	-.036	.506	.444	.001
Quadratic slope	--	--	--	--	-.042	.000
Covariances						
Intercept with linear slope	--	--	-.171	.909	6.372	.015
Intercept with quadratic slope	--	--	--	--	-.626	.001
Linear slope with quadratic slope	--	--	--	--	-.063	.063
Variances						
Intercept	117.637	.000	109.255	.000	107.495	.000
Linear slope	--	--	.464	.208	1.226	.033
Quadratic slope	--	--	--	--	.005	.021
Residual variances						
Age band 1 alcohol consumption	148.583	.000	134.120	.000	135.136	.000
Age band 2 alcohol consumption	86.412	.000	91.159	.000	69.577[a]	.000
Age band 3 alcohol consumption	96.572	.000	56.374	.013	69.577[a]	.000

Note. [a] As was supported by Wald χ^2 tests with a preliminary model, the age band 2 and 3 alcohol consumption residual variances were constrained to be equal in the above quadratic slope model and in all subsequent single-group alcohol consumption models. Note, however, that this constraint was not in place when comparisons were made among intercept-only, linear slope, and quadratic slope models with loglikelihood difference tests.

Table 3

The Distribution of the Drinking Consequences Variables: Frequencies at Age Bands 1, 2, and 3

	Age band 1		Age band 2		Age band 3	
Values	Frequency	Percent of non-missing	Frequency	Percent of non-missing	Frequency	Percent of non-missing
0	395	67.9	585	81.4	640	87.6
1	80	13.7	68	9.5	42	5.7
2	35	6.0	28	3.9	18	2.5
3	26	4.5	18	2.5	15	2.1
4	12	2.1	3	0.4	6	0.8
5	13	2.2	5	0.7	3	0.4
6	11	1.9	4	0.6	4	0.5
7	8	1.4	4	0.6	2	0.3
8	0	0.0	1	0.1	1	0.1
9	2	0.3	1	0.1	0	0.0
10	0	0.0	1	0.1	0	0.0
11	0	0.0	1	0.1	0	0.0
Missing	262		125		113	
Total	844		844		844	

Table 4

Comparing Intercept-only, Linear, and Quadratic Drinking Consequence Models using Loglikelihood Difference Tests for Different Types of Models with Different Distributional Assumptions

	Nested model		Full model		Combined correction factor	Adjusted $-2_{\Delta}L$	$_{\Delta}df$	*p*-value
	L (df)	Correction factor	L (df)	Correction factor				
Continuous variable models								
Intercept-only vs. linear model	-3367.53 (5)	5.104	-3341.99 (8)	4.976	4.763	10.728	3	.013
Linear vs. quadratic model	-3341.99 (8)	4.976	-3339.44 (9)	4.564	1.268	4.013	1	.045
Negative binomial models								
Intercept-only vs. linear model	-1661.46 (5)	1.629	-1635.19 (7)	.936	-.797	-65.981	2	—[a]
Linear vs. quadratic model	-1635.19 (7)	.936	-1629.48 (12)	.618	-.104	66.088	5	.000
Poisson models								
Intercept-only vs. linear model	-1838.52 (2)	.922	-1677.27 (5)	.919	.917	351.692	3	.000
Linear vs. quadratic model	-1677.27 (5)	.919	-1654.01 (9)	.931	.946	49.186	4	.000
Zero-inflated Poisson models								
Intercept-only vs. linear model	-1649.45 (5)	1.039	-1633.06 (8)	.994	.919	35.658	3	.000
Linear vs. quadratic model	-1633.06 (8)	.994	-1626.34 (12)	.911	.745	18.038	4	.001
Zero-inflated Poisson models with a fixed linear slope for the zero-inflated part								
Intercept-only vs. linear model	-1649.76 (4)	1.058	-1634.25 (7)	1.071	1.088	28.497	3	.000
Linear vs. quadratic model	-1634.25 (7)	1.071	-1632.65 (11)	.715	.092	34.804	4	.000

Note. Zero-inflated Poisson models were also estimated with fixed linear *and quadratic* slopes for the zero-inflated part, but the linear slope model of this type failed to converge, thus precluding comparisons among intercept-only, linear slope, and quadratic slope models of this type.

[a]For the negative binomial models, the loglikelihood comparison between the intercept-only model and the linear slope model was problematic due to the intercept-only model's large correction factor. However, the superior fit of a linear slope model relative to an intercept-only model was shown through a Wald χ^2 test which showed a significant reduction in model fit when the linear slope model's linear slope mean and variance were constrained to zero ($\chi^2[2] = 30.426$; $p < .001$).

Table 5

Comparing Different Types of Quadratic Slope Drinking Consequence Models with Different Distributional Assumptions using BIC and AIC Fit Indices

	Continuous variable model	Negative binomial model	Poisson model	ZIP model	ZIP model with a fixed linear slope for the zero-inflation part	ZIP model with fixed linear and quadratic slopes for the zero-inflation part
AIC	6696.886	3282.952	3326.013	3276.682	3287.300	3293.411
BIC	6739.529	3339.810	3368.657	3333.540	3339.420	3350.269
ABIC	6710.948	3301.702	3340.076	3295.432	3304.487	3312.161

Note. To estimate the continuous variable model, it was necessary to constrain the quadratic slope variance to zero. The continuous variable models could not be compared to the other models using BIC and AIC fit indices because all other models used exponentiated rather than raw drinking consequence values. However, the continuous variable model should likely be rejected based on the non-normal distribution of the drinking consequences variable alone. In addition, this model was problematic in that it was necessary to constrain the quadratic slope variance to zero for this model to converge. ZIP = Zero-inflation Poisson.

Table 6

Results of the Final Unconditional Zero-inflated Poisson Count Intercept-only, Linear Slope, and Quadratic Slope Drinking Consequence Growth Models

	Intercept-only model		Linear slope model		Quadratic slope model	
	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value
Means						
Intercept	-.752	.001	-.564	.048	-.649	.025
Linear slope	--	--	-.139	.001	-.001	.991
Quadratic slope	--	--	--	--	-.026	.000
Covariances						
Intercept with linear slope	--	--	.032	.182	-.053	.383
Intercept with quadratic slope	--	--	--	--	.010	.054
Linear slope with quadratic slope	--	--	--	--	-.003	.116
Variances						
Intercept	1.774	.000	1.570	.000	1.564	.000
Linear slope	--	--	.009	.008	.040	.023
Quadratic slope	--	--	--	--	.000	.089
Zero-inflation binary thresholds						
Age band 1 drinking consequences	-1.047	.006	-.491	.201	-1.006	.078
Age band 2 drinking consequences	.305	.133	-.045	.859	-.054	.819
Age band 3 drinking consequences	.905	.000	-.113	.771	@-15[a]	--

Note. [a] Fixed at the maximum value of -15 by the Mplus program.

Table 7

Results from Testing Effects of Late Adolescent Alcohol Consumption Growth Intercept on the Linear and Quadratic Alcohol Consumption Slopes, and Conditional Linear and Quadratic Slope Estimates at Different Levels of Late Adolescent Alcohol Consumption

Initial model estimates	Estimate	*p*-value
Effects of late adolescent alcohol consumption (i.e., the growth intercept)		
Predicting the linear slope	.053	.037
Predicting the quadratic slope	-.006	.001
Effects of parental alcoholism		
Predicting the linear slope	.546	.031
Predicting the quadratic slope	-.034	.087
Effects of male gender		
Predicting the linear slope	.156	.517
Predicting the quadratic slope	-.006	.001
Intercepts[a]		
Linear slope	.446	.001
Quadratic slope	-.042	.000
Means		
Growth intercept	-.022	.969
Wald χ^2 tests		
Intercept effects on both the linear and the quadratic slope tested simultaneously	$\chi^2(2) = 15.329$ ($p < .001$)	
Conditional slopes at different levels of late adolescent alcohol consumption growth intercept[b]		
One *SD* below the intercept mean (2.830)		
Linear slope	-.104	.666
Quadratic slope	.018	.238
At the intercept mean (13.199)		
Linear slope	.446	.001
Quadratic slope	-.042	.000
One *SD* above the intercept mean (23.568)		
Linear slope	.996	.004
Quadratic slope	-.102	.000

Note. Covariances, variances and residual variances were omitted above to focus on key estimates.

[a] Because the linear and quadratic slopes are predicted by the growth intercept, model results provide estimates for these two slopes conditional on a growth intercept value of zero (termed "slope intercepts" in the above table). Thus, because the alcohol consumption variables were initially centered at the growth intercept's mean value, the slope intercepts in the above initial model results represent estimates of the linear and quadratic slopes conditional on this mean growth intercept value.

[b] As explained above, conditional linear and quadratic slopes at the mean of the growth intercept were obtained directly from the initial model results. Conditional slopes at one standard deviation below and one standard deviation above the mean of the growth intercept were obtained by re-estimating the model after re-scaling the alcohol consumption variables. The intercept's standard deviation was computed as a function of its model-provided variance: *SD* = SQRT(variance); thus, *SD* = SQRT(107.495) = 10.368.

Table 8

Results from Testing Effects of Late Adolescent Drinking Consequence Growth Intercept on the Linear and Quadratic Drinking Consequence Slopes, and Conditional Linear and Quadratic Slope Estimates at Different Levels of Late Adolescent Drinking Consequences

Initial model results	Estimate	*p*-value
Effects of late adolescent drinking consequences growth intercept		
Predicting the linear slope	-.041	.297
Predicting the quadratic slope	.005	.136
Effects of parental alcoholism		
Predicting the linear slope	.075	.170
Predicting the quadratic slope	.001	.842
Effects of male gender		
Predicting the linear slope	-.064	.287
Predicting the quadratic slope	.014	.025
Slope intercepts[a]		
Linear slope	-.014	.773
Quadratic slope	-.025	.000
Means		
Growth intercept	-.575	.076
Wald χ^2 tests		
Intercept effects on both the linear and the quadratic slope tested simultaneously	$\chi^2(2) = 2.27$ ($p = .322$)	

Note. Covariances, variances, residual variances, and zero-inflation thresholds were omitted to focus on key estimates.

[a] Because the linear and quadratic slopes are predicted by the growth intercept, model results provide estimates for these two slopes conditional on a growth intercept value of zero (termed "slope intercepts" in the above table). However, because Poisson count models use log transformed values for the dependent variable, a value of zero on the growth intercept reflects a raw value of 1 drinking consequence (log[1] = 0). Thus, the slope intercepts in the above initial model results represent estimates of the linear and quadratic slopes conditional on an intercept value of 1 drinking consequence.

Table 9

Results of the Multiple-group Alcohol Consumption Model and Wald χ^2 Test Results Comparing Intercepts, Linear Slopes, and Quadratic Slopes between the Never Married Group and the Became Married Group

Initial model results	*Never married* group		*Became married* group		*Other* group	
	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value
Effects of parental alcoholism	4.314	.034	4.285	.158	4.338	.001
Predicting the intercept	.059	.909	1.244	.010	.070	.832
Predicting the linear slope	-.010	.824	-.111	.002	-.017	.497
Predicting the quadratic slope						
Effects of gender	7.512	.000	8.896	.002	8.744	.000
Predicting the intercept	-.671	.174	-.369	.458	-.445	.160
Predicting the linear slope	.039	.355	-.005	.903	.021	.363
Predicting the quadratic slope						
Intercepts	14.148	.000	10.329	.000	13.743	.000
Growth intercept	1.095	.000	.094	.751	.287	.077
Linear slope	-.079	.000	-.015	.475	-.037	.003
Quadratic slope						
Covariances	3.975	.091	3.975	.091	3.975	.091
Intercept with linear slope	-.454	.012	-.454	.012	-.454	.012
Intercept with quadratic slope	-.091	.029	-.091	.029	-.091	.029
Linear slope with quadratic slope						
Residual variances	100.340	.000	112.489	.006	82.953	.000
Intercept	2.181	.003	1.058	.038	1.590	.026
Linear slope	.008	.192	.008	.019	.006	.012
Quadratic slope	114.558	.000	114.558	.000	114.558	.000
Age band 1 alcohol consumption	65.902	.000	65.902	.000	65.902	.000
Age band 2 alcohol consumption	4.314	.034	4.285	.158	4.338	.001
Age band 3 alcohol consumption	.059	.909	1.244	.010	.070	.832
Wald χ^2 tests of differences between the *never married* group and the married group						
Intercept			$\chi^2(1) = 3.51$ ($p = .061$)			
Linear slope			$\chi^2(1) = 6.57$ ($p = .010$)			
Quadratic slope			$\chi^2(1) = 4.32$ ($p = .038$)			
Both linear and quadratic slope			$\chi^2(2) = 6.89$ ($p = .032$)			

Note. As was supported by Wald χ^2 tests with a preliminary model, the above model constrained to be equal (a) the age band 2 and 3 alcohol consumption residual variances *within* all three groups, (b) the age band 1, 2, and 3 alcohol consumption residual variances *across* the three groups, and (c) all correlations among the intercept, the linear slope, and the quadratic slope *across* the three groups. These constraints were placed in all subsequent multiple-group alcohol consumption models.

Table 10

Results of the Multiple-group Drinking Consequence Model and Wald χ^2 Test Results Comparing Intercepts, Linear Slopes, and Quadratic Slopes between the Never Married Group and the Became Married Group

Initial model results	*Never married* group		*Became married* group		*Other* group	
	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value
Effects of parental alcoholism						
Predicting the intercept	.739	.008	.018	.971	.777	.000
Predicting the linear slope	.051	.578	.678	.029	-.001	.990
Predicting the quadratic slope	-.002	.842	-.034	.290	.001	.916
Effects of gender						
Predicting the intercept	.722	.016	1.157	.007	.726	.001
Predicting the linear slope	-.083	.424	-.216	.428	-.099	.160
Predicting the quadratic slope	.007	.506	.022	.523	.014	.058
Intercepts						
Growth intercept	-.742	.000	-1.496	.000	-.525	.047
Linear slope	.078	.297	.778	.000	-.110	.037
Quadratic slope	-.026	.003	-.141	.000	-.015	.006
Covariances						
Intercept with linear slope	-.099	.173	-.517	.000	.048	.271
Intercept with quadratic slope	.012	.130	.075	.000	-.003	.514
Linear slope with quadratic slope	-.005	.070	-.023	.000	-.001	.448
Residual variances						
Intercept	1.289	.000	1.664	.001	1.082	.000
Linear slope	.059	.020	.161	.011	.032	.095
Quadratic slope	.000	.119	.004	.004	.000	.669
Zero-inflation binary thresholds						
Age band 1 drinking consequences	@-15[a]	--	@-15[a]	--	-.460	.096
Age band 2 drinking consequences	-.460	.096	2.458	.000	-.460	.096
Age band 3 drinking consequences	@-15[a]	--	@-15[a]	--	@-15[a]	--
Wald χ^2 tests of differences between the *never married* group and the married group						
Intercept			$\chi^2(1)=2.984$ ($p=0.084$)			
Linear slope			$\chi^2(1)=15.02$ ($p<0.001$)			
Quadratic slope			$\chi^2(1)=10.99$ ($p<0.001$)			
Both linear and quadratic slope			$\chi^2(2)=15.18$ ($p<0.001$)			

Note. As was supported by Wald χ^2 tests with a preliminary model, the above model constrained to be equal (a) the age band 1 and 3 drinking consequence binary thresholds *within* the *never married* group and the *became married* group, (b) the age band 1 and 2 drinking consequence binary thresholds *within* the *other* group, (c) the age band 1 drinking consequence binary threshold *between* the *never married* group and the *became married* group, (d) the age band 2 drinking consequence binary threshold *between* the *never married* group and the *other* group, and (e) the age band 3 drinking consequence binary threshold *across* all three groups. These constraints were placed in all subsequent multiple-group drinking consequence models.

[a] This parameter fixed at -15 (the maximum value) by the Mplus program.

Table 11

Testing Various Selection Effects on Marriage: Zero-order Correlations with Marriage, and Partial Correlations with Marriage, Controlling for Parental Alcoholism, Gender, and Late Adolescent Alcohol Involvement

Predictors of marriage	Correlations with marriage	
	Zero-order correlations (pairwise *n*)	Partial correlations controlling for parental alcoholism, gender, and late adolescent alcohol involvement (pairwise *n*)
Drinking onset variables		
Age of alcohol use onset	.131† (*n* = 184)	.115 (*n* = 157)
Age of binge drinking onset	-.041 (*n* = 150)	-.113 (*n* = 126)
Age band 1 variables		
Lifetime maximum frequency of any drug use	-.201** (*n* = 249)	-.124† (*n* = 241)
Lifetime number of social drug consequences	-.230** (*n* = 249)	-.157* (*n* = 241)
Peer substance use	-.265** (*n* = 249)	-.167* (*n* = 241)
Externalizing	-.165** (*n* = 248)	-.081 (*n* = 241)
Internalizing	-.168** (*n* = 249)	-.143* (*n* = 241)
Past-year stressful life events	-.098 (*n* = 220)	-.051 (*n* = 212)
Attending college = 1; Not attending college = 0[a]	.136* (*n* = 246)	.082 (*n* = 238)
Employed = 1; Not employed = 0[b]	.042 (*n* = 249)	.069 (*n* = 241)
Transitions between age bands 1 and 2		
College to graduated = 1; Never attended college = 0	.089 (*n* = 283)	.068 (*n* = 204)
Unemployed to employed = 1; Never employed = 0	-.007 (*n* = 120)	.023 (*n* = 114)

Note. Values are given above for all binary predictors of marriage. All other predictors are coded such that higher values indicate higher levels of the construct.

[a] College was defined as 4-year residential college only.

[b] Employed defined as full-time employment.

Table 12

Results of Models Testing Effects of Sensation-seeking Change and Neuroticism Change on the Alcohol Consumption Growth Intercept, Linear Slope, and Quadratic Slope

Initial model results	Sensation-seeking model		Neuroticism model	
	Estimate	*p*-value	Estimate	*p*-value
Effects of personality change				
Predicting the growth intercept	-.188	.840	-.590	.595
Predicting the linear slope	.845	.003	.225	.443
Predicting the quadratic slope	-.045	.063	.013	.593
Effects of parental alcoholism				
Predicting the growth intercept	4.616	.000	4.592	.000
Predicting the linear slope	.252	.305	.256	.305
Predicting the quadratic slope	-.030	.125	-.029	.145
Effects of gender				
Predicting the growth intercept	8.772	.000	8.671	.000
Predicting the linear slope	-.453	.052	-.356	.124
Predicting the quadratic slope	.017	.336	.012	.515
Intercepts[a]				
Growth intercept	13.231	.000	13.219	.000
Linear slope	.449	.000	.456	.000
Quadratic slope	-.042	.000	-.044	.000
Wald χ^2 tests				
Personality change effects on both the linear and the quadratic slope	$\chi^2(2) = 11.19$ ($p = .004$)		$\chi^2(2) = 6.72$ ($p = .035$)	
Conditional growth intercepts and slopes at different levels of personality change[b]				
One *SD* below the mean of personality change (large decrease)				
Growth intercept	13.350	.000	13.569	.000
Linear slope	-.085	.695	.323	.103
Quadratic slope	-.014	.412	-.051	.001
At the mean of personality change (small decrease)				
Growth intercept	13.231	.000	13.219	.000
Linear slope	.449	.000	.456	.000
Quadratic slope	-.042	.000	-.044	.000
One *SD* above the mean of personality change (moderate increase)				
Growth intercept	13.112	.000	12.873	.000
Linear slope	.983	.000	.588	.010
Quadratic slope	-.071	.000	-.036	.048

Note. Covariances, variances and residual variances were omitted above to focus on key estimates.

[a] Because personality change scores were initially mean centered, the intercepts provided in the initial model results represent growth intercepts, linear slopes, and quadratic slopes conditional on the mean of personality change.

[b] As explained above, growth intercept and slope estimates conditional on the mean of sensation seeking change were obtained directly from the initial model results. Conditional linear and quadratic slopes at other levels of sensation seeking change were obtained by re-scaling the personality variables and re-estimating the model.

Table 13

Results of Models Testing Effects of Sensation-seeking Change and Neuroticism Change on the Drinking Consequence Growth Intercept, Linear Slope, and Quadratic Slope

Initial model results	Sensation-seeking model		Neuroticism model	
	Estimate	*p*-value	Estimate	*p*-value
Effects of personality change				
Predicting the growth intercept	-.123	.458	-.069	.669
Predicting the linear slope	.001	.988	.092	.071
Predicting the quadratic slope	.005	.510	.002	.786
Effects of parental alcoholism				
Predicting the growth intercept	.737	.000	.732	.000
Predicting the linear slope	.039	.449	.033	.524
Predicting the quadratic slope	.000	.964	.001	.875
Effects of gender				
Predicting the growth intercept	.886	.000	.886	.000
Predicting the linear slope	-.112	.048	-.113	.044
Predicting the quadratic slope	.013	.020	.013	.018
Intercepts[a]				
Growth intercept	-.759	.002	-.777	.002
Linear slope	.011	.871	.031	.655
Quadratic slope	-.027	.000	-.029	.000
Wald χ^2 tests				
Personality change effects on both the linear and the quadratic slope	$\chi^2(2) = 2.01$ ($p = .366$)		$\chi^2(2) = 11.82$ ($p = .003$)	
Conditional growth intercepts and slopes at different levels of personality change[b]				
One *SD* below the mean of personality change (large decrease)				
Growth intercept	--	--	-.736	.006
Linear slope	--	--	-.023	.740
Quadratic slope	--	--	-.029	.000
At the mean of personality change (small decrease)				
Growth intercept	--	--	-.777	.002
Linear slope	--	--	.031	.655
Quadratic slope	--	--	-.029	.000
One *SD* above the mean of personality change (moderate increase)				
Growth intercept	--	--	-.819	.003
Linear slope	--	--	.085	.297
Quadratic slope	--	--	-.028	.000

Note. Covariances, variances and residual variances were omitted above to focus on key estimates.

[a] Because observed change scores were initially mean centered, the intercepts provided in the initial model results represent growth intercepts, linear slopes, and quadratic slopes conditional on the mean of personality change.

[b] As explained above, growth intercept and slope estimates conditional on the mean of neuroticism change were obtained directly from the initial model results. Conditional growth intercepts and slopes conditional on other levels of neuroticism change were obtained by re-scaling the personality variables and re-estimating the model.

Table 14

Multiple-group Alcohol Consumption Model Results and Wald χ^2 Tests of Marriage Interactions with Late Adolescent Alcohol Consumption Growth Intercept Predicting the Alcohol Consumption Linear and Quadratic Slopes

Initial model results	Never married group		Became married group		Other group	
	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value
Effects of late adolescent alcohol consumption (i.e., the growth intercept)						
Predicting the linear slope	.115	.032	-.016	.691	.059	.134
Predicting the quadratic slope	-.011	.014	.000	.924	-.006	.018
Effects of parental alcoholism						
Predicting the growth intercept	4.544	.025	4.334	.167	4.283	.001
Predicting the linear slope	-.514	.448	1.272	.010	-.176	.625
Predicting the quadratic slope	.041	.468	-.107	.004	.010	.689
Effects of gender						
Predicting the growth intercept	7.381	.000	9.204	.003	8.693	.000
Predicting the linear slope	-1.498	.028	-.319	.479	-.949	.022
Predicting the quadratic slope	.122	.032	-.002	.958	.076	.013
Intercepts[a]						
Growth intercept	.943	.334	-2.759	.153	.521	.408
Linear slope	.996	.000	-.038	.929	.263	.114
Quadratic slope	-.070	.001	-.007	.813	-.034	.007
Wald χ^2 tests of differences between marriage groups in growth intercept effects on slopes (i.e., testing interactions)						
Growth intercept on linear slope			$\chi^2(1) = 4.32$ ($p = .038$)			
Growth intercept on quadratic slope			$\chi^2(1) = 4.70$ ($p = .030$)			
Growth intercept on linear and quadratic slope			$\chi^2(2) = 4.75$ ($p = .093$)			
Conditional slopes at different levels of late adolescent alcohol consumption (i.e., the growth intercept)[b]						
One *SD* below growth intercept mean (2.830)						
Linear slope	-.193	.738	.131	.543	-.352	.371
Quadratic slope	.045	.366	-.011	.495	.032	.216
At the growth intercept mean (13.199)						
Linear slope	.996	.000	-.038	.929	.263	.114
Quadratic slope	-.070	.001	-.007	.813	-.034	.007
One *SD* above growth intercept mean (23.568)						
Linear slope	2.185	.001	-.206	.800	.877	.071
Quadratic slope	-.186	.001	-.004	.945	-.100	.004
Wald χ^2 tests of slope differences between marriage groups (i.e., marriage effects) at different levels of late adolescent alcohol involvement (i.e., the growth intercept)						
One SD below the mean (2.830)						
Linear slope difference			$\chi^2(1) = .30$ ($p = .585$)			
Quadratic slope difference			$\chi^2(1) = 1.24$ ($p = .265$)			
Linear and quadratic slope difference			$\chi^2(2) = 2.34$ ($p = .310$)			
At the mean (13.199)						
Linear slope difference			$\chi^2(1) = 4.26$ ($p = .039$)			
Quadratic slope difference			$\chi^2(1) = 2.64$ ($p = .104$)			
Linear and quadratic slope difference			$\chi^2(2) = 4.92$ ($p = .085$)			
One *SD* above the mean (23.568)						
Linear slope difference			$\chi^2(1) = 5.71$ ($p = .017$)			

Quadratic slope difference	$\chi^2(1) = 5.08$ ($p = .024$)
Linear and quadratic slope difference	$\chi^2(2) = 5.71$ ($p = .058$)

Note. Covariances, variances and residual variances were omitted above to focus on key estimates. As was supported by Wald χ^2 tests with a preliminary model, the above model constrained to be equal (a) the age band 2 and 3 alcohol consumption residual variances *within* all three groups, (b) the age band 1, 2, and 3 alcohol consumption residual variances *across* the three groups, and (c) all correlations among the intercept, the linear slope, and the quadratic slope *across* the three groups. These constraints were placed in all subsequent multiple-group alcohol consumption models.

[a] Because the alcohol consumption variables were initially centered at the growth intercept's mean value, the slope intercepts in the above initial model results represent estimates of the linear and quadratic slopes conditional on this mean growth intercept value.

[b] As explained above, conditional linear and quadratic slopes at the mean of the growth intercept were obtained directly from the initial model results. Conditional slopes at one standard deviation below and one standard deviation above the mean of the growth intercept were obtained by re-estimating the model after re-scaling the alcohol consumption variables.

Table 15

Multiple-group Drinking Consequence Model Results and Wald χ^2 Tests of Marriage Interactions with Late Adolescent Drinking Consequence Growth Intercept Predicting the Drinking Consequence Linear and Quadratic Slopes

Initial model results	Never married group		Became married group		Other group	
	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value
Effects of late adolescent drinking consequences (i.e., the growth intercept)						
Predicting the linear slope	-0.060	0.348	-0.167	0.028	-0.016	0.731
Predicting the quadratic slope	0.009	0.180	0.060	0.005	0.002	0.667
Effects of parental alcoholism						
Predicting the growth intercept	0.698	0.008	-0.218	0.669	0.769	0.000
Predicting the linear slope	0.086	0.352	0.379	0.186	-0.010	0.892
Predicting the quadratic slope	-0.006	0.502	0.029	0.571	0.002	0.810
Effects of gender						
Predicting the growth intercept	0.665	0.027	1.498	0.004	0.741	0.000
Predicting the linear slope	-0.042	0.720	0.250	0.353	-0.104	0.165
Predicting the quadratic slope	0.002	0.883	-0.087	0.126	0.014	0.077
Intercepts[a]						
Growth intercept	-0.297	0.193	-1.351	0.000	-0.525	0.031
Linear slope	0.003	0.973	-0.080	0.576	-0.009	0.881
Quadratic slope	-0.020	0.026	-0.032	0.383	-0.022	0.000
Wald χ^2 tests of differences between marriage groups in growth intercept effects on slopes (i.e., testing interactions)						
Growth intercept on linear slope			$\chi^2(1)=1.26$ ($p=0.262$)			
Growth intercept on quadratic slope			$\chi^2(1)=5.36$ ($p=0.021$)			
Growth intercept on linear and quadratic slope			$\chi^2(2)=5.44$ ($p=0.066$)			
Conditional slopes at different levels of late adolescent drinking consequences (i.e., the growth intercept)[b]						
One SD below intercept mean (0.13 consequences)						
Linear slope	0.127	--	0.264	--	--	--
Quadratic slope	-0.039	--	-0.156	--	--	--
At the growth intercept mean (0.48 consequences)						
Linear slope	0.046	--	0.040	--	--	--
Quadratic slope	-0.027	--	-0.075	--	--	--

At the growth intercept value of 1 consequence						
Linear slope	0.003	--	-0.080	--	--	--
Quadratic slope	-0.020	--	-0.032	--	--	--

Note. P-values are not available for the conditional slope estimates at different levels of the intercept because they were computed arithmetically based on model results. Covariances, variances, residual variances, and zero-inflation thresholds were omitted above to focus on key estimates. As was supported by Wald χ^2 tests with a preliminary model, the above model constrained to be equal (a) the age band 1 and 3 drinking consequence binary thresholds *within* the *never married* group and the *became married* group, (b) the age band 1 and 2 drinking consequence binary thresholds *within* the *other* group, (c) the age band 1 drinking consequence binary threshold *between* the *never married* group and the *became married* group, (d) the age band 2 drinking consequence binary threshold *between* the *never married* group and the *other* group, and (e) the age band 3 drinking consequence binary threshold *across* all three groups. These constraints were placed in all subsequent multiple-group drinking consequence models.

[a] The drinking consequences variables were un-centered (because negative and non-integar values are not permissible in Poisson count models), so the slope intercepts in the above initial model results represent estimates of the linear and quadratic slopes conditional on an intercept value of 1 drinking consequence (the raw value corresponding to a log transformed value of zero).

Table 16

Frequency Distribution of Age band 1 Drinking Consequences among the Full Sample, the Never Married Group, and the Became Married Group

	Full sample		Never married group		Became married group	
Number of consequences	Frequency	Percent of non-missing	Frequency	Percent of non-missing	Frequency	Percent of non-missing
0	172	69.1	86	60.6	86	80.4
1	34	13.7	23	16.2	11	10.3
2	16	6.4	12	8.5	4	3.7
3	9	3.6	7	4.9	2	1.9
4	4	1.6	3	2.1	1	0.9
5	2	0.8	2	1.4	0	0.0
6	6	2.4	4	2.8	2	1.9
7	5	2.0	5	3.5	0	0.0
8	0	0.4	0	0.0	0	0.0
9	1	0.4	0	0.0	1	0.9
Total non-missing	249		142		107	
Mean consequences	0.799		1.049		0.467	

Table 17

Results of Models Testing Personality Change Interactions with Late Adolescent Alcohol Consumption Growth Intercept Predicting the Linear and Quadratic Alcohol Consumption Slopes

Initial model results	Sensation-seeking model		Neuroticism model	
	Estimate	*p*-value	Estimate	*p*-value
Effects of personality change[a]				
Predicting the linear slope	.617	.036	.222	.423
Predicting the quadratic slope	-.035	.162	.013	.587
Effects of the growth intercept[a]				
Predicting the linear slope	.062	.112	.079	.103
Predicting the quadratic slope	-.007	.026	-.008	.025
Effects of the personality-by-growth-intercept interaction				
Predicting the linear slope	.050	.231	-.002	.947
Predicting the quadratic slope	-.003	.426	.002	.396
Effects of parental alcoholism				
Predicting the linear slope	.434	.171	.333	.331
Predicting the quadratic slope	-.023	.418	-.014	.645
Effects of gender				
Predicting the linear slope	-.042	.889	.049	.872
Predicting the quadratic slope	.019	.485	.010	.701
Growth intercepts[a]				
Linear slope	.469	.364	.439	.439
Quadratic slope	-.079	.085	-.075	.114
Wald χ^2 tests				
Interaction effects on both the linear and the quadratic slope tested simultaneously	$\chi^2(2) = 2.65$ ($p = .266$)		$\chi^2(2) = 4.55$ ($p = .103$)	

Note. Covariances, variances and residual variances were omitted above to focus on key estimates.

[a] The observed personality change scores were initially mean centered and the alcohol consumption variables were initially centered at the growth intercept's mean value . Thus, in the above initial model results, the effects of personality change are conditional on the mean level of the growth intercept, the effects of the growth intercept are conditional on the mean level of personality change, and the slope intercepts represent conditional linear and quadratic slopes at the mean levels of both personality change and the growth intercept.

Table 18

Results of Models Testing Personality Change Interactions with Late Adolescent Drinking Consequence Growth Intercept Predicting the Linear and Quadratic Drinking Consequence Slopes

Initial model results	Sensation-seeking model		Neuroticism Model	
	Estimate	*p*-value	Estimate	*p*-value
Effects of personality change[a]				
Predicting the linear slope	-.021	.783	.118	.107
Predicting the quadratic slope	.005	.514	-.001	.899
Effects of the growth intercept[a]				
Predicting the linear slope	-.081	.077	-.087	.075
Predicting the quadratic slope	.007	.129	.006	.189
Effects of the personality-by-growth-intercept interaction				
Predicting the linear slope	.020	.730	-.074	.339
Predicting the quadratic slope	-.008	.229	.008	.339
Effects of parental alcoholism				
Predicting the linear slope	.036	.643	.016	.836
Predicting the quadratic slope	.004	.612	.007	.384
Effects of gender				
Predicting the linear slope	-.038	.647	-.045	.596
Predicting the quadratic slope	.010	.239	.012	.181
Growth intercepts[a]				
Linear slope	.050	.750	.107	.501
Quadratic slope	-.040	.021	-.049	.003
Wald χ^2 tests				
Interaction effects on both the linear and the quadratic slope tested simultaneously	$\chi^2(2) = 3.11$ ($p = .212$)		$\chi^2(2) = .931$ ($p = .628$)	

Note. Covariances, variances, residual variances, and zero-inflation thresholds were omitted to focus on key estimates.

[a] The observed personality change scores were initially mean centered and the drinking consequence variables were un-centered (because negative and non-integar values are not permitted in Poisson count models). Thus, in the above initial model results, the effects of personality change are conditional on a growth intercept value of 1 drinking consequence (the raw value corresponding to a log transformed value of zero), the effects of the growth intercept are conditional on the mean level of personality change, and the slope intercepts represent conditional linear and quadratic slopes at the mean level of personality change and a growth intercept value of 1 drinking consequence.

Table 19

Results of Models Testing Marriage Interactions with Personality Change Predicting the Alcohol Consumption Intercept and Slopes

Initial model results	Sensation-seeking model						Neuroticism model					
	Never married Group		*Became married* group		*Other* group		*Never married* group		*Became married* Group		*Other* group	
	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value
Effects of personality change												
Predicting the growth intercept	4.730	.023	-1.672	.366	-1.514	.262	-.947	.707	5.932	.033	-2.318	.071
Predicting the linear slope	1.453	.016	.299	.356	.822	.057	-1.258	.084	-.102	.870	.390	.285
Predicting the quadratic slope	-.091	.186	.001	.980	-.049	.158	.157	.035	.005	.913	-.002	.930
Effects of parental alcoholism												
Predicting the growth intercept	4.761	.019	4.654	.136	4.331	.001	4.038	.051	4.801	.103	4.413	.001
Predicting the linear slope	.190	.713	1.129	.020	.073	.824	.006	.991	1.231	.012	.036	.913
Predicting the quadratic slope	-.019	.680	-.104	.003	-.017	.495	.001	.988	-.110	.002	-.014	.568
Effects of gender												
Predicting the growth intercept	6.920	.001	8.801	.003	8.976	.000	7.534	.000	9.250	.002	8.710	.000
Predicting the linear slope	-.835	.101	-.355	.467	-.546	.087	-.580	.242	-.369	.467	-.440	.168
Predicting the quadratic slope	.049	.275	-.004	.904	.027	.251	.029	.504	-.005	.895	.021	.370
Intercepts[a]												
Growth intercept	.706	.486	-3.073	.090	.594	.341	1.137	.290	-2.632	.146	.357	.563
Linear slope	1.005	.000	.139	.626	.267	.096	1.311	.000	.073	.822	.338	.047
Quadratic slope	-.074	.001	-.016	.422	-.036	.004	-.107	.000	-.014	.545	-.039	.002
Wald χ^2 tests of differences between marriage groups in personality change effects on the intercept and slopes (i.e., testing interactions)												
Effects on the linear slope	$\chi^2(1) = 2.80$ ($p = .094$)						$\chi^2(1) = 1.48$ ($p = .224$)					
Effects on the quadratic slope	$\chi^2(1) = 1.59$ ($p = .208$)						$\chi^2(1) = 3.23$ ($p = .072$)					
Effects on both slopes	$\chi^2(2) = 2.86$ ($p = .239$)						$\chi^2(2) = 3.56$ ($p = .168$)					

Note. Covariances, variances and residual variances were omitted above to focus on key estimates.

[a] Because the personality change variables were initially mean centered, the slope intercepts in the above initial model results represent estimates of the linear and quadratic slopes conditional on the mean of personality change.

Table 20

Results of Models Testing Marriage Interactions with Personality Change Predicting the Drinking Consequence Intercept and Slopes

Initial model results	Sensation-seeking model						Neuroticism model					
	Never married Group		*Became married* group		*Other* group		*Never married* group		*Became married* Group		*Other* group	
	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value
Effects of personality change												
Predicting the growth intercept	.454	.163	-.809	.061	-.142	.516	-.425	.227	.196	.693	-.102	.648
Predicting the linear slope	-.089	.478	.459	.030	-.036	.663	-.014	.892	-.036	.898	.124	.066
Predicting the quadratic slope	.013	.419	-.028	.251	.006	.493	.021	.059	.025	.266	-.006	.411
Effects of parental alcoholism												
Predicting the linear slope	.070	.410	.147	.603	.024	.739	.070	.420	.527	.026	.026	.720
Predicting the quadratic slope	.000	.978	.015	.674	.003	.627	.002	.866	-.025	.278	.003	.698
Effects of gender												
Predicting the linear slope	-.050	.631	-.293	.269	-.066	.374	-.054	.617	-.262	.304	-.067	.371
Predicting the quadratic slope	.007	.477	.050	.075	.016	.042	.009	.424	.040	.139	.016	.053
Intercepts[a]												
Growth intercept	-.302	.320	-.940	.123	-.266	.401	-.458	.170	-.914	.192	-.589	.096
Linear slope	-.034	.714	.562	.005	-.056	.490	.019	.852	.377	.032	.043	.634
Quadratic slope	-.020	.032	-.070	.000	-.024	.001	-.025	.007	-.063	.000	-.029	.000
Wald χ^2 tests of differences between marriage groups in personality change effects on the intercept and slopes (i.e., testing interactions)												
Effects on the linear slope			$\chi^2(1) = 4.96$ ($p = .026$)						$\chi^2(1) = .01$ ($p = .940$)			
Effects on the quadratic slope			$\chi^2(1) = 1.97$ ($p = .160$)						$\chi^2(1) = .02$ ($p = .883$)			
Effects on both slopes			$\chi^2(2) = 5.14$ ($p = .077$)						$\chi^2(2) = .04$ ($p = .979$)			

Note. Covariances, variances, residual variances, and zero-inflated thresholds were omitted above to focus on key estimates.

[a] Because the personality change variables were initially mean centered, the slope intercepts in the above initial model results represent estimates of the linear and quadratic slopes conditional on the mean of age band 2 personality.

Table 21

Testing Parental Alcoholism as a Moderator of Late Adolescent Alcohol Involvement Growth Intercepts, Marriage, and Personality Change Effects on the Alcohol Involvement Slopes

Effects	Predicting alcohol consumption slopes		Predicting drinking consequence slopes	
	Estimate	*p*-value	Estimate	*p*-value
Parental-alcoholism-by-growth-intercept interaction				
Predicting the linear slope	$b = .061$	.043	$b = .000$	.998
Predicting the quadratic slope	$b = -.006$	.011	$b = -.010$	.112
Predicting both slopes	$\chi^2(2) = 7.18$	.028	$\chi^2(2) = 6.84$	.033
Parental-alcoholism-by-marriage interaction (i.e., differences between marriage groups in parental-alcoholism-on-slope effects)				
Predicting the linear slope	$\chi^2(1) = 2.71$	.100	$\chi^2(1) = 3.76$	.053
Predicting the quadratic slope	$\chi^2(1) = 2.98$	.084	$\chi^2(1) = .18$	.671
Predicting both slopes	$\chi^2(2) = 3.04$	.219	$\chi^2(2) = 6.08$	.048
Parental-alcoholism-by-sensation-seeking-change interaction				
Predicting the linear slope	$b = -.784$	.155	$b = -.165$	.267
Predicting the quadratic slope	$b = .055$	.233	$b = .023$	.152
Predicting both slopes	$\chi^2(2) = 2.04$	.360	$\chi^2(2)=2.202$	.333
Parental-alcoholism-by-neuroticism-change interaction				
Predicting the linear slope	$b = .583$	.320	$b = .081$	.478
Predicting the quadratic slope	$b = .018$	.717	$b = -.002$	.875
Predicting both slopes	$\chi^2(2) = 7.99$	.018	$\chi^2(2)=1.150$	.563

Table 22

Testing Gender as a Moderator of Late Adolescent Alcohol Involvement Growth Intercepts, Marriage, and Personality Change Effects on the Alcohol Involvement Slopes

Effects	Predicting alcohol consumption slopes		Predicting drinking consequence slopes	
	Estimate	*p*-value	Estimate	*p*-value
Gender-by-growth-intercept interaction				
Predicting the linear slope	b = .058	.156	b = .015	.839
Predicting the quadratic slope	b = -.002	.576	b = -.005	.670
Predicting both slopes	$\chi^2(2) = 7.44$	.024	$\chi^2(2) = .27$	.873
Gender-by-marriage interaction (i.e., differences between marriage groups in gender-on-slope effects)				
Predicting the linear slope	$\chi^2(1) = .19$	.664	$\chi^2(1) = .21$	.647
Predicting the quadratic slope	$\chi^2(1) = .60$	.438	$\chi^2(1) = .18$	.671
Predicting both slopes	$\chi^2(2) = .98$	.613	$\chi^2(2) = .21$	.900
Gender-by-sensation-seeking-change interaction				
Predicting the linear slope	b = -.359	.549	b = -.076	.603
Predicting the quadratic slope	b = .024	.625	b = .001	.925
Predicting both slopes	$\chi^2(2) = .37$	.832	$\chi^2(2)=.974$	.615
Gender-by-neuroticism-change interaction				
Predicting the linear slope	b = .426	.456	b = .022	.826
Predicting the quadratic slope	b = -.013	.782	b = -.004	.733
Predicting both slopes	$\chi^2(2) = 1.33$	.515	$\chi^2(2)=.129$	.938

Table 23

Results of Models Testing Mediated Effects of Parental Alcoholism through Late Adolescent Alcohol Involvement Growth Intercepts, Marriage, and Personality Change Predicting the Alcohol Involvement Slopes

	Predicting alcohol consumption slopes		Predicting drinking consequence slopes	
	Estimate	*p*-value	Estimate	*p*-value
Mediated effects through the growth intercept				
A path: Parental alcoholism to growth intercept	$b = 4.598$	.000	$b = .729$	.000
B path: Growth intercept to linear slope	$b = .063$	.031	$b = -.043$	.230
B path: Growth intercept to quadratic slope	$b = -.006$	.001	$b = .006$	.063
B paths: Wald χ^2 test: Growth intercept to both slopes	$\chi^2(2) = 14.33$	.000	$\chi^2(2) = 3.63$	.163
Direct effect: Parental alcoholism to linear slope	$b = -.021$	.944	$b = .074$	.192
Direct effect: Parental alcoholism to quadratic slope	$b = -.002$	.908	$b = -.005$	.385
Direct effect: Wald χ^2 test: Parental alcoholism to both slopes	$\chi^2(2) = .22$	.897	$\chi^2(2) = 1.83$	.401
Mediated effects through marriage				
A path: Parental alcoholism to marriage	$b = -.516$	.033	$b = -.516$	.033
B path: Marriage to linear slope	$b = -1.395$	.000	$b = .024$	.829
B path: Marriage to quadratic slope	$b = .085$	.005	$b = -.020$	.127
B paths: Wald χ^2 test: Marriage to both slopes	$\chi^2(2) = 19.37$	.000	$\chi^2(2) = 6.83$	.033
Direct effect: Parental alcoholism to linear slope	$b = .744$	.059	$b = .116$	.158
Direct effect: Parental alcoholism to quadratic slope	$b = -.050$	.151	$b = -.002$	.829
Direct effect: Wald χ^2 test: Parental alcoholism to both slopes	$\chi^2(2) = 4.12$	.127	$\chi^2(2) = 5.28$	.071
Mediated effects through sensation-seeking change				
A path: Parental alcoholism to sensation-seeking change	$b = .009$	.895	$b = .008$	.899
B path: Sensation-seeking change to linear slope	$b = .826$	.004	$b = -.004$	.954
B path: Sensation-seeking change to quadratic slope	$b = -.043$	.075	$b = .005$	.483
B paths: Wald χ^2 test: Sensation-seeking change to both slopes	$\chi^2(2) = 10.68$	.005	$\chi^2(2) = 1.94$	.379
Direct effect: Parental alcoholism to linear slope	$b = .250$	.310	$b = .040$	.446
Direct effect: Parental alcoholism to quadratic slope	$b = -.030$	.126	$b = .000$	.937
Direct effect: Wald χ^2 test: Parental alcoholism to both slopes	$\chi^2(2) = 3.32$	.019	$\chi^2(2) = 1.58$	.454
Mediated effects through neuroticism change				
A path: Parental alcoholism to neuroticism change	$b = -.050$	.406	$b = -.047$	.445
B path: Neuroticism change to linear slope	$b = .229$	.434	$b = .093$	.067
B path: Neuroticism change to quadratic slope	$b = .013$	.593	$b = .001$	.803
B paths: Wald χ^2 test: Neuroticism change to both slopes	$\chi^2(2) = 6.90$	.032	$\chi^2(2) = 11.88$	.003
Direct effect: Parental alcoholism to linear slope	$b = .256$	.305	$b = .036$	.497
Direct effect: Parental alcoholism to quadratic slope	$b = -.028$	.159	$b = .001$	.862
Direct effect: Wald χ^2 test: Parental alcoholism to both slopes	$\chi^2(2) = 2.39$	.303	$\chi^2(2) = 2.24$	.327

Note. Results other than a paths, b paths, and direct effects (i.e., c' paths) were omitted to focus on key estimates.

Table 24

Results of Models Testing Mediated Effects of Gender through Late Adolescent Alcohol Involvement Growth Intercepts, Marriage, and Personality Change Predicting the Alcohol Involvement Slopes

	Predicting alcohol consumption slopes		Predicting drinking consequence slopes	
	Estimate	*p*-value	Estimate	*p*-value
Mediated effects through the growth intercept				
A path: Gender to growth intercept	b = 8.687	.001	b = .883	.000
B path: Growth intercept to linear slope	b = .063	.031	b = -.043	.230
B path: Growth intercept to quadratic slope	b = -.006	.001	b = .006	.063
B paths: Wald χ^2 test: Growth intercept to both slopes	$\chi^2(2)$ = 14.33	.000	$\chi^2(2)$ = 3.63	.163
Direct effect: Gender to linear slope	b = -.991	.005	b = -.074	.233
Direct effect: Gender to quadratic slope	b = .066	.005	b = .008	.226
Direct effect: Wald χ^2 test: Gender to both slopes	$\chi^2(2)$ = 8.16	.017	$\chi^2(2)$ = 1.56	.458
Mediated effects through marriage				
A path: Gender to marriage	b = -.706	.003	b = -.706	.003
B path: Marriage to linear slope	b = -1.395	.000	b = .024	.829
B path: Marriage to quadratic slope	b = .085	.005	b = -.020	.127
B paths: Wald χ^2 test: Marriage to both slopes	$\chi^2(2)$ = 19.37	.000	$\chi^2(2)$ = 6.83	.033
Direct effect: Gender to linear slope	b = .046	.910	b = -.099	.296
Direct effect: Gender to quadratic slope	b = -.003	.936	b = .014	.125
Direct effect: Wald χ^2 test: Gender to both slopes	$\chi^2(2)$ = .02	.990	$\chi^2(2)$ = 2.69	.261
Mediated effects through sensation-seeking change				
A path: Gender to sensation-seeking change	b = .149	.018	b = .153	.016
B path: Sensation-seeking change to linear slope	b = .826	.004	b = -.004	.954
B path: Sensation-seeking change to quadratic slope	b = -.043	.075	b = .005	.483
B paths: Wald χ^2 test: Sensation-seeking change to both slopes	$\chi^2(2)$ = 10.68	.005	$\chi^2(2)$ = 1.94	.379
Direct effect: Gender to linear slope	b = -.497	.037	b = -.111	.054
Direct effect: Gender to quadratic slope	b = .019	.299	b = .012	.032
Direct effect: Wald χ^2 test: Gender to both slopes	$\chi^2(2)$ = 8.57	.014	$\chi^2(2)$ = 4.65	.098
Mediated effects through neuroticism change				
A path: Gender to neuroticism change	b = -.029	.628	b = -.034	.569
B path: Neuroticism change to linear slope	b = .229	.434	b = .093	.067
B path: Neuroticism change to quadratic slope	b = .013	.593	b = .001	.803
B paths: Wald χ^2 test: Neuroticism change to both slopes	$\chi^2(2)$ = 6.90	.032	$\chi^2(2)$ = 11.88	.003
Direct effect: Gender to linear slope	b = -.356	126	b = -.110	.049
Direct effect: Gender to quadratic slope	b = .012	.500	b = .013	.017
Direct effect: Wald χ^2 test: Gender to both slopes	$\chi^2(2)$ = 5.41	.067	$\chi^2(2)$ = 5.66	.059

Note. Results other than a paths, b paths, and direct effects (i.e., c' paths) were omitted to focus on key estimates.

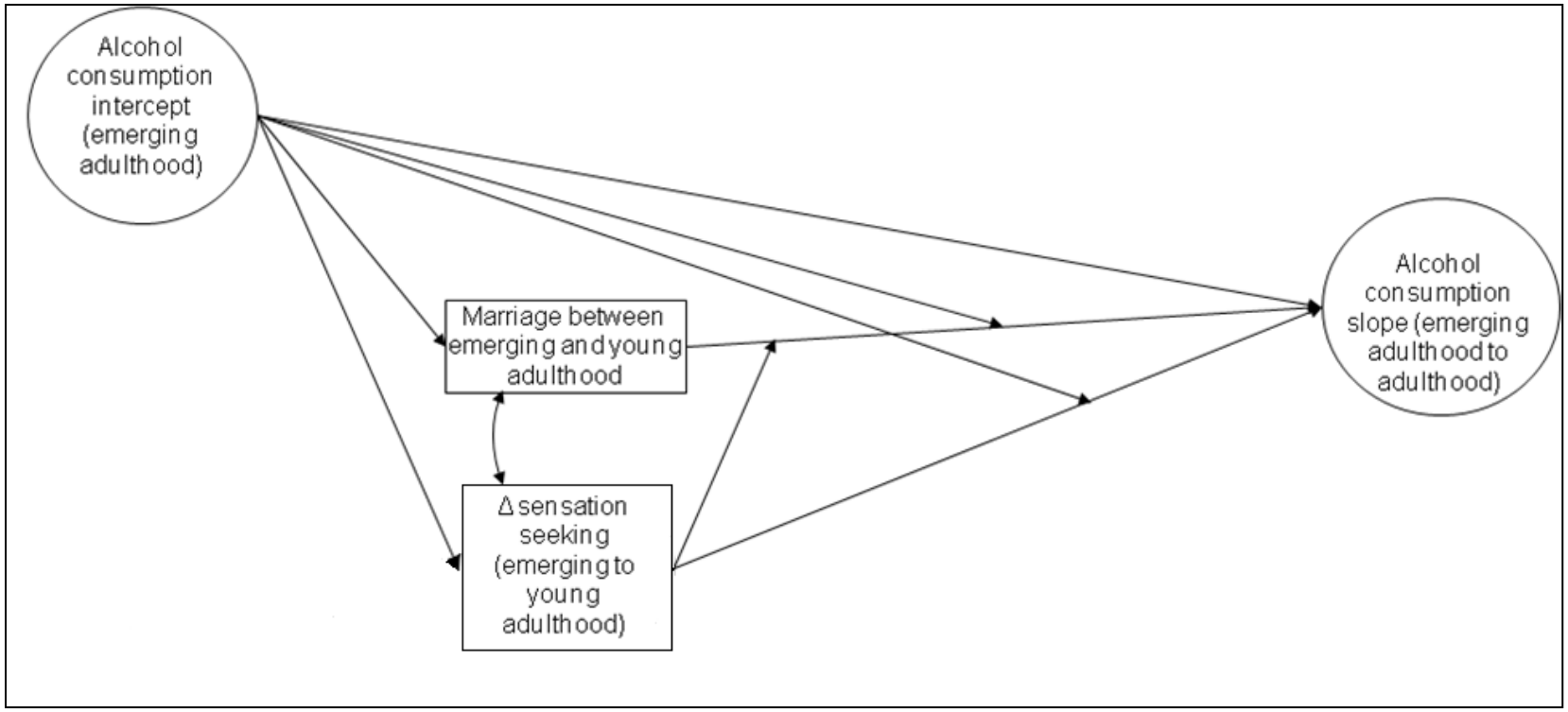

Figure 1. Conceptual model depicting all current study hypotheses regarding effects of late adolescent alcohol involvement, young adult marriage, and young adult personality change when predicting alcohol involvement changes from late adolescence to adulthood. Note that the effects depicted here were tested in separate model-building steps rather than simultaneously. Further, this model depicts alcohol consumption as the drinking-related outcome and sensation-seeking as the personality predictor, but models were also tested with drinking consequences as an additional drinking-related outcome and with neuroticism as an additional personality predictor.

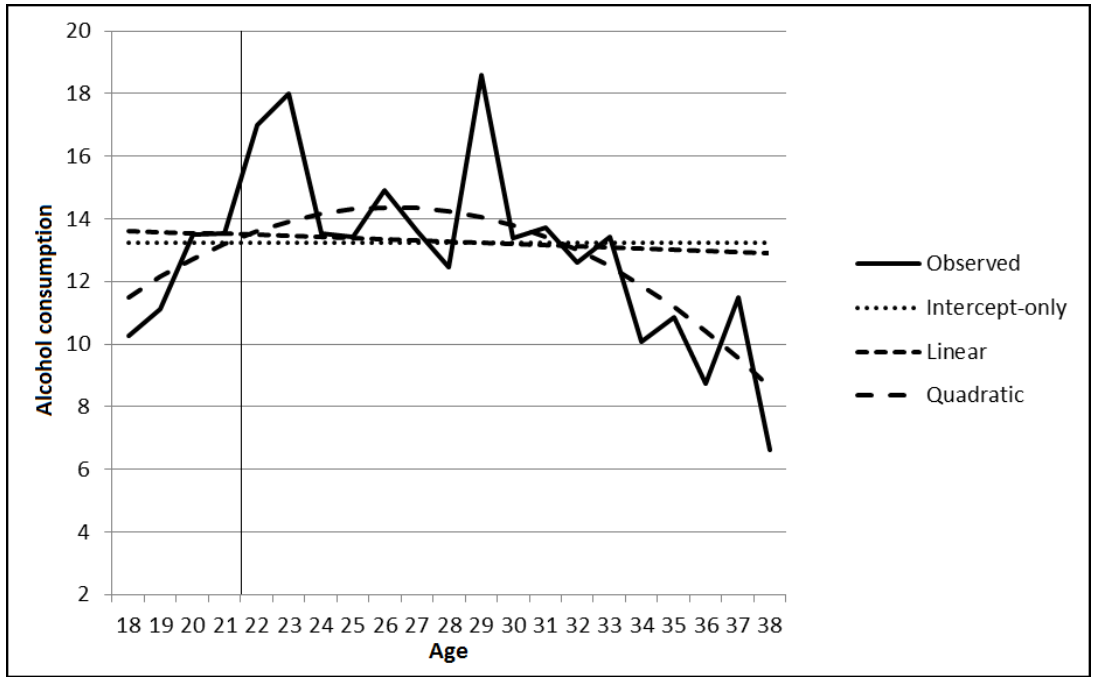

Figure 2. Plotted model-implied alcohol consumption growth slopes from the intercept-only, linear slope, and quadratic slope models. Observed alcohol consumption means by age are also plotted. Model-implied slopes were obtained by entering different age values into model-resulting regression equations to obtain model-implied alcohol-consumption means by age (for intercept-only models: $Y_{predicted} = MEAN_{intercept}$; for linear slope models: $Y_{predicted} = MEAN_{intercept} + MEAN_{linear\ slope}$*age; for quadratic slope models: $Y_{predicted} = MEAN_{intercept} + MEAN_{linear\ slope}$*age + ($MEAN_{quadratic\ slope}$*age^2). The vertical line at age 21.5 represents the location of the growth intercept.

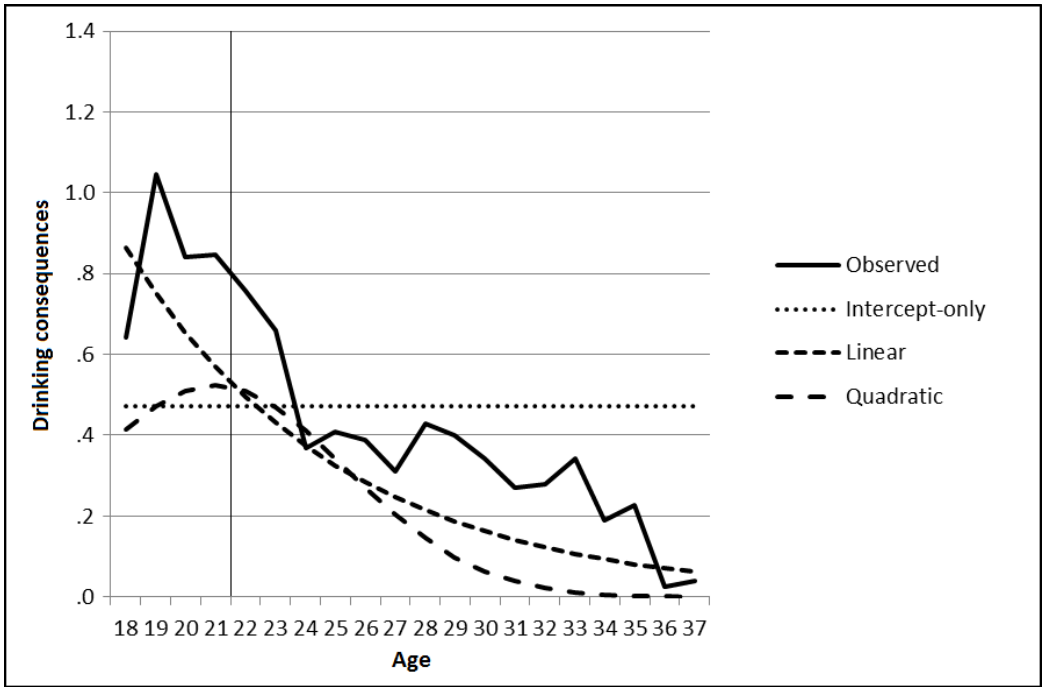

Figure 3. Plotted model-implied drinking consequence growth slopes from intercept-only, linear slope, and quadratic slope zero-inflated Poisson count models. Observed drinking consequence means by age are also plotted. As was done for alcohol consumption models (see Figure 2 notes), model-implied slopes were obtained by entering different age values into model-resulting regression equations. However, because Poisson models provide results in a log metric, all model-implied drinking consequence means were exponentiated before plotting to provide more interpretable plotted results. The vertical line at age 21.5 represents the location of the growth intercept.

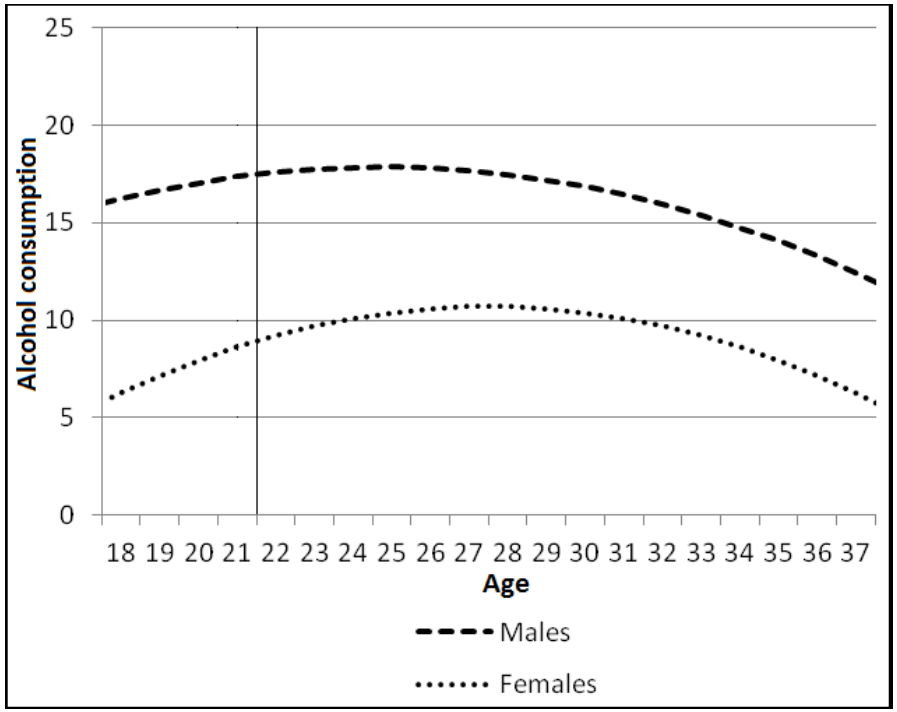

Figure 4. Model-estimated alcohol consumption growth curves separately for males and females. The vertical line at age 21.5 represents the location of the growth intercept.

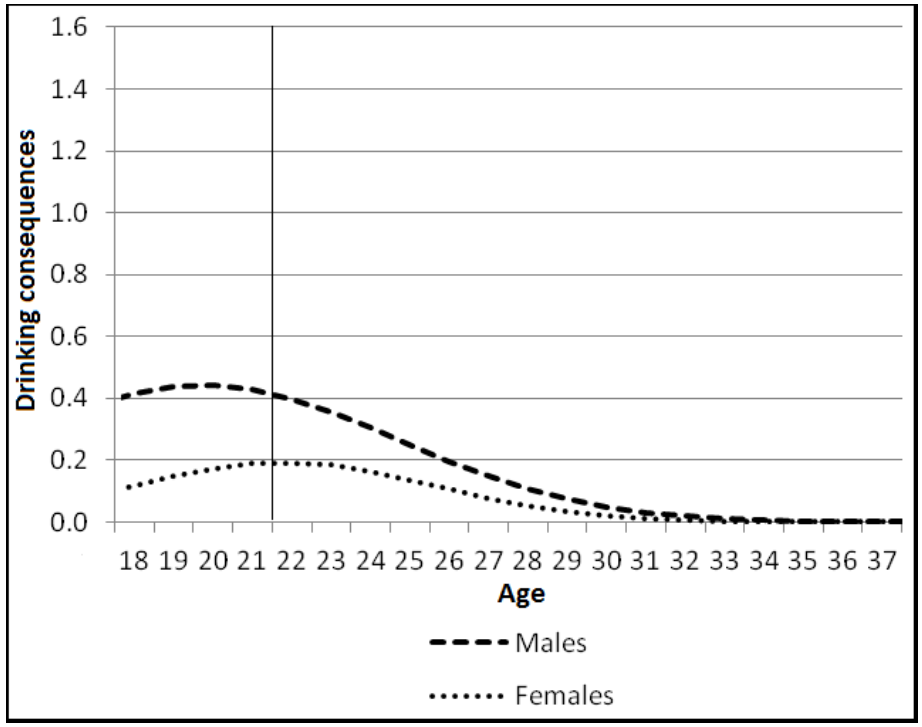

Figure 5. Model-estimated drinking consequence growth curves separately for males and females. The vertical line at age 21.5 represents the location of the growth intercept.

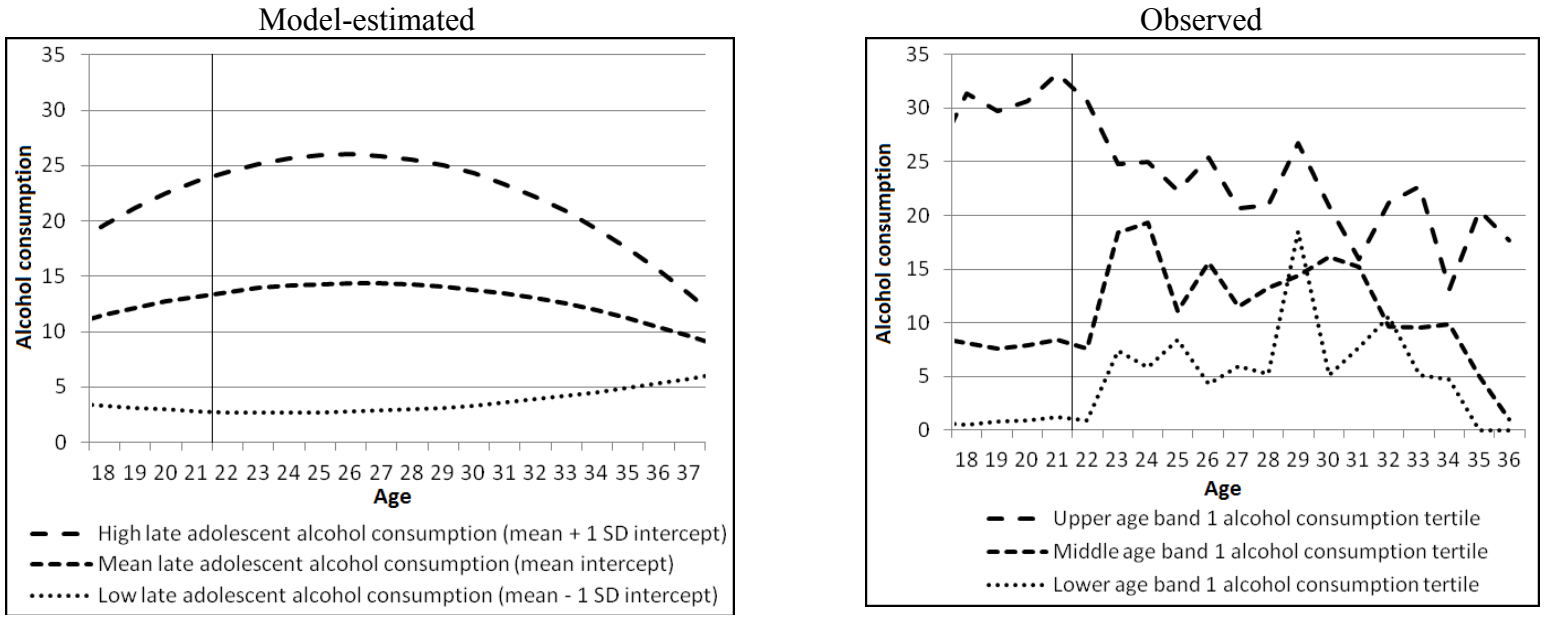

Figure 6. Model-estimated conditional growth curves and observed means by age for alcohol consumption. The left panel presents model-estimated conditional alcohol consumption growth curves at three different levels of the growth intercept based on results of probing the growth intercept's effects on the linear and quadratic slopes (controlling for parental alcoholism and gender effects on the slopes). These conditional growth curves are depicted at one standard deviation below the mean (2.830), at the mean (13.199), and at one standard deviation above the mean (23.568) of the growth intercept. For comparison, the right panel presents observed alcohol consumption means by age separately for those in the lower, middle, and upper tertiles of age band 1 alcohol consumption. The vertical lines at age 21.5 represent the location of the growth model intercept.

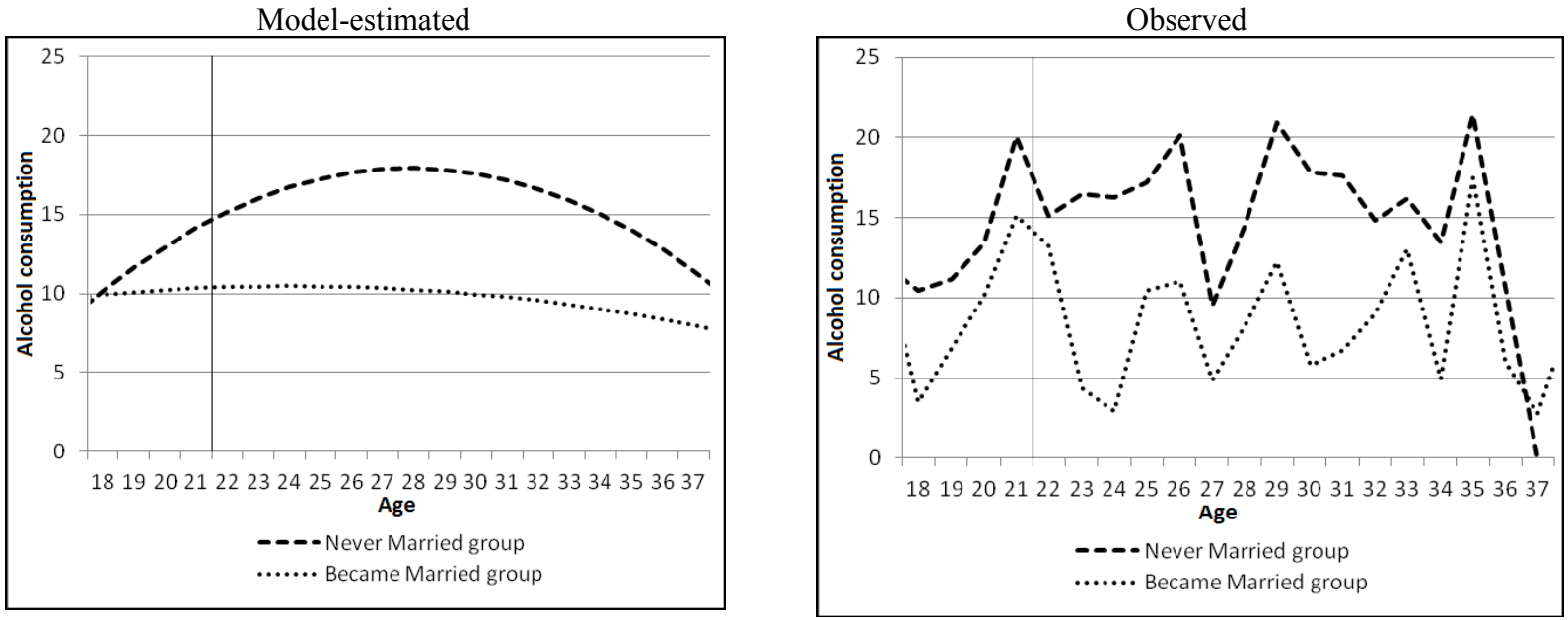

Figure 7. Model-estimated growth curves and observed means by age for alcohol consumption separately for never married versus became married group. The left panel presents model-estimated alcohol consumption growth curves separately for the *never married* group and the *became married* group (controlling for parental alcoholism and gender effects on the intercept and slopes). For comparison, the right panel presents observed alcohol consumption means by age separately for the same two groups. The vertical lines at age 21.5 represent the location of the growth model intercept.

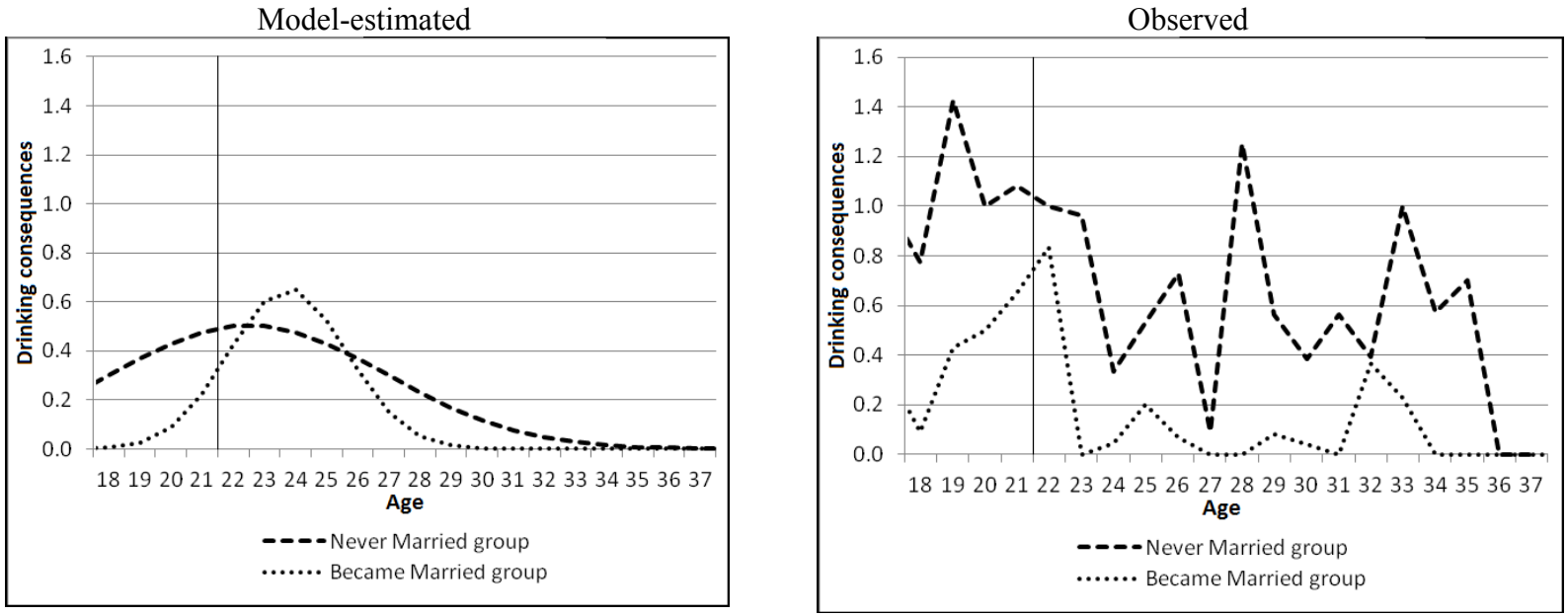

Figure 8. Model-estimated growth curves and observed means by age for drinking consequence separately for *never married* group versus *became married* group. The left panel presents model-estimated drinking consequence growth curves separately for the *never married* group and the *became married* group (controlling for parental alcoholism and gender effects on the intercept and slopes). Note that, because Poisson models provide results in a log metric, all model-implied drinking consequence means were exponentiated before plotting. For comparison, the right panel presents observed drinking consequence means by age separately for the same two groups. The vertical lines at age 21.5 represent the location of the growth model intercept.

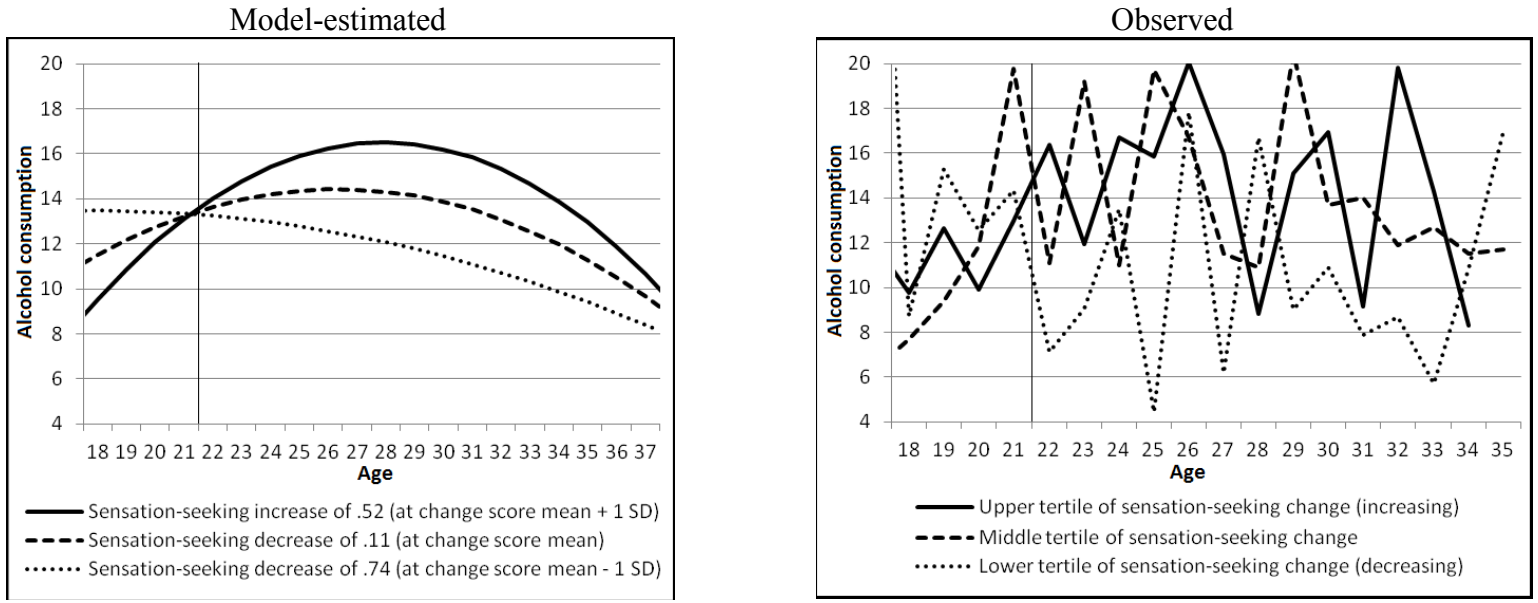

Figure 9. Model-estimated conditional growth curves and observed means by age for alcohol consumption by sensation-seeking change. The left panel presents model-estimated conditional alcohol consumption growth curves at three different levels of sensation-seeking change based on probing effects of sensation-seeking change on the linear and quadratic slopes (controlling for parental alcoholism and gender effects on the intercept and slopes). These conditional growth curves are depicted at one standard deviation below the mean (a decrease of 0.74), at the mean (a decrease of 0.11), and at one standard deviation above the mean (an increase of 0.52) of sensation-seeking change. For comparison, the right panel presents observed alcohol consumption means by age for those in the lower, middle, and upper tertiles of sensation-seeking change. The vertical lines at age 21.5 represent the location of the growth model intercept.

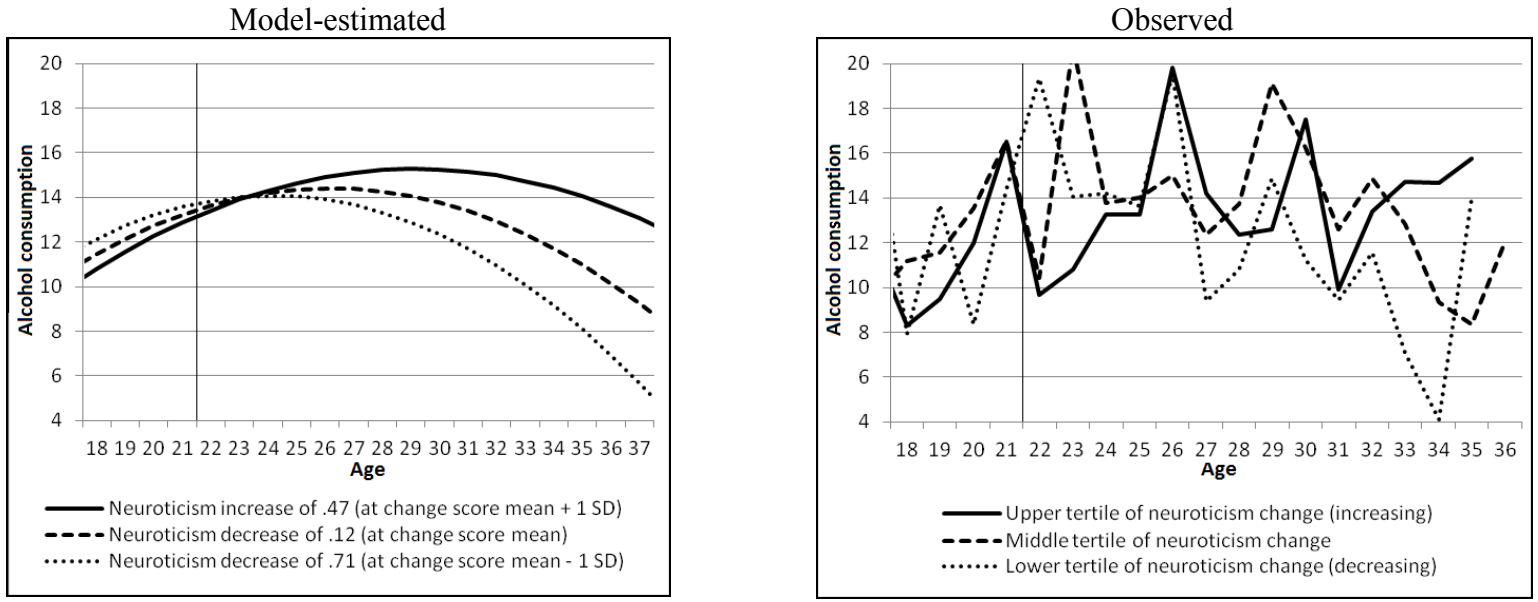

Figure 10. Model-estimated conditional growth curves and observed means by age for alcohol consumption by neuroticism change. The left panel presents model-estimated conditional alcohol consumption growth curves at three different levels of neuroticism change based on probing effects of neuroticism change on the linear and quadratic slopes (controlling for parental alcoholism and gender effects on the intercept and slopes). These conditional alcohol consumption growth curves are depicted at one standard deviation below the mean (a decrease of 0.71), at the mean (a decrease of 0.12), and at one standard deviation above the mean (in increase of 0.47) of neuroticism change. For comparison, the right panel presents observed alcohol consumption means by age for those in the lower, middle, and upper tertiles of neuroticism change. The vertical lines at age 21.5 represent the location of the growth model intercept.

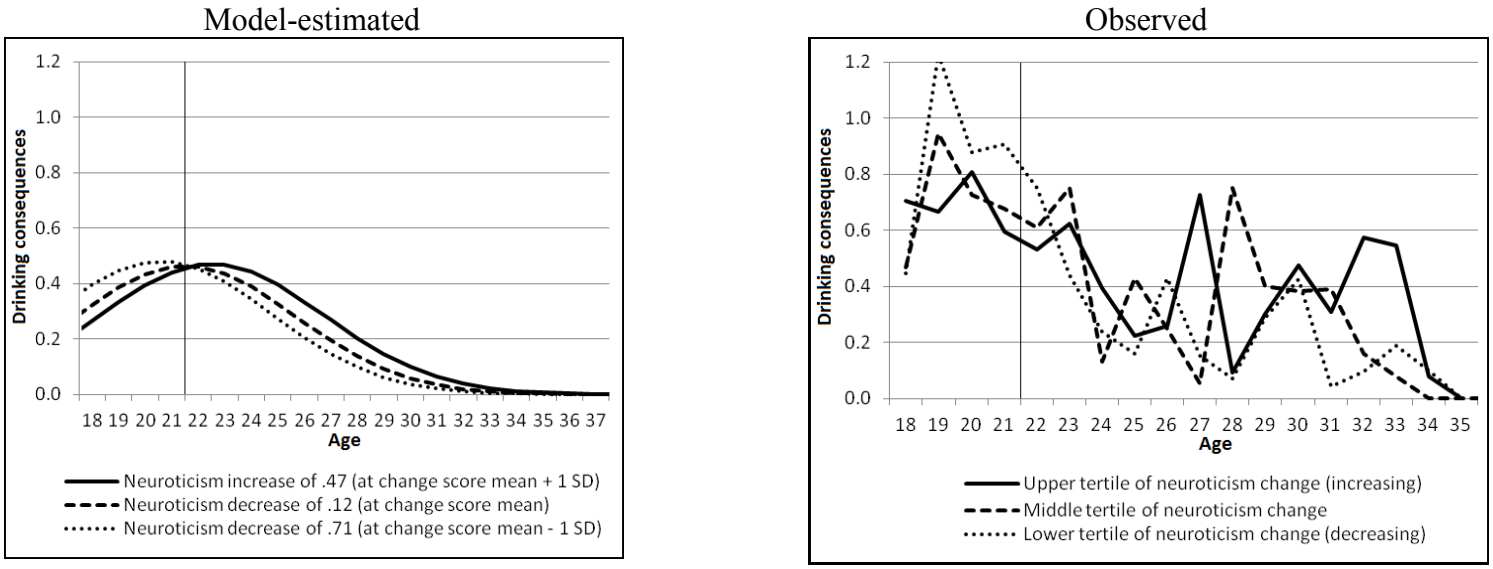

Figure 11. Model-estimated conditional growth curves and observed means by age for drinking consequence by neuroticism change. The left panel presents model-estimated conditional drinking consequence growth curves at three different levels of neuroticism change based on probing effects of neuroticism change on the linear and quadratic slopes (controlling for parental alcoholism and gender effects on the intercept and slopes). These conditional growth curves are depicted at one standard deviation below the mean (a decrease of 0.71), at the mean (a decrease of 0.12), and at one standard deviation above the mean (an increase of 0.47) of neuroticism change. For comparison, the right panel presents observed drinking consequence means by age for those in the lower, middle, an upper tertiles of neuroticism change. The vertical lines at age 21.5 represent the location of the growth model intercept.

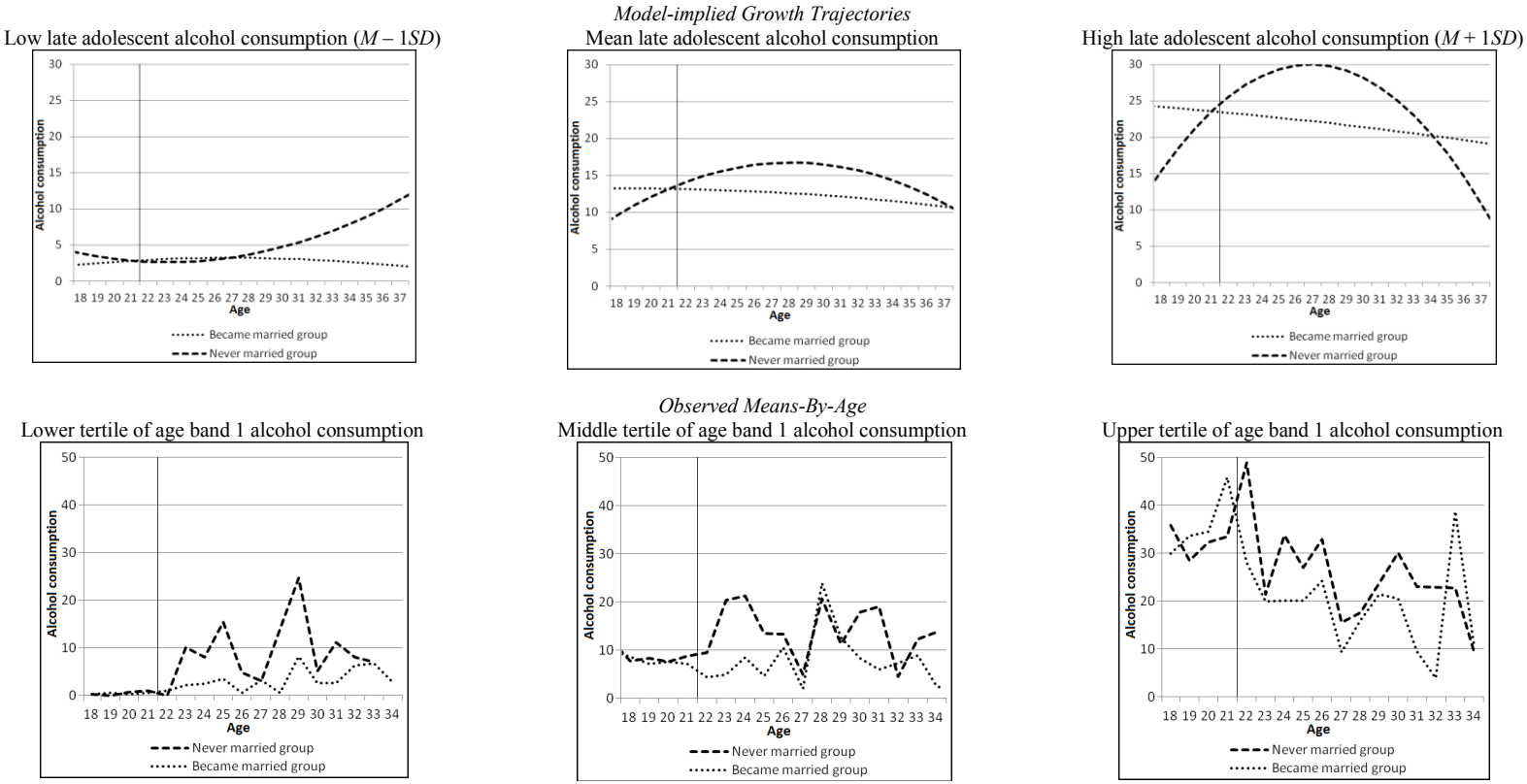

Figure 12. Model-estimated conditional alcohol consumption growth curves for the two marriage groups at three levels of late adolescent alcohol consumption (i.e., the growth intercept; controlling for parental alcoholism and gender effects on the slopes): One *SD* below the intercept mean (2.83; left panel), at the intercept mean (13.20; middle panel), and one *SD* above the intercept mean (23.57; right panel). Alcohol consumption means-by-age are also presented for both marriage groups among the lower, middle, and upper tertiles of age band 1 alcohol consumption. The vertical lines at age 21.5 represent the location of the growth model intercept.

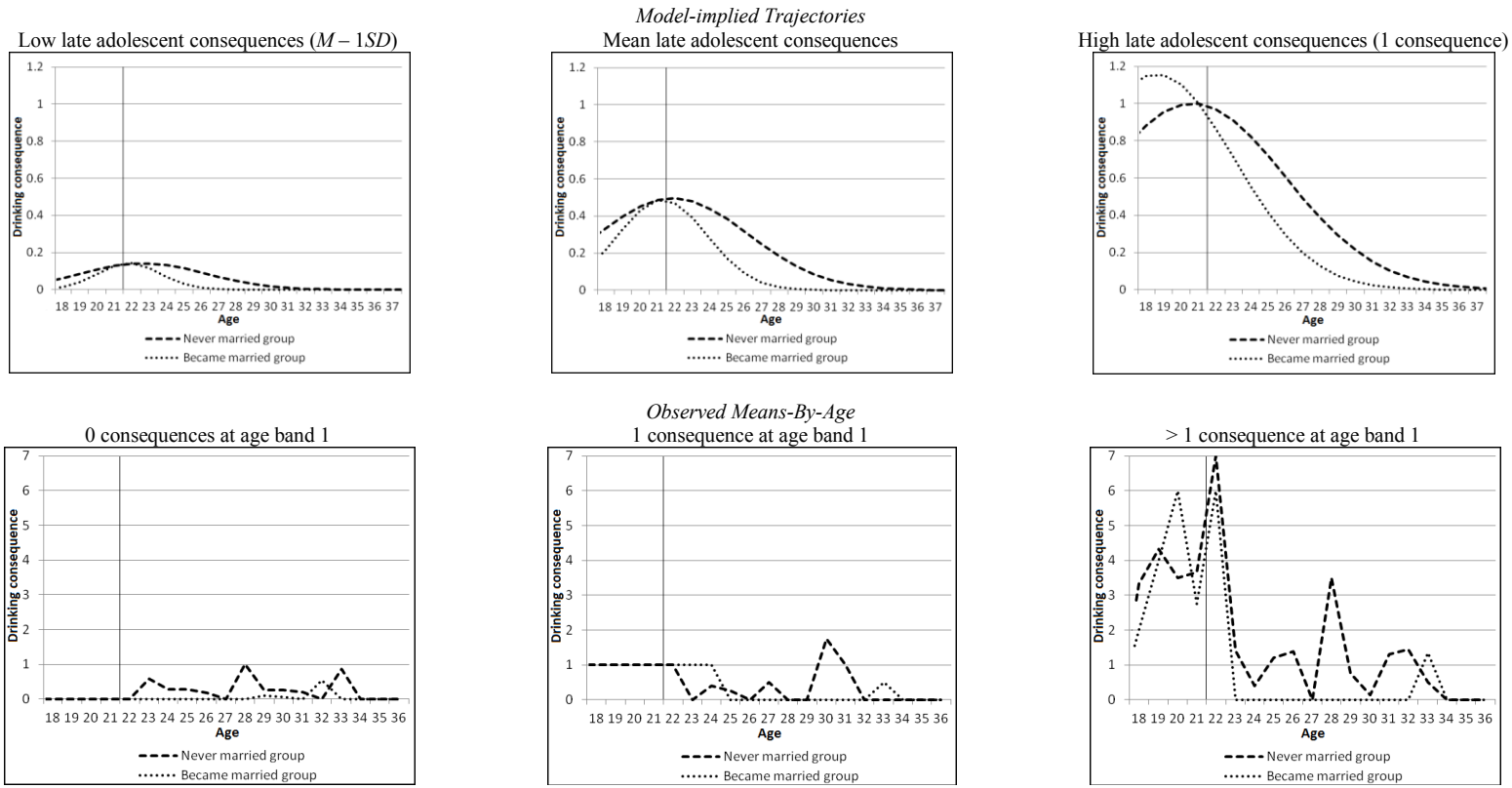

Figure 13. Model-estimated conditional drinking consequence growth curves for the two marriage groups at three different levels of late adolescent drinking consequence (i.e., the growth intercept; controlling for parental alcoholism and gender effects on the slopes): *One SD* below the intercept mean (0.15; left panel), at the intercept mean (0.52; middle panel), and at an intercept value of 1 consequence (right panel). Drinking consequence means-by-age are also presented for both marriage groups among those with 0, 1, and more than one age band 1 drinking consequence. The vertical lines at age 21.5 represent the location of the growth model intercept.

APPENDIX A

ITEMS AND RESPONSE OPTIONS

Alcohol Involvement at Waves 4, 5, and 6

Frequency of Alcohol Use. Participants were asked the following two questions:

1. How often did you drink wine or beer or wine coolers in the past year?
2. How often did you drink hard liquor in the past year (e.g., vodka, gin, whiskey)?

Response options for these items were (0) not at all, (1) 1-2 times, (2) once a month, (3) 2-3 times a month, (4) once a week, (5) 2-3 times a week, (6) 4-6 times a week, and (7) and every day.

Typical Quantity of Alcohol Use. Participants were asked the following two questions:

1. When you drink, about how many cans of beer, glasses of wine, or bottles of wine cooler do you usually have?
2. When you drink, about how many drinks of hard liquor do you usually have?

Response options for these items were (1) one, (2) two, (3) three, (4) four, (5) five, (6) six, (7) seven to eight, and (8) nine or more.

Drinking-Related Consequences. Participants were asked if they had ever experienced thirteen different drinking-related consequences with response options including (0) no and (1) yes. If they responded affirmatively for a given consequence, they were asked how recently they experienced the consequence with response options including (1) within the past three months, (2) within the past year, (3) 1-2 years age, (4) 2-5 years ago, and (5) more than 5 years ago. Based on these reports, the current study used counts of drinking-related consequences occurring in the past year. The 13 drinking consequences were the following:

1. Complaints from family.
2. Complaints from friends.
3. Getting in trouble at school or work.
4. Getting arrested.
5. Missing school or work.
6. Suffering an accident or injury.
7. Problems with schoolwork or studying.
8. Getting in a physical fight.
9. Destroying property.
10. Getting into sexual situations that were later regretted.
11. Financial problems.
12. Injuring someone else.
13. Neglect of usual responsibilities.

Marriage: Never Married vs. Became Married

Several variables (see below) were used to classify participants into a *never married* group (n=198) who never married across the three age bands (i.e., from late adolescence to adulthood), a *became married* group (*n*=143) who became married for the first time at age band 2 (i.e., young adulthood) and remained married at age band 3 (i.e., adulthood), and an *other* group (*n*=503) including all other in the sample. Given the heterogeneity of the *other* group, Table A1 below characterized this group by presenting all marital transition patterns among this group and the frequency of each of these patterns.

Ever Married by Age Band 3. For those whose age band 3 data were taken from Wave 5, whether or not participants had ever been married was determined using an item that asked participants, "How old were you when you first got married?", with response options including (1) never married, (2) under 16, (3) 16-17, (4) 18-20, (5) 21-23, (6) 24-26, and (7) 27 or older. For those whose age band 3 data were taken from Wave 6, whether or not participants had ever been married was determined using an item that asked participants, "How many times have you been legally married?", with response options including (1) zero, (2) one, (3) two, (4) , three (5) four (6) and five or more.

Marital Status. An items that assessed participants' marital status at Waves 4, 5, and 6 was used to confirm age band 3 retrospective reports of whether participants had ever been married (discussed above), and was also used to identify potential members of the *became married* group. This item asked participants, "What is your current marital status?", with response options including (1) unmarried, single or divorced, (2) separated, (3) widow or widower, (4) engaged, and (5) married.

Times Married and Ever Divorced. In addition to the requirement of going from unmarried to married to married across the three age bands, membership in the *became married* group required that participants were married for the first time at age band 2 and did not get divorced and then remarried between age bands 2 and 3. For those whose age band 3 data were taken from Wave 5, this was determined using an age

band 3 item that asked participants, “Have you ever been divorced?”, with response options including (1) no and (2) yes. For those whose age band 3 data were taken from Wave 6, this was determined using two age band 3 items that asked participants, “How many times have you been divorced?” and, “How many times have you been legally married?”, both with response options including (1) zero, (2) one, (3) two, (4) , three (5) four (6) and five or more.

Age of Marriage. For potential members of the *became married* group who were missing data at either age band 1 or age band 2, it was necessary to reconstruct marital timelines using retrospective reports of age of marriage. For those whose age band 3 data were taken from Wave 5, age of marriage was determined using an age band 3 item that asked participants, “How old were you when you first got married?”, with response options including (1) never married, (2) under 16, (3) 16-17, (4) 18-20, (5) 21-23, (6) 24-26, and (7) 27 or older. For those whose age band 3 data were taken from Wave 6, age of marriage was determined using an age band 3 item that asked participants, “How old were you the first time you were legally married?”, with participants allowed to freely respond with any number.

Sensation-seeking and Neuroticism at Waves 4, 5, and 6

Participants were asked to rate their agreement with the following statements with response options including (1) strongly disagree, (2) disagree, (3) neutral, (4) agree, and (5) strongly agree. Note that only sensation-seeking items are given below because publication is not permitted for items of the NEO-FFI (the source of neuroticism items).

Sensation-Seeking.

Note that the item “I like wild parties” was excluded from the sensation-seeking scale due to overlap with alcohol involvement constructs.

1. I like to do things on the spur of the moment.
2. I like being where there is something going on all the time.
3. I would do almost anything on a dare.
4. I like work that has lots of excitement.
5. I like to have new and exciting experiences, even if they are a little unconventional.

Table A1

Characterizing the other marriage group: Frequencies of different marital transitions in descending order

Marital status transitions				
Age band 1	Age band 2	Age band 3	Frequency (*n*)	Percent
Unmarried	Unmarried	Married	99	19.7
Missing	Married	Married	56	11.1
Missing	Unmarried	Married	52	10.3
Unmarried	Unmarried	Missing	49	9.7
Unmarried	Missing	Missing	27	5.4
Unmarried	Married	Missing	26	5.2
Unmarried	Unmarried	Unmarried	22	4.4
Unmarried	Married	Unmarried	21	4.2
Missing	Married	Unmarried	20	4
Missing	Unmarried	Missing	17	3.4
Missing	Unmarried	Unmarried	16	3.2
Missing	Missing	Married	14	2.8
Unmarried	Married	Married	14	2.8
Unmarried	Missing	Married	12	2.4
Missing	Married	Missing	10	2
Married	Unmarried	Married	9	1.8
Missing	Missing	Unmarried	8	1.6
Unmarried	Missing	Unmarried	8	1.6
Married	Unmarried	Unmarried	7	1.4
Married	Married	Unmarried	6	1.2
Married	Married	Married	4	0.8
Married	Missing	Unmarried	2	0.4
Missing	Missing	Missing	2	0.4
Married	Missing	Missing	1	0.2
Married	Unmarried	Missing	1	0.2
Total			503	100.0

APPENDIX B

ANALYSES TESTING EFFECTS OF LATE ADOLESCENT ALCOHOL INVOLVEMENT, MARRIAGE, PERSONALITY, AND THE INTERACTIONS AMONG THEM WITHOUT CONTROLLING FOR PARENTAL ALCOHOLISM AND GENDER

Although all analyses presented in the main body of this document controlled for parental alcoholism and gender, supplemental analyses carried out the models from hypothesis-testing steps 3 through 8 without controlling for these variables. These analyses are describes and presented below.

Hypothesis-testing step 3: Testing intercept effects on the linear and quadratic slopes.

The final quadratic alcohol consumption and drinking consequence models from hypothesis-testing step 1 were modified to test effects of the intercept on the linear and quadratic slopes. These analyses were designed to replicate the findings of Lee et. al (in press) by testing whether higher late adolescent alcohol consumption and drinking consequences predict more dramatic subsequent declines in these drinking variables from late adolescence to adulthood.

Alcohol consumption models. Results showed that the alcohol consumption growth intercept significantly predicted both the linear slope and the quadratic slope (see Table B1). In addition, a Wald χ^2 test testing both of these intercept effects simultaneously was also significant (i.e., model fit significantly decreased when the intercept's effects on both slopes were simultaneously constrained to zero; see Table B1). Note that, because the linear and quadratic slopes are endogenous variables predicted by the growth intercept, the initial model results provide estimates of the linear and quadratic slopes conditional on a growth intercept value of zero (i.e., slope intercepts). However, because the alcohol consumption variables were initially centered at the mean of the growth intercept (13.199), these linear and quadratic slopes estimates reflect conditional slopes at the mean of the growth intercept (see Table B1 notes for more details). Thus, to probe the growth intercept's effects on the slopes, additional slope estimates were obtained conditional on one standard deviation below (2.830) and one standard deviation above (23.568) the growth intercept's mean. This was done by re-scaling the alcohol consumption variables and then re-estimating the model (see Table B1). Based on these results, Figure B1 characterizes the growth intercept's effects on the slopes by presenting plotted growth curves at three different levels of the growth intercept. Consistent with hypotheses, results showed that higher levels of the alcohol consumption intercept predicted greater subsequent declines in alcohol consumption.

Drinking consequence models. Results showed that the drinking consequence growth intercept significantly predicted the quadratic slope but not the linear slope (see Table B2), and a Wald χ^2 test of both of these intercept effects simultaneously was marginally significant (see Table B2). Note that it was necessary to use un-centered drinking consequence variables because negative and non-integar values are not permissible with Poisson count models. However, because Poisson count models use log transformed rather than raw data values, the initial model-provided linear and quadratic slope estimates are conditional on a log transformed value of zero which corresponds to a raw data value of one drinking consequence (see Table B2 notes for more details). Further, because negative and non-integer values are not permissible, the growth intercept's effects on the slopes could not be probed by re-scaling the drinking consequence variable and re-estimating the model (as was done above for alcohol consumption). Instead, based on the initial model results, the Mplus function MODEL CONSTRAINT was used to compute conditional slopes at one standard deviation below the mean (0.15 consequences), at the mean (0.52 consequences), and at one standard deviation above the mean (1.83 consequences) of the growth intercept (see Table B2 notes for more details). Based on these results (see Table B2, Figure B2 characterizes the growth intercept's effects on the slopes by presenting plotted growth curves at three different levels of the growth intercept. Consistent with hypotheses, results showed that higher levels of the drinking consequences intercept predicted greater subsequent declines in drinking consequence.

Conclusions. As hypothesized, for both alcohol consumption and drinking consequences, higher late adolescent levels predicted greater subsequent declines from late adolescence to adulthood.

Hypothesis-testing step 4: Testing marriage effects on the intercept, linear slope, and quadratic slope.

The final quadratic alcohol consumption and drinking consequence models from hypothesis-testing step 1 were modified to test effects of marriage on the growth intercept, the linear slope, and the quadratic slope. Specifically, the final models from hypothesis-testing step 1 were estimated as multiple-group models with three groups including the *never married* group (n=198), the *became married* group (*n*=143), and the *other* group (*n*=503; see Measures). Wald χ^2 tests were then used to test differences between the *never married* group and the *became married* group on their growth intercepts, linear slopes, and quadratic slopes. These analyses were designed to test the hypothesis that becoming married between emerging and young adulthood would predict greater decreases in alcohol consumption and drinking consequences from late adolescence to adulthood (between-marriage-group differences in the slopes), and

to test the alternative hypothesis of greater selection into marriage between emerging and young adulthood among those with lower late adolescent alcohol consumption and drinking consequences (between-marriage-group differences in the intercept).

Alcohol consumption models. Upon estimating the multiple-group alcohol consumption model, Wald χ^2 tests showed that the *never married* group and the *became married* group differed significantly on their mean growth intercepts, mean linear slopes, and mean quadratic slopes (see Table B3). See Figure B3 for plotted growth curves for the two marriage groups based on these model results. Figure B3 indicates that the *never married* group showed a quadratic growth curve of alcohol consumption which peaked around age 28 and then declined, whereas the *became married* group showed a stable and relatively low-level trajectory of alcohol consumption across the three age bands.

Drinking consequence models. Upon estimating the multiple-group drinking consequence model, Wald χ^2 tests showed that the *never married* group and the *became married* group differed significantly on their mean growth intercepts (see Table B4). Also, although the two groups did not differ significantly on either their linear slope means or their quadratic slope means when tested separately, a Wald χ^2 test was marginally significant when both of these differences were tested simultaneously. See Figure B4 for plotted growth curves for the two marriage groups based on these model results. Figure B4 shows a quadratic drinking consequence growth curve for both groups, although the *never married* group escalated earlier and declined later when compared to the *became married* group.

Conclusions. Results showed evidence for selection effects whereby both lower alcohol consumption and lower drinking consequences in late adolescent were associated with a greater likelihood of subsequent marriage, but results also showed effects of marriage between emerging and young adulthood on trajectories of alcohol consumption and drinking consequences from late adolescence to adulthood. However, the nature of marriage's effects differed between the two drinking outcomes. Specifically, for alcohol consumption the *became married* group showed a stably flat and low-level trajectory from late adolescence to adulthood, whereas for drinking consequences the *became married* group showed a curvilinear trajectory of drinking consequences that was merely less protracted than for the *never married* group.

Hypothesis-testing step 5: Testing personality effects on the intercept, linear slope, and quadratic slope.

The final quadratic alcohol consumption and drinking consequence models from hypothesis-testing step 1 were modified to test effects of personality change between age bands 1 and 2 on the growth intercept, the linear slope, and the quadratic slope. These analyses were designed to test the hypotheses that decreased sensation-seeking and decreased neuroticism between emerging and young adulthood would predict decreased alcohol consumption and decreased drinking consequences from late adolescence to adulthood (i.e., personality effects on slopes), and to test the alternative hypotheses of greater "selection" into personality changes between emerging and young adulthood among those with lower late adolescent alcohol consumption and drinking consequences (i.e., personality effects on intercepts). As explained in the Analyses section, only models using observed change scores are reported here, but results of models using other methods of modeling personality change are reported in Appendix B.

Alcohol consumption models: Effects of sensation-seeking. Sensation-seeking change significantly predicted the linear slope and marginally significantly predicted the quadratic slope of alcohol consumption, and a Wald χ^2 test of both of these effects simultaneously was significant (see Table B5). To probe these effects, conditional alcohol consumption growth intercepts and slopes at three different levels of sensation-seeking change were obtained (see Table B5) and plotted (see Figure B5). Consistent with hypotheses, Figure B5 shows that greater declines in sensation-seeking were associated with steady decreases in alcohol consumption from age 17 to 39, whereas smaller declines in sensation-seeking were associated with a more curvilinear pattern of initial escalation followed by later declines beginning around age 28. Regarding selection into sensation-seeking change as a function of earlier alcohol consumption, sensation-seeking change did not significantly predict the alcohol consumption growth intercept.

Alcohol consumption models: Effects of neuroticism. Neuroticism change did not significantly predict either the linear or the quadratic alcohol consumption slope, but a Wald χ^2 tests of both of these effects simultaneously was significant. Consistent with hypotheses, results of probing this interaction (see Table B5 and Figure B6) showed that greater declines in neuroticism were associated with an earlier downturn in alcohol consumption, with peak consumption occurring around age 22 for those with relatively large decreases in neuroticism and peak consumption occurring around age 28 for those with relatively

small decreases in neuroticism. Regarding selection into neuroticism change as a function of earlier alcohol consumption, neuroticism change did not significantly predict the alcohol consumption growth intercept.

Drinking consequence models: Effects of sensation-seeking. Sensation-seeking change failed to significantly predict either the linear or the quadratic drinking consequences slope, and a Wald χ^2 of both of these effects simultaneously was non-significant (see Tables B6). Thus, these effects were not probed. Regarding selection into sensation-seeking change as a function of earlier drinking consequences, sensation-seeking change did not significantly predict the drinking consequence growth intercept.

Drinking consequence models: Effects of neuroticism. Neuroticism change did not significantly predict either the linear or the quadratic drinking consequences slope, but a Wald χ^2 tests of both of these effects simultaneously was significant (see Table B6). Consistent with hypotheses, results of probing this interaction (see Table B6 and Figure B7) showed that greater declines in neuroticism were associated with an earlier downturn in drinking consequences, with peak drinking consequences occurring around age 18 for those with relatively large decreases in neuroticism and peak drinking consequences occurring around age 23 for those with relatively small decreases in neuroticism. Regarding selection into neuroticism change as a function of earlier drinking consequences, neuroticism change did not significantly predict the drinking consequence growth intercept.

Conclusions. Both decreased sensation-seeking and decreased neuroticism predicted declines in alcohol consumption, but only decreased neuroticism predicted declines in drinking consequences. Generally speaking, probing these effects showed that a high degree of personality maturation between emerging and young adulthood was associated with relatively early declines in alcohol involvement, whereas less personality maturation was associated with a longer period of alcohol involvement escalation with declines occurring only in young adulthood or even adulthood. It is noteworthy that sensation-seeking did not predict drinking consequences, given that this is consistent with the hypothesis (based on previous research) that sensation-seeking may be most closely related to alcohol consumption and neuroticism may be most closely related to drinking consequences. Regarding selection into personality change between emerging and young adulthood as a function of late adolescent alcohol involvement, results consistently failed to show personality effects on either the alcohol consumption or the drinking consequence growth intercepts.

Hypothesis-testing step 6: Testing intercept-by-marriage interaction effects on the linear slope and the quadratic slope.

The final quadratic alcohol consumption and drinking consequence models from hypothesis-testing step 1 were modified to test interactions between the growth intercept and marriage predicting the linear and the quadratic slope. Specifically, as was done when main effects of marriage were tested in hypothesis-testing step 4, the final models from hypothesis-testing step 1 were estimated as multiple-group models with a *never married* group (n=198), a *became married* group (*n*=143), and an *other* group (*n*=503). However, unlike in hypothesis-testing step 4, the growth intercept was modeled as a predictor of the linear and the quadratic slope. Thus, the growth-intercept-by-marriage interaction was tested through Wald χ^2 tests of whether the growth intercept's effects on the slopes differed between the *never married* group and the *became married* group. These analyses were designed to test the hypothesis that marriage between emerging and young adulthood would more strongly predict decreased alcohol involvement among those with higher earlier alcohol involvement in late adolescent.

Alcohol consumption models. Upon estimating the alcohol consumption model, Wald χ^2 tests showed inconsistent evidence for an intercept-by-marriage interaction (see Table B7). Specifically, the growth intercept's effects on both the linear and the quadratic slope differed marginally significantly between the *never married* group and the *became married* group. However, a Wald χ^2 test of both of these between-group differences simultaneously was non-significant. Although evidence for this interaction was weak and inconsistent, it was probed as described below.

Toward probing the growth-intercept-by-marriage interaction, the initial model results showed that the growth intercept's effects on both the linear and the quadratic slope were significant for the *never married* group but non-significant for the *became married* group (see Table B7). Also of interest was how the effects of marriage on the slopes vary as a function of the level of the growth intercept. Thus, linear and quadratic slope estimates for both marriage groups at three different levels of the growth intercept were obtained (see Table B7) and plotted (see Figure B8), and Wald χ^2 tests were used to test marriage effects (i.e., to test slope differences between marriage groups) at each level of the growth intercept (see Table B7). Consistent with hypotheses, marriage effects were stronger at higher levels of the growth intercept,

given that marriage did not significantly predict either slope at one standard deviation below the mean growth intercept but significant predicted the linear slope and marginally significantly predicted the quadratic slope at the mean growth intercept and at one standard deviation above the mean growth intercept.

Drinking consequence models. Upon estimating the drinking consequence model, Wald χ^2 tests consistently failed to show evidence for an intercept-by-marriage interaction (see Table B8). Specifically, the growth intercept's effects on both the linear and the quadratic slope did not differ significantly between the two marriage groups when these differences were tested separately or when they were tested simultaneously. Thus, this interaction was not probed.

Conclusions. For alcohol consumption but not drinking consequences, there was evidence that late adolescent alcohol involvement moderated effects of marriage on changes in alcohol involvement from late adolescence to adulthood. Consistent with hypotheses, marriage effects were strongest at relatively high levels of late adolescent alcohol consumption. Plotted results indicated that, at high levels of late adolescent alcohol consumption, the *became married* group showed steady decreases in alcohol consumption from late adolescence to adulthood, whereas the *never married* group showed dramatic escalation in young adulthood followed by later decreases in adulthood.

Hypothesis-testing step 7: Testing growth-intercept-by-personality interaction effects on the linear slope and the quadratic slope.

The final quadratic alcohol consumption and drinking consequence models from hypothesis-testing step 1 were modified to test interactions of the growth intercept with sensation-seeking change and neuroticism change. Specifically, the linear and quadratic slopes were predicted by the growth intercept, the personality change variable, and a growth-intercept-by-personality-change interaction (specified using the Mplus command XWITH). These analyses were designed to test the hypotheses that decreases in sensation-seeking and neuroticism from emerging to young adulthood would more strongly predict decreased alcohol involvement among those with higher earlier alcohol involvement in late adolescent. As explained in the Analyses section, only models using observed change scores are reported here, but results of models using other methods of modeling personality change are reported in Appendix B.

Alcohol consumption models: Growth-intercept-by-sensation-seeking interactions. The growth-intercept-by-sensation-seeking-change interaction did not significantly predict either the linear or the quadratic alcohol consumption slope, and a Wald χ^2 test of both interaction effects simultaneously was non-significant (see Table B9). Thus, this interaction was not probed.

Alcohol consumption models: Growth-intercept-by-neuroticism interactions. The growth-intercept-by-neuroticism-change interaction did not significantly predict either the linear or the quadratic alcohol consumption slope, but a Wald χ^2 test of both interaction effects simultaneously was marginally significant (see Table B9). Although evidence for this interaction was weak and inconsistent, it was probed as described below.

To probe the growth-intercept-by-neuroticism-change interaction, effects of neuroticism change were obtained at three different levels of the growth intercept (see Table B9), effects of the growth intercept were obtained at three different levels of neuroticism change (see Table B9), and conditional linear and quadratic slope estimates were obtained and plotted at the nine different combinations of these three growth intercept and neuroticism change levels (see Table B9 and Figure B9). Consistent with hypotheses, higher alcohol consumption growth intercept values most strongly predicted decreased alcohol consumption at relatively high levels of neuroticism declines, and neuroticism declines most strongly predicted decreased alcohol consumption at relatively high levels of the alcohol consumption growth intercept. Thus, the most dramatic alcohol consumption decreases were observed when relatively high levels of late adolescent alcohol consumption were combined with relatively dramatic decreases in neuroticism.

Drinking consequence models: Intercept-by-sensation-seeking interactions. The growth-intercept-by-sensation-seeking-change interaction did not significantly predict the linear or the quadratic drinking consequence slope either when these effects were tested separately or when they were tested simultaneously (see Table B10). Thus, this interactions were not probed.

Drinking consequence models: Intercept-by-neuroticism interactions. The growth-intercept-by-neuroticism-change interaction did not significantly predict the linear or the quadratic drinking consequence slope either when these effects were tested separately or when they were tested simultaneously (see Table B10). Thus, this interactions were not probed.

Conclusions. Among the four growth-intercept-by-personality-change interactions that were tested, results only supported the **g**rowth-intercept-by-neuroticism-change interaction when predicting alcohol consumption. Consistent with hypotheses, results of this interaction indicated that the combination of higher late adolescent alcohol consumption and greater neuroticism-related maturation from emerging to young adulthood produced the most dramatic decreases in alcohol involvement from late adolescence to adulthood.

Hypothesis-testing step 8: Testing personality-by-marriage interaction effects on the linear slope and the quadratic slope.

The final quadratic alcohol consumption and drinking consequence models from hypothesis-testing step 1 were modified to test interactions of marriage with sensation-seeking change and neuroticism change. Specifically, as was done when testing main effects of marriage in hypothesis-testing step 4, the final models from hypothesis-testing step 1 were estimated as multiple-group models with a *never married* group (n=198), a *became married* group (*n*=143), and an *other* group (*n*=503). However, unlike in hypothesis-testing step 4, personality change variables were included as predictors of the linear and quadratic slopes. Thus, marriage-by-personality-change interactions were tested through Wald χ^2 tests of whether personality effects on the slopes differed between the *never married* group and the *became married* group. These analyses were designed to test the hypothesis that marriage between emerging and young adulthood would more strongly predict decreased alcohol involvement (consumption and consequences) among those with greater decreases in sensation-seeking and neuroticism between emerging and young adulthood. As explained in the Analyses section, only models using observed change scores are reported here, but results of models using other methods of modeling personality change are reported in Appendix B.

Alcohol consumption models: Sensation-seeking-by-marriage interactions. Wald χ^2 tests consistently failed to support a marriage-by-sensation-seeking-change interaction when predicting alcohol consumption slopes. Specifically, sensation-seeking-change effects on both the linear and the quadratic slope did not differ between the *never married* group and the *became married* group either when these differences were tested separately or when they were tested simultaneously (see Table B11). Thus, these interactions were not probed.

Alcohol consumption models: Neuroticism-by-marriage interactions. Wald χ^2 tests showed some support for a marriage-by-neuroticism-change interaction when predicting alcohol consumption slopes. Specifically, the two marriage groups differed significantly in the effect of neuroticism change on the quadratic slope but not the linear slope, and a test of both of these differences simultaneously was non-significant (see Table B11). Although evidence for this interaction was weak and inconsistent, it was probed as described below.

Toward probing the marriage-by-neuroticism-change interaction, the initial model results showed that neuroticism change marginally significantly predicted the linear slope and significantly predicted the quadratic slope for the *never married* group, but did not significantly predict either slope for the *became married* group (see Table B11). Also of interest was how the effects of marriage on the slopes vary as a function of the level of neuroticism change. Thus, linear and quadratic slope estimates were obtained and plotted for both marriage groups at three different levels of neuroticism change (see Table B11 and Figure B10), and Wald χ^2 tests were used to test marriage effects (i.e., to test slope differences between marriage groups) at each level of neuroticism change (see Table B11). Consistent with hypotheses, marriage effects were stronger at higher levels of neuroticism declines such that marriage effects on the slopes were significant at one standard deviation below the mean of neuroticism change (a decrease of 0.71), marginally significant at the mean of neuroticism change (a decrease of 0.12), and non-significant at one standard deviation above the mean of neuroticism change (an increase of 0.47).

Drinking consequence models: Sensation-seeking-by-marriage interactions. Wald χ^2 tests showed support for a marriage-by-sensation-seeking-change interaction predicting the drinking consequence slopes. Specifically, sensation-seeking change effects on both the linear and the quadratic slope differed significantly between the two marriage groups both when these differences were tested separately and when they were tested simultaneously (see Table B12). Thus, this interaction was probed as described below.

Toward probing the marriage-by-sensation-seeking-change interaction, the initial model results showed that sensation-seeking change did not significantly predict either the linear or the quadratic slope for the *never married* group but did significantly predict both slopes for the *became married* group (see

Table B12). Also of interest was how the effects of marriage on the slopes vary as a function of the level of sensation-seeking change. Thus, linear and quadratic slope estimates were obtained and plotted for both marriage groups at three different levels of sensation-seeking change(see Table B12 and Figure B11), and Wald χ^2 tests were used to test marriage effects (i.e., to test slope differences between marriage groups) at each level of sensation-seeking change (see Table B12). Contrary to hypotheses, marriage effects were stronger at *lower* levels of sensation-seeking declines such that marriage effects were non-significant at one standard deviation below the mean of sensation-seeking change (a decrease of 0.74) but significant both at the mean of sensation-seeking change (a decrease of 0.11) and at one standard deviation above the mean of sensation-seeking change (an increase of 0.52).

Drinking consequence models: Neuroticism-by-marriage interactions. Wald χ^2 tests consistently failed to support a marriage-by-neuroticism-change interaction predicting the drinking consequence slopes. Specifically, neuroticism change effects on both the linear and the quadratic slope did not differ significantly between the two marriage groups either when these differences were tested separately or when they were tested simultaneously (see Table B12). Thus, this interaction was not probed.

Conclusions. For alcohol consumption, there was evidence that neuroticism change but not sensation-seeking change moderated effects of marriage, and this effect was consistent with hypotheses given that marriage effects were stronger when accompanied by greater neuroticism maturation. At this high level of neuroticism decline, the *became married* group showed slight but steady decreases in alcohol consumption from late adolescence to adulthood, whereas the *never married* group showed dramatic escalation in young adulthood followed by later decreases in adulthood.

In contrast, for drinking consequences, there was evidence that sensation-seeking change but not neuroticism change moderated effects of marriage, and this effect was contrary to hypotheses given that marriage effects were stronger when accompanied by relatively low sensation-seeking maturation. Further, surprisingly, at this low level of sensation-seeking decline, the *became married* group showed a dramatic curvilinear pattern with a high peak in young adulthood, whereas the *never married* group showed steady decreases from late adolescence to adulthood.

Table B1

Results from testing the alcohol consumption intercept's effect on the linear and quadratic alcohol consumption slopes and conditional linear and quadratic slope estimates at different levels of the intercept

Initial model estimates	Estimate	*p*-value
Effects of the growth intercept		
Predicting the linear slope	0.059	0.045
Predicting the quadratic slope	-0.006	0.006
Slope intercepts[a]		
Linear slope	0.444	0.001
Quadratic slope	-0.042	0.000
Means		
Growth intercept	0.000	1.000
Covariances		
Quadratic slope with linear slope	-0.026	0.573
Wald χ^2 tests		
Intercept effects on both the linear and the quadratic slope tested simultaneously	$\chi^2(2)=10.09$ ($p=0.007$)	
Conditional slopes at different levels of the growth intercept[b]		
One SD below the mean (2.830)		
Linear slope	-0.171	0.523
Quadratic slope	0.018	0.331
At the mean (13.199)		
Linear slope	0.444	0.001
Quadratic slope	-0.042	0.000
One SD above the mean (23.568)		
Linear slope	1.059	0.007
Quadratic slope	-0.103	0.000

Note. Variances and residual variances were omitted above to focus on key estimates.

[a] Because the linear and quadratic slopes are predicted by the growth intercept, model results provide estimates for these two slopes conditional on a growth intercept value of zero (termed "slope intercepts" in the above table). Thus, because the alcohol consumption variables were initially centered at the growth intercept's mean value, the slope intercepts in the above initial model results represent estimates of the linear and quadratic slopes conditional on this mean growth intercept value.

[b] As explained above, conditional linear and quadratic slopes at the mean of the growth intercept were obtained directly from the initial model results. Conditional slopes at one standard deviation below and one standard deviation above the mean of the growth intercept were obtained by re-estimating the model after re-scaling the alcohol consumption variables. The intercept's standard deviation was computed as a function of its model-provided variance: SD=SQRT(variance); thus, SD=SQRT(107.495)=10.368.

Table B2

Results from testing the drinking consequence intercept's effect on the linear and quadratic drinking consequence slopes and conditional linear and quadratic slope estimates at different levels of the intercept

Initial model results	Estimate	*p*-value
Effects of the growth intercept		
Predicting the linear slope	-0.031	0.378
Predicting the quadratic slope	0.006	0.038
Slope intercepts[a]		
Linear slope	-0.026	0.599
Quadratic slope	-0.022	0.000
Means		
Growth intercept	-0.649	0.026
Covariances		
Quadratic slope with linear slope	-0.002	0.132
Wald χ^2 tests		
Intercept effects on both the linear and the quadratic slope tested simultaneously	$\chi^2(2)=5.26$ ($p=0.072$)	
Conditional slopes at different levels of the growth intercept[b]		
One SD below the mean (0.15)		
Linear slope	0.033	0.776
Quadratic slope	-0.034	0.000
At the mean (0.52)		
Linear slope	-0.006	0.937
Quadratic slope	-0.026	0.000
One SD above the mean (1.83)		
Linear slope	-0.044	0.248
Quadratic slope	-0.018	0.000

Note. Variances, residual variances, and zero-inflation thresholds were omitted to focus on key estimates.

[a] Because the linear and quadratic slopes are predicted by the growth intercept, model results provide estimates for these two slopes conditional on a growth intercept value of zero (termed "slope intercepts" in the above table). However, because Poisson count models use log transformed values for the dependent variable, a value of zero on the growth intercept reflects a raw value of 1 drinking consequence (log(1) = 0). Thus, the slope intercepts in the above initial model results represent estimates of the linear and quadratic slopes conditional on an intercept value of 1 drinking consequence.

[b] Conditional linear and quadratic slopes at other levels of the growth intercept were computed based on model results using the Mplus MODEL CONSTRAINT option. For example, because (1) *the intercept of the linear slope* gives the linear slope at a growth intercept value of zero and (2) *the coefficient for the effect of the growth intercept on the linear slope* gives the change in the linear slope with a 1 unit change in the growth intercept, these two model parameters can be used to compute linear slope values conditional on different value of the growth intercept (e.g., linear slope at the mean growth intercept = linear slope intercept + (mean growth intercept * growth intercept effect on the linear slope) = -0.026 + (-0.649 * -0.031) = -0.006). This approach was necessary because negative and non-integar values are not permitted in Poisson count models, so conditional slopes could not be obtained by re-scaling the drinking consequence variables and re-estimating the model (as was done for alcohol consumption).

Table B3

*Results of the multiple-*group *alcohol consumption model and Wald χ^2 test results comparing intercepts, linear slopes, and quadratic slopes between the never married group and the became married group*

	Never married group		*Became married* group		*Other* group	
Initial model results	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value
Means						
Intercept	14.663	0.000	8.954	0.000	13.850	0.000
Linear slope	1.059	0.000	-0.048	0.842	0.277	0.094
Quadratic slope	-0.077	0.001	0.001	0.954	-0.037	0.003
Covariances						
Intercept with linear slope	4.837	0.098	4.837	0.098	4.837	0.098
Intercept with quadratic slope	-0.532	0.009	-0.532	0.009	-0.532	0.009
Linear slope with quadratic slope	-0.085	0.083	-0.085	0.083	-0.085	0.083
Variances						
Intercept	115.998	0.000	124.646	0.009	101.318	0.000
Linear slope	1.907	0.014	0.980	0.330	1.428	0.084
Quadratic slope	0.009	0.206	0.008	0.279	0.006	0.043
Residual variances						
Age band 1 alcohol consumption	127.793	0.000	127.793	0.000	127.793	0.000
Age band 2 alcohol consumption	64.880	0.000	64.880	0.000	64.880	0.000
Age band 3 alcohol consumption	64.880	0.000	64.880	0.000	64.880	0.000
Wald χ^2 tests of differences between the *never married* group and the married group						
Intercept mean			$\chi^2(1)=9.78$ ($p=0.002$)			
Linear slope mean			$\chi^2(1)=9.68$ ($p=0.002$)			
Quadratic slope mean			$\chi^2(1)=7.07$ ($p=0.008$)			
Linear and quadratic slope means			$\chi^2(2)=9.76$ ($p=0.008$)			

Note. As was supported by Wald χ^2 tests with a preliminary model, the above model constrained to be equal (1) the age band 2 and 3 alcohol consumption residual variances *within* all three groups, (2) the age band 1, 2, and 3 alcohol consumption residual variances *across* the three groups, and (3) all correlations among the intercept, the linear slope, and the quadratic slope *across* the three groups. These constraints were placed in all subsequent multiple-group alcohol consumption models.

Table B4

*Results of the multiple-*group *drinking consequence model and Wald χ^2 test results comparing intercepts, linear slopes, and quadratic slopes between the never married group and the became married group*

	Never married group		*Became married* group		*Other* group	
Initial model results	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value
Means						
Intercept	-0.669	0.001	-1.658	0.000	-0.434	0.143
Linear slope	0.078	0.312	0.740	0.344	-0.129	0.011
Quadratic slope	-0.026	0.005	-0.133	0.059	-0.014	0.004
Covariances						
Intercept with linear slope	-0.110	0.149	-0.602	0.387	0.038	0.417
Intercept with quadratic slope	0.013	0.133	0.081	0.143	-0.001	0.753
Linear slope with quadratic slope	-0.005	0.053	-0.028	0.743	-0.001	0.402
Variances						
Intercept	1.574	0.000	2.111	0.035	1.320	0.000
Linear slope	0.058	0.013	0.273	0.685	0.029	0.076
Quadratic slope	0.000	0.096	0.004	0.703	0.000	0.601
Zero-inflation binary thresholds						
Age band 1 drinking consequences	@-15[a]	--	@-15[a]	--	-0.394	0.180
Age band 2 drinking consequences	-0.394	0.180	2.515	0.030	-0.394	0.180
Age band 3 drinking consequences	@-15[a]	--	@-15[a]	--	@-15[a]	--
Wald χ^2 tests of differences between the *never married* group and the married group						
Intercept mean			$\chi^2(1)=3.99$ ($p=0.046$)			
Linear slope mean			$\chi^2(1)=0.71$ ($p=0.401$)			
Quadratic slope mean			$\chi^2(1)=2.25$ ($p=0.133$)			
Linear and quadratic slope means			$\chi^2(2)=5.34$ ($p=0.069$)			

Note. As was supported by Wald χ^2 tests with a preliminary model, the above model constrained to be equal (1) the age band 1 and 3 drinking consequence binary thresholds *within* the *never married* group and the *became married* group, (2) the age band 1 and 2 drinking consequence binary thresholds *within* the *other* group, (3) the age band 1 drinking consequence binary threshold *between* the *never married* group and the *became married* group, (4) the age band 2 drinking consequence binary threshold *between* the *never married* group and the *other* group, and (5) the age band 3 drinking consequence binary threshold *across* all three groups. These constraints were placed in all subsequent multiple-group drinking consequence models. [a] This parameter fixed at -15 (the maximum value) by the Mplus program.

Table B5

Results of models testing effects of sensation-seeking change and neuroticism change on the alcohol consumption growth intercept, linear slope, and quadratic slope

	Sensation-seeking model		Neuroticism model	
Initial model results	Estimate	*p*-value	Estimate	*p*-value
Effects of personality change				
Predicting the growth intercept	0.758	0.468	-0.945	0.413
Predicting the linear slope	0.777	0.006	0.255	0.437
Predicting the quadratic slope	-0.042	0.073	0.013	0.570
Intercepts[a]				
Growth intercept	13.206	0.000	13.189	0.000
Linear slope	0.444	0.001	0.456	0.001
Quadratic slope	-0.042	0.000	-0.044	0.000
Covariances				
Growth intercept with linear slope	5.914	0.037	6.576	0.017
Growth intercept with quadratic slope	-0.597	0.004	-0.635	0.002
Linear slope with quadratic slope	-0.054	0.157	-0.068	0.082
Wald χ^2 tests				
Personality change effects on both the linear and the quadratic slope	$\chi^2(2)=9.15$ ($p=0.010$)		$\chi^2(2)=7.91$ ($p=0.019$)	
Conditional growth intercepts and slopes at different levels of latent sensation-seeking change[b]				
One SD below the mean (decrease of 0.74)				
Growth intercept	11.423	0.000	13.510	0.000
Linear slope	-0.207	0.384	0.187	0.372
Quadratic slope	-0.006	0.745	-0.036	0.044
At the mean (decrease of 0.11)				
Growth intercept	13.221	0.000	13.177	0.000
Linear slope	0.433	0.001	0.463	0.001
Quadratic slope	-0.042	0.000	-0.044	0.000
One SD above the mean (increase of 0.52)				
Growth intercept	15.019	0.000	12.901	0.000
Linear slope	1.074	0.000	0.729	0.004
Quadratic slope	-0.077	0.000	-0.052	0.013

Note. Variances and residual variances were omitted above to focus on key estimates. [a] Because personality change scores were initially mean centered, the intercepts provided in the initial model results represent growth intercepts, linear slopes, and quadratic slopes conditional on the mean of personality change. [b]As explained above, growth intercept and slope estimates conditional on the mean of sensation seeking change were obtained directly from the initial model results. Conditional linear and quadratic slopes at other levels of sensation seeking change were obtained by re-scaling the personality variables and re-estimating the model.

Table B6

Results of models testing effects of sensation-seeking change and neuroticism change on the drinking consequence growth intercept, linear slope, and quadratic slope

	Sensation-seeking model		Neuroticism model	
Initial model results	Estimate	*p*-value	Estimate	*p*-value
Effects of personality change				
Predicting the growth intercept	-0.011	0.953	-0.097	0.585
Predicting the linear slope	-0.016	0.823	0.083	0.114
Predicting the quadratic slope	0.007	0.395	0.002	0.741
Intercepts[a]				
Growth intercept	-0.648	0.023	-0.621	0.032
Linear slope	-0.006	0.939	-0.004	0.959
Quadratic slope	-0.026	0.000	-0.026	0.000
Covariances				
Growth intercept with linear slope	-0.049	0.406	-0.043	0.455
Growth intercept with quadratic slope	0.009	0.072	0.010	0.057
Linear slope with quadratic slope	-0.002	0.156	-0.002	0.136
Wald χ^2 tests				
Personality change effects on both the linear and the quadratic slope	$\chi^2(2)=2.15$ ($p=0.341$)		$\chi^2(2)=11.57$ ($p=0.003$)	
Conditional growth intercepts and slopes at different levels of latent neuroticism change[b]				
One SD below the mean (decrease of 0.71)				
Growth intercept	--	--	-0.669	0.021
Linear slope	--	--	-0.112	0.114
Quadratic slope	--	--	-0.021	0.001
At the mean (decrease of 0.12)				
Growth intercept	--	--	-0.631	0.031
Linear slope	--	--	0.013	0.865
Quadratic slope	--	--	-0.027	0.000
One SD above the mean (increase of 0.47)				
Growth intercept	--	--	-0.486	0.144
Linear slope	--	--	0.091	0.288
Quadratic slope	--	--	-0.030	0.000

Note. Variances and residual variances were omitted above to focus on key estimates. [a] Because observed change scores were initially mean centered, the intercepts provided in the initial model results represent growth intercepts, linear slopes, and quadratic slopes conditional on the mean of personality change. [b]As explained above, growth intercept and slope estimates conditional on the mean of neuroticism change were obtained directly from the initial model results. Conditional growth intercepts and slopes conditional on other levels of neuroticism change were obtained by re-scaling the personality variables and re-estimating the model.

Table B7

Multiple-group alcohol consumption model results and Wald χ^2 tests of intercept-by-marriage interactions

	Never married group		Became married group		Other group	
Initial model results	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value
Effects of the growth intercept						
Predicting the linear slope	0.099	0.048	-0.005	0.919	0.054	0.163
Predicting the quadratic slope	-0.010	0.025	-0.001	0.817	-0.006	0.038
Slope intercepts[a]						
Linear slope	0.925	0.000	-0.131	0.768	0.247	0.141
Quadratic slope	-0.065	0.004	0.003	0.931	-0.034	0.008
Means						
Growth intercept	-0.046	0.591	-0.046	0.591	-0.046	0.591
Covariances						
Quadratic slope with linear slope	1.457	0.168	-4.143	0.010	0.638	0.344
Wald χ^2 tests of differences between marriage groups in growth intercept effects on slopes (i.e., testing interactions)						
Growth intercept on linear slope			$\chi^2(1)=2.77$ ($p=0.096$)			
Growth intercept on quadratic slope			$\chi^2(1)=2.87$ ($p=0.091$)			
Growth intercept on linear and quadratic slope			$\chi^2(2)=2.95$ ($p=0.229$)			
Conditional slopes at different levels of the growth intercept[b]						
One SD below the mean (2.830)						
Linear slope	-0.106	0.843	-0.083	0.650	-0.314	0.395
Quadratic slope	0.035	0.463	0.011	0.531	0.026	0.307
At the mean (13.199)						
Linear slope	0.925	0.000	-0.131	0.768	0.247	0.141
Quadratic slope	-0.065	0.004	0.003	0.931	-0.034	0.008
One SD above the mean (23.568)						
Linear slope	1.955	0.002	-0.178	0.842	0.808	0.102
Quadratic slope	-0.165	0.002	-0.005	0.936	-0.093	0.010
Wald χ^2 tests of slope differences between marriage groups (i.e., marriage effects) at different levels of the growth intercept						
One SD below the mean (2.830)						
Linear slope difference			$\chi^2(1)=0.002$ ($p=0.966$)			
Quadratic slope difference			$\chi^2(1)=0.24$ ($p=0.623$)			
Linear and quadratic slope difference			$\chi^2(2)=1.03$ ($p=0.599$)			
At the mean (13.199)						
Linear slope difference			$\chi^2(1)=4.02$ ($p=0.045$)			
Quadratic slope difference			$\chi^2(1)=2.81$ ($p=0.094$)			
Linear and quadratic slope difference			$\chi^2(2)=4.30$ ($p=0.116$)			

One SD above the mean (23.568)	
Linear slope difference	$\chi^2(1)=4.09$ ($p=0.043$)
Quadratic slope difference	$\chi^2(1)=3.76$ ($p=0.053$)
Linear and quadratic slope difference	$\chi^2(2)=4.12$ ($p=0.128$)

Note. Variances and residual variances were omitted above to focus on key estimates. As was supported by Wald χ^2 tests with a preliminary model, the above model constrained to be equal (1) the age band 2 and 3 alcohol consumption residual variances *within* all three groups, (2) the age band 1, 2, and 3 alcohol consumption residual variances *across* the three groups, and (3) all correlations among the intercept, the linear slope, and the quadratic slope *across* the three groups. These constraints were placed in all subsequent multiple-group alcohol consumption models.

[a] Because the alcohol consumption variables were initially centered at the growth intercept's mean value, the slope intercepts in the above initial model results represent estimates of the linear and quadratic slopes conditional on this mean growth intercept value.

[b] As explained above, conditional linear and quadratic slopes at the mean of the growth intercept were obtained directly from the initial model results. Conditional slopes at one standard deviation below and one standard deviation above the mean of the growth intercept were obtained by re-estimating the model after re-scaling the alcohol consumption variables.

Table B8

Multiple-group drinking consequence model results and Wald χ^2 tests of intercept-by-marriage interactions

	Never married group		Became married group		Other group	
Initial model results	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value
Effects of the growth intercept						
Predicting the linear slope	-0.070	0.141	-0.331	0.332	0.031	0.430
Predicting the quadratic slope	0.008	0.147	0.042	0.125	-0.001	0.795
Slope intercepts[a]						
Linear slope	0.033	0.583	0.287	0.154	-0.116	0.007
Quadratic slope	-0.020	0.009	-0.071	0.011	-0.014	0.001
Means						
Growth intercept	-0.668	0.001	-1.668	0.000	-0.412	0.168
Covariances						
Quadratic slope with linear slope	-0.004	0.115	-0.009	0.816	-0.001	0.450
Wald χ^2 tests of differences between marriage groups in growth intercept effects on slopes (i.e., testing interactions)						
Growth intercept on linear slope			$\chi^2(1)=0.57$ ($p=0.451$)			
Growth intercept on quadratic slope			$\chi^2(1)=1.44$ ($p=0.231$)			
Growth intercept on linear and quadratic slope			$\chi^2(2)=2.60$ ($p=0.273$)			

Note. Variances, residual variances, and zero-inflation thresholds were omitted above to focus on key estimates. As was supported by Wald χ^2 tests with a preliminary model, the above model constrained to be equal (1) the age band 1 and 3 drinking consequence binary thresholds *within* the *never married* group and the *became married* group, (2) the age band 1 and 2 drinking consequence binary thresholds *within* the *other* group, (3) the age band 1 drinking consequence binary threshold *between* the *never married* group and the *became married* group, (4) the age band 2 drinking consequence binary threshold *between* the *never married* group and the *other* group, and (5) the age band 3 drinking consequence binary threshold *across* all three groups. These constraints were placed in all subsequent multiple-group drinking consequence models.

[a] The drinking consequences variables were un-centered (because negative and non-integar values are not permissible in Poisson count models), so the slope intercepts in the above initial model results represent estimates of the linear and quadratic slopes conditional on an intercept value of 1 drinking consequence (the raw value corresponding to a log transformed value of zero; see Table B2 notes for a more detailed explanation).

Table B9

Results of models testing growth-intercept-by-sensation-seeking-change and growth-intercept-by-neuroticism-change interactions predicting alcohol consumption slopes

	Sensation-seeking model		Neuroticism model	
Initial model results	Estimate	*p*-value	Estimate	*p*-value
Effects of personality change[a]				
Predicting the linear slope	0.632	0.028	0.231	0.399
Predicting the quadratic slope	-0.036	0.144	0.012	0.600
Effects of the growth intercept[a]				
Predicting the linear slope	0.058	0.147	0.085	0.044
Predicting the quadratic slope	-0.006	0.042	-0.008	0.012
Effects of the personality-by-growth-intercept interaction				
Predicting the linear slope	0.046	0.257	0.004	0.894
Predicting the quadratic slope	-0.003	0.446	0.002	0.425
Slope intercepts[a]				
Linear slope	0.611	0.001	0.682	0.001
Quadratic slope	-0.061	0.000	-0.067	0.000
Covariances				
Growth intercept with personality change	0.321	0.415	-0.472	0.220
Linear slope with quadratic slope	-0.055	0.613	-0.044	0.712
Wald χ^2 tests				
Interaction effects on both the linear and the quadratic slope tested simultaneously	$\chi^2(2)=2.36$ ($p=0.307$)		$\chi^2(2)=5.71$ ($p=0.058$)	
Conditional effects of neuroticism change at different levels of the growth intercept[b]				
One SD below the mean (2.830)				
Predicting the linear slope	--	--	0.186	0.522
Predicting the quadratic slope	--	--	-0.008	0.711
At the mean (13.199)				
Predicting the linear slope	--	--	0.231	0.399
Predicting the quadratic slope	--	--	0.012	0.600
One SD above the mean (23.568)				
Predicting the linear slope	--	--	0.284	0.577
Predicting the quadratic slope	--	--	0.033	0.454
Conditional effects of the growth intercept at different levels of neuroticism change[b]				
One SD below the mean (decrease of 0.71)				
Predicting the linear slope	--	--	0.083	0.024

Predicting the quadratic slope	--	--	-0.009	0.001
At the mean (decrease of 0.12)				
Predicting the linear slope	--	--	0.085	0.044
Predicting the quadratic slope	--	--	-0.008	0.012
One SD above the mean (increase of 0.47)				
Predicting the linear slope	--	--	0.088	0.100
Predicting the quadratic slope	--	--	-0.007	0.095
Conditional slopes at different combinations of neuroticism change and growth intercept levels[b]				
Low growth intercept, low personality change				
Linear slope	--	--	-0.281	0.402
Quadratic slope	--	--	0.020	0.458
Low growth intercept, mean personality change				
Linear slope	--	--	-0.171	0.591
Quadratic slope	--	--	0.015	0.545
Low growth intercept, high personality change				
Linear slope	--	--	-0.062	0.873
Quadratic slope	--	--	0.010	0.727
Mean growth intercept, low personality change				
Linear slope	--	--	0.545	0.005
Quadratic slope	--	--	-0.074	0.000
Mean growth intercept, mean personality change				
Linear slope	--	--	0.682	0.001
Quadratic slope	--	--	-0.067	0.000
Mean growth intercept, high personality change				
Linear slope	--	--	0.818	0.007
Quadratic slope	--	--	-0.060	0.014
High growth intercept, low personality change				
Linear slope	--	--	1.388	0.003
Quadratic slope	--	--	-0.170	0.000
High growth intercept, mean personality change				
Linear slope	--	--	1.556	0.005
Quadratic slope	--	--	-0.150	0.001
High growth intercept, high personality change				
Linear slope	--	--	1.691	0.029
Quadratic slope	--	--	-0.129	0.036

Note. Variances and residual variances were omitted above to focus on key estimates.

[a] The observed personality change scores were initially mean centered and the alcohol consumption variables were initially centered at the growth

intercept's mean value . Thus, in the above initial model results, the effects of personality change are conditional on the mean level of the growth intercept, the effects of the growth intercept are conditional on the mean level of personality change, and the slope intercepts represent conditional linear and quadratic slopes at the mean levels of both personality change and the growth intercept.

[b] As explained above, the initial model results provide neuroticism change effects at the mean of the growth intercept, growth intercept effects at the mean of neuroticism change, and slope estimates at the mean of both neuroticism change and the growth intercept. Neuroticism change effects at other growth intercept levels, growth intercept effects at other neuroticism change levels, and slope estimates at different combinations of neuroticism change and growth intercept levels were obtained by re-estimating the model after re-scaling the neuroticism change and alcohol consumption variables.

Table B10

Results of models testing growth-intercept-by-sensation-seeking-change and growth-intercept-by-neuroticism-change interactions predicting drinking consequence slopes

	Sensation-seeking model		Neuroticism model	
Initial model results	Estimate	*p*-value	Estimate	*p*-value
Effects of personality change[a]				
Predicting the linear slope	-0.015	0.836	0.116	0.085
Predicting the quadratic slope	0.006	0.437	-0.001	0.847
Effects of the growth intercept[a]				
Predicting the linear slope	-0.080	0.047	-0.090	0.029
Predicting the quadratic slope	0.008	0.055	0.008	0.049
Effects of the personality-by-growth-intercept interaction				
Predicting the linear slope	0.024	0.693	-0.073	0.264
Predicting the quadratic slope	-0.007	0.249	0.008	0.260
Growth intercepts[a]				
Linear slope	0.004	0.934	0.046	0.430
Quadratic slope	-0.019	0.000	-0.026	0.000
Covariances				
Growth intercept with personality change	-0.014	0.840	-0.058	0.398
Wald χ^2 tests				
Interaction effects on both the linear and the quadratic slope tested simultaneously	$\chi^2(2)=2.65$ ($p=0.266$)		$\chi^2(2)=1.30$ ($p=0.522$)	

Note. Variances, residual variances, and zero-inflation thresholds were omitted to focus on key estimates.

[a] The observed personality change scores were initially mean centered and the drinking consequence variables were un-centered (because negative and non-integar values are not permitted in Poisson count models). Thus, in the above initial model results, the effects of personality change are conditional on a growth intercept value of 1 drinking consequence (the raw value corresponding to a log transformed value of zero; see Table B2 notes for a more detailed explanation), the effects of the growth intercept are conditional on the mean level of personality change, and the slope intercepts represent conditional linear and quadratic slopes at the mean level of personality change and a growth intercept value of 1 drinking consequence.

Table B11

Results of models testing sensation-seeking-change-by-marriage and neuroticism-change-by-marriage interactions predicting the alcohol consumption intercept and slopes

	Sensation-seeking model						Neuroticism model					
	Never married group		*Became married* group		*Other* group		*Never married* group		*Became married* Group		*Other* group	
Initial model results	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value
Effects of personality change												
Predicting the growth intercept	5.418	0.013	-1.641	0.356	-0.432	0.770	-0.095	0.972	5.026	0.082	-2.440	0.066
Predicting the linear slope	1.220	0.053	0.498	0.143	0.693	0.105	-1.407	0.056	-0.150	0.804	0.388	0.270
Predicting the quadratic slope	-0.074	0.282	-0.012	0.576	-0.042	0.235	0.167	0.020	0.011	0.782	-0.003	0.913
Intercepts[a]												
Growth intercept	1.072	0.331	-4.355	0.009	0.686	0.305	1.476	0.200	-4.002	0.016	0.461	0.490
Linear slope	0.981	0.000	-0.023	0.951	0.260	0.116	1.326	0.000	-0.127	0.737	0.326	0.064
Quadratic slope	-0.073	0.002	0.002	0.953	-0.036	0.005	-0.109	0.000	0.006	0.816	-0.039	0.003
Wald χ^2 tests of differences between marriage groups in personality change effects on the intercept and slopes (i.e., testing interactions)												
Effects on the linear slope			$\chi^2(1)=1.03$ (p=0.311)						$\chi^2(1)=1.75$ (p=0.186)			
Effects on the quadratic slope			$\chi^2(1)=0.73$ (p=0.394)						$\chi^2(1)=3.62$ (p=0.057)			
Effects on both slopes			$\chi^2(2)=1.03$ (p=0.598)						$\chi^2(2)=4.03$ (p=0.133)			
Conditional slopes at different levels of neuroticism change[b]												
One SD below the mean (- 0.71)												
Linear slope	--	--	--	--	--	--	2.134	0.000	0.022	0.939	0.096	0.672
Quadratic slope	--	--	--	--	--	--	-0.206	0.000	-0.005	0.820	-0.037	0.040
At the mean (- 0.12)												
Linear slope	--	--	--	--	--	--	1.326	0.000	-0.127	0.737	0.326	0.064
Quadratic slope	--	--	--	--	--	--	-0.109	0.000	0.006	0.816	-0.039	0.003
One SD above the mean (+ 0.47)												
Linear slope	--	--	--	--	--	--	0.487	0.278	-0.152	0.785	0.563	0.068
Quadratic slope	--	--	--	--	--	--	-0.009	0.821	0.009	0.818	-0.042	0.067
Wald χ^2 tests of differences between marriage groups (i.e., marriage effects) at different levels of neuroticism change												
One SD below the mean (- 0.71)												
Linear slope difference			--						$\chi^2(1)=11.26$ (p=0.001)			
Quadratic slope difference			--						$\chi^2(1)=11.37$ (p=0.001)			
Both slope differences			--						$\chi^2(2)=12.11$ (p=0.002)			
At the mean (- 0.12)												
Linear slope difference			--						$\chi^2(1)=5.57$ (p=0.018)			
Quadratic slope difference			--						$\chi^2(1)=4.23$ (p=0.040)			
Both slope differences			--						$\chi^2(2)=5.61$ (p=0.060)			
One SD above the mean (+ 0.47)												
Linear slope difference			--						$\chi^2(1)=0.80$ (p=0.372)			
Quadratic slope difference			--						$\chi^2(1)=0.11$ (p=0.744)			
Both slope differences			--						$\chi^2(2)=1.86$ (p=0.395)			

Note. Variances and residual variances were omitted above to focus on key estimates.
[a] Because the personality change variables were initially mean centered, the slope intercepts in the above initial model results represent estimates of the linear and quadratic slopes conditional on the mean of personality change.
[b] As explained above, conditional linear and quadratic slopes at the mean of neuroticism change were obtained directly from the initial model results. Conditional slopes at one standard deviation below and one standard deviation above the neuroticism change mean were obtained by re-estimating the model after re-scaling the neuroticism change variable.

Table B12

Results of models testing sensation-seeking-change-by-marriage and neuroticism-change-by-marriage interactions predicting the drinking consequence intercept and slopes

	Sensation-seeking model						Neuroticism model					
	Never married group		*Became married* group		*Other* group		*Never married* group		*Became married* Group		*Other* group	
Initial model results	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value
Effects of personality change												
Predicting the growth intercept	0.464	0.152	-0.702	0.107	-0.126	0.565	-0.395	0.259	-0.032	0.953	-0.112	0.621
Predicting the linear slope	-0.088	0.520	0.619	0.009	-0.042	0.621	-0.008	0.940	-0.057	0.861	0.125	0.080
Predicting the quadratic slope	0.013	0.452	-0.048	0.031	0.007	0.388	0.019	0.086	0.026	0.382	-0.006	0.450
Intercepts[a]												
Growth intercept	-0.426	0.130	-1.225	0.029	-0.427	0.158	-0.528	0.080	-0.861	0.150	-0.689	0.032
Linear slope	-0.030	0.724	0.591	0.010	-0.051	0.528	0.005	0.958	0.288	0.133	0.033	0.712
Quadratic slope	-0.018	0.037	-0.068	0.000	-0.022	0.001	-0.022	0.011	-0.049	0.001	-0.026	0.000
Wald χ^2 tests of differences between marriage groups in personality change effects on the intercept and slopes (i.e., testing interactions)												
Effects on the linear slope	$\chi^2(1)=6.76$ ($p=0.009$)						$\chi^2(1)=0.02$ ($p=0.884$)					
Effects on the quadratic slope	$\chi^2(1)=4.75$ ($p=0.029$)						$\chi^2(1)=0.05$ ($p=0.827$)					
Effects on both slopes	$\chi^2(2)=6.82$ ($p=0.033$)						$\chi^2(2)=0.05$ ($p=0.975$)					
Conditional slopes at different levels of sensation-seeking change[b]												
One SD below the mean (- 0.74)												
Linear slope	0.024	0.867	0.201	0.286	-0.025	0.817	--	--	--	--	--	--
Quadratic slope	-0.026	0.127	-0.038	0.027	-0.026	0.005	--	--	--	--	--	--
At the mean (- 0.11)												
Linear slope	-0.030	0.724	0.591	0.010	-0.051	0.528	--	--	--	--	--	--
Quadratic slope	-0.018	0.037	-0.068	0.000	-0.022	0.001	--	--	--	--	--	--
One SD above the mean (+ 0.52)												
Linear slope	-0.086	0.358	0.987	0.004	-0.079	0.337	--	--	--	--	--	--
Quadratic slope	-0.009	0.354	-0.099	0.000	-0.017	0.019	--	--	--	--	--	--
	Observed sensation-seeking change model						Observed neuroticism change model					
Wald χ^2 tests of differences between marriage groups (i.e., marriage effects) at different levels of sensation-seeking change												
One SD below the mean (- 0.74)												

Linear slope difference	$\chi^2(1)=0.60$ ($p=0.437$)	--
Quadratic slope difference	$\chi^2(1)=0.24$ ($p=0.623$)	--
Both slope differences	$\chi^2(2)=0.71$ ($p=0.703$)	--
At the mean (- 0.11)		
Linear slope difference	$\chi^2(1)=7.07$ ($p=0.008$)	--
Quadratic slope difference	$\chi^2(1)=8.06$ ($p=0.005$)	--
Both slope differences	$\chi^2(2)=8.25$ ($p=0.016$)	--
One SD above the mean (+ 0.52)		
Linear slope difference	$\chi^2(1)=9.70$ ($p=0.002$)	--
Quadratic slope difference	$\chi^2(1)=11.58$ ($p=0.001$)	--
Both slope differences	$\chi^2(2)=11.63$ ($p=0.003$)	--

Note. Variances, residual variances, and zero-inflated thresholds were omitted above to focus on key estimates.

[a] Because the personality change variables were initially mean centered, the slope intercepts in the above initial model results represent estimates of the linear and quadratic slopes conditional on the mean of age band 2 personality.

[b] As explained above, conditional linear and quadratic slopes at the mean of sensation seeking change were obtained directly from the initial model results. Conditional slopes at one standard deviation below and one standard deviation above the sensation seeking change mean were obtained by re-estimating the model after re-scaling the sensation seeking change variable.

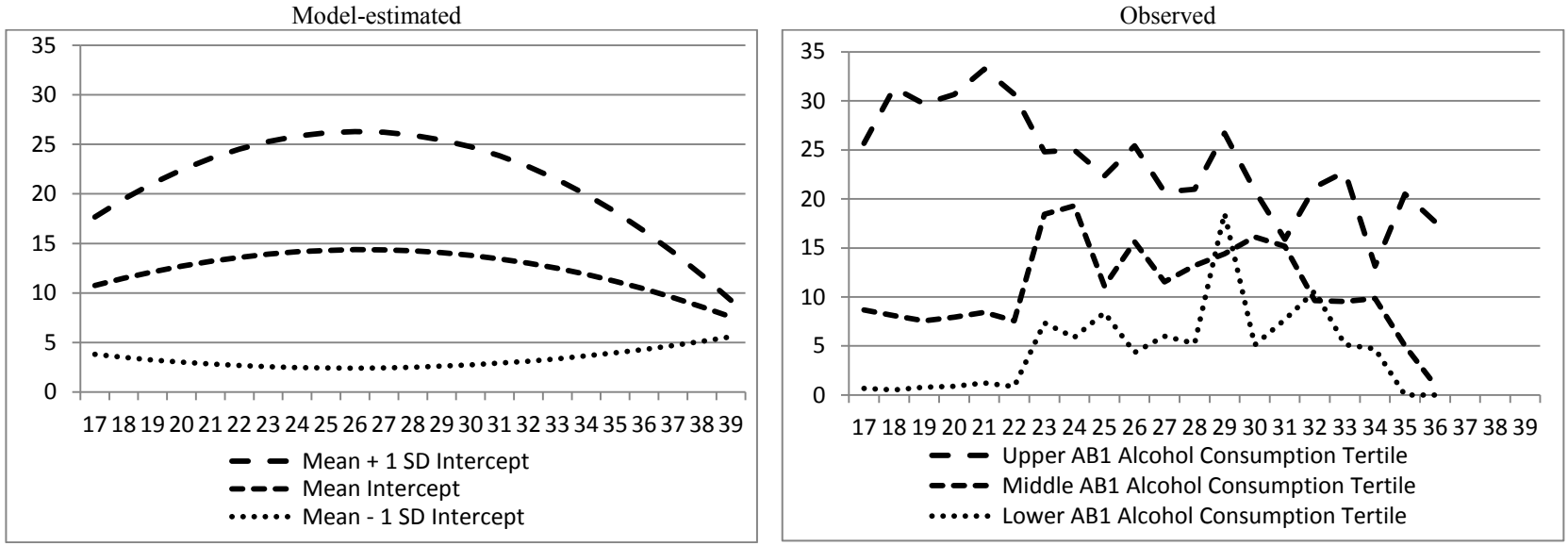

Figure B1. The left panel presents model-estimated conditional alcohol consumption growth curves at three different levels of the growth intercept based on results of probing the growth intercept's effects on the linear and quadratic slopes. These conditional growth curves are depicted at one standard deviation below the growth intercept's mean (2.830), at the growth intercept's mean (13.199), and at one standard deviation above the growth intercept's mean (23.568). For comparison, the right panel presents observed alcohol consumption means by age for three different groups of age band 1 drinkers: Those in the lowest tertile of age band 1 alcohol consumption, those in the middle tertile of age band 1 alcohol consumption, and those in the highest tertile of age band 1 alcohol consumption. AB = age band.

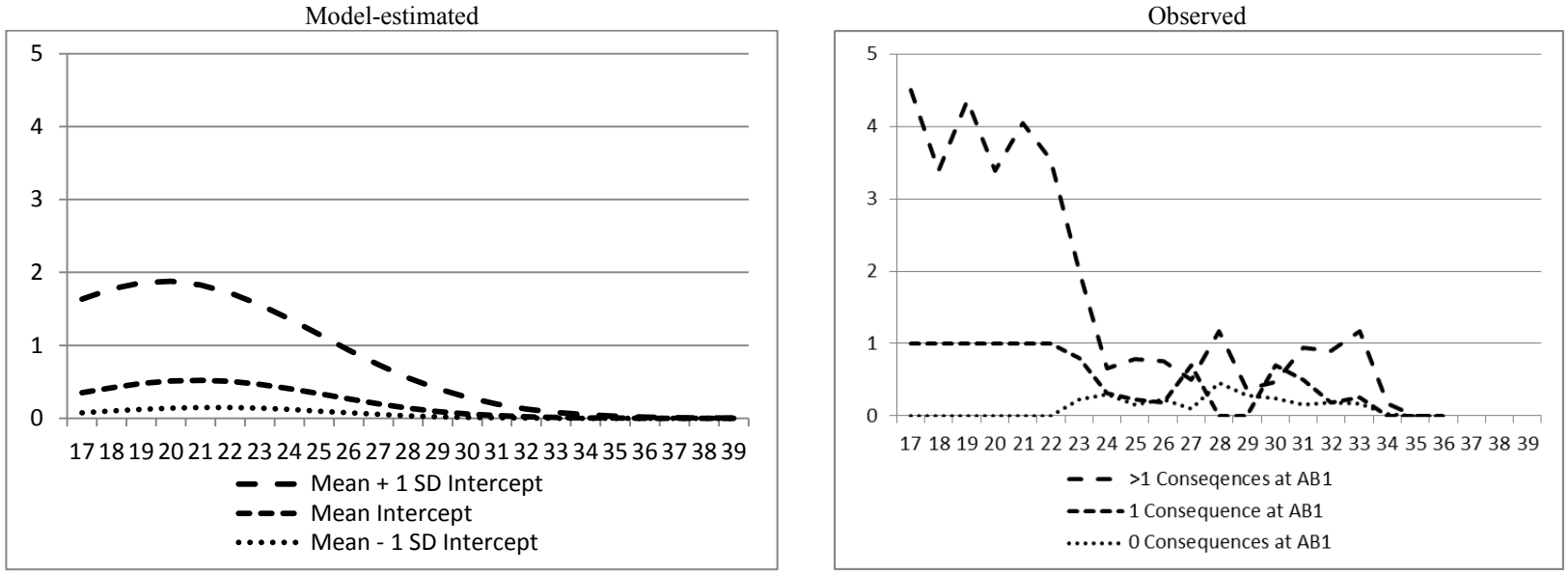

Figure B2. The left panel presents model-estimated conditional drinking consequence growth curves at three different levels of the growth intercept based on results of probing the growth intercept's effects on the linear and quadratic slopes. These conditional growth curves are depicted at one standard deviation below the growth intercept's mean (0.15 consequences), at the growth intercept's mean (0.52 consequences), and at one standard deviation above the growth intercept mean (1.83 consequences). Note that, because Poisson models provide results in a log metric, all model-implied drinking consequence means were exponentiated before plotting. For comparison, the right panel presents observed drinking consequence means by age for three different groups of age band 1 drinkers: Those with 0 drinking consequences at age band 1, those with 1 drinking consequence at age band 1, and those with more than 1 drinking consequence at age band 1. AB = age band.

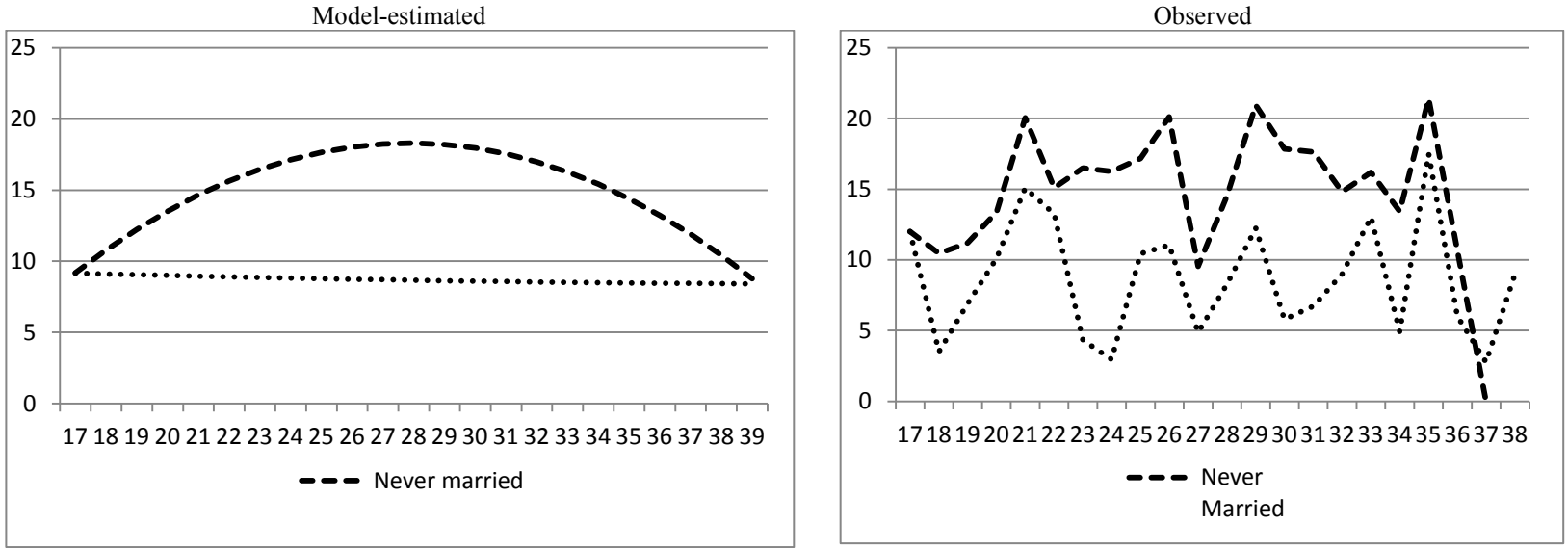

Figure B3. The left panel presents model-estimated alcohol consumption growth curves separately for the *never married* group and the *became married* group. For comparison, the right panel presents observed alcohol consumption means by age separately for the same two groups.

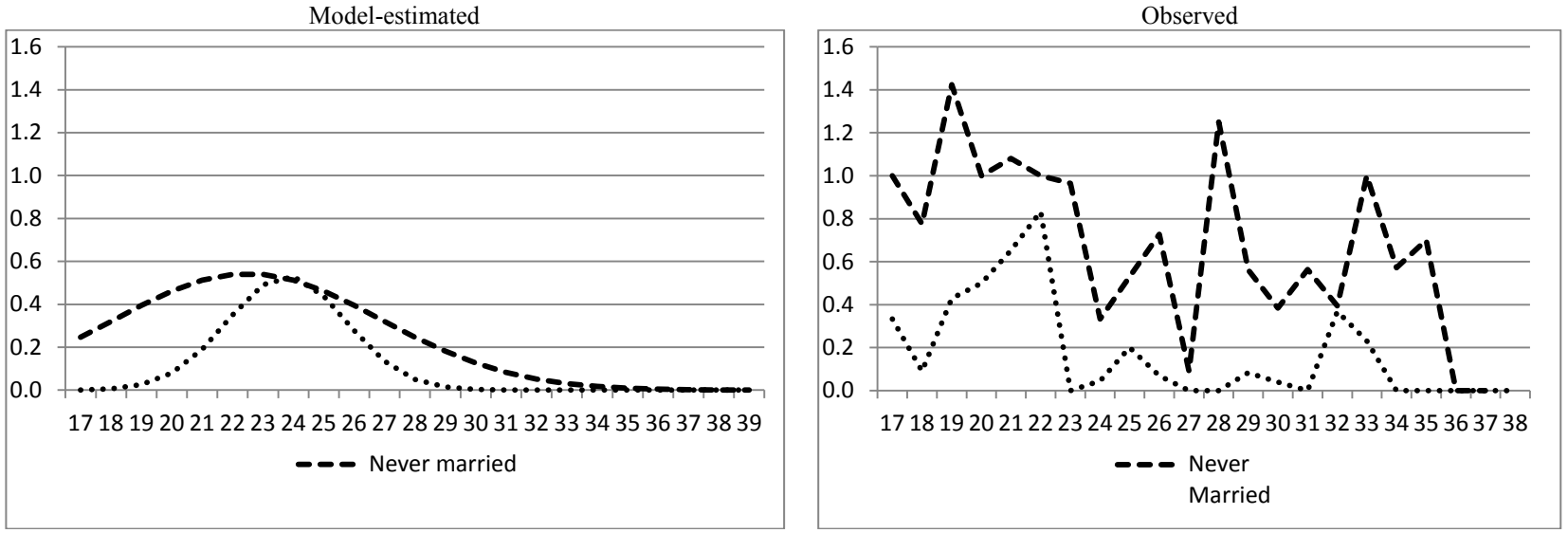

Figure B4. The left panel presents model-estimated drinking consequence growth curves separately for the *never married* group and the *became married* group. Note that, because Poisson models provide results in a log metric, all model-implied drinking consequence means were exponentiated before plotting. For comparison, the right panel presents observed drinking consequence means by age separately for the same two groups.

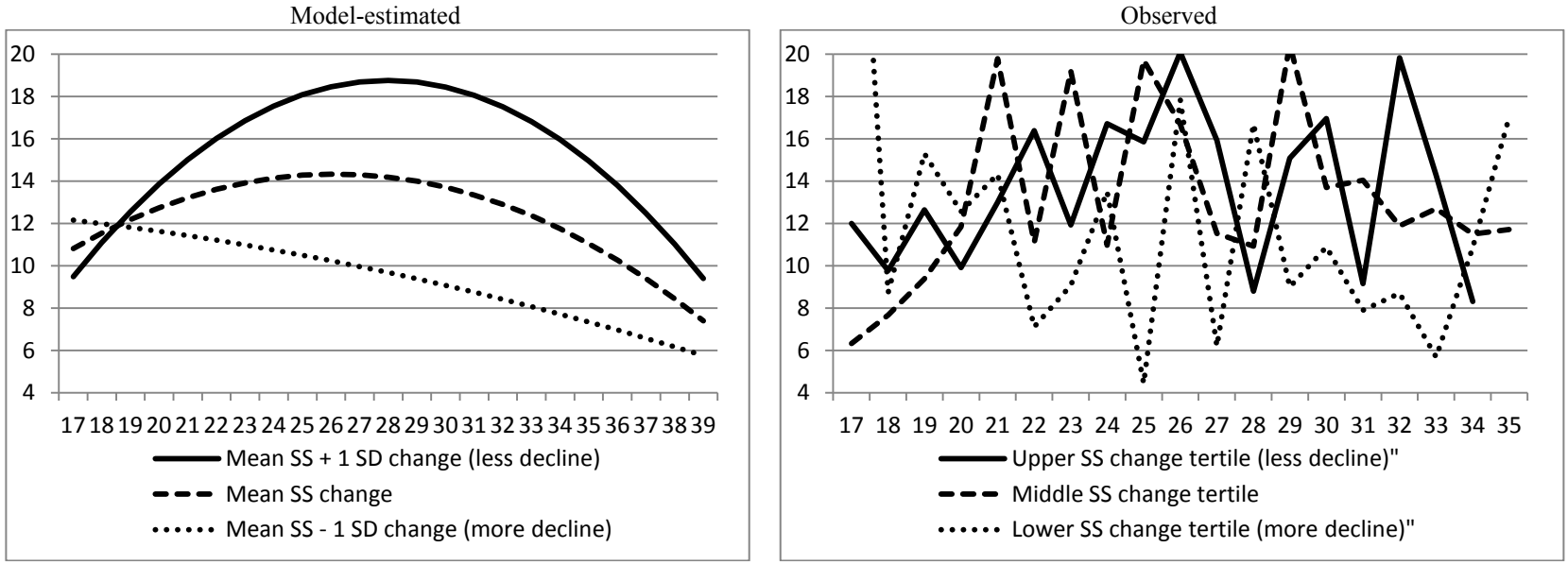

Figure B5. The left panel presents model-estimated conditional alcohol consumption growth curves at different levels of sensation-seeking change based on probing effects of sensation-seeking change on the linear and quadratic slopes. These conditional growth curves are depicted at one standard deviation below the mean of sensation-seeking change (a sensation-seeking decrease of 0.74), at the mean of sensation-seeking change (a sensation-seeking decrease of 0.11), and at one standard deviation above the mean of sensation-seeking change (a sensation-seeking increase of 0.52). For comparison, the right panel presents observed alcohol consumption means by age for those in the lower tertile of observed sensation-seeking change between age bands 1 and 2, those in the middle tertile of observed sensation-seeking change between age bands 1 and 2, and those in the lower tertile of observed sensation-seeking change between age bands 1 and 2. SS = sensation-seeking.

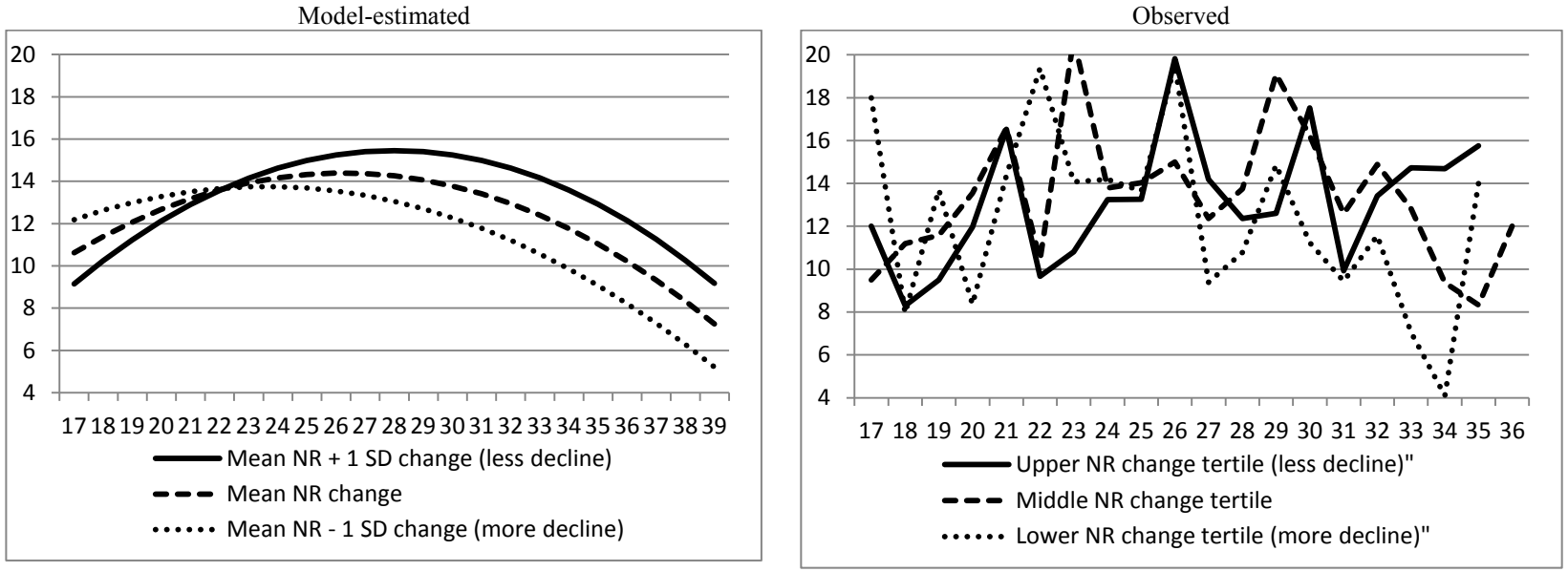

Figure B6. The left panel presents model-estimated conditional alcohol consumption growth curves at different levels of neuroticism change based on probing effects of neuroticism change on the linear and quadratic slopes. These conditional alcohol consumption growth curves are depicted at one standard deviation below the mean of neuroticism change (a decrease of 0.71), at the mean of neuroticism change (a decrease of 0.12), and at one standard deviation above the mean of neuroticism change (an increase of 0.47). For comparison, the right panel presents observed alcohol consumption means by age for (1) those in the lower tertile of observed neuroticism change between age bands 1 and 2, (2) those in the middle tertile of observed neuroticism change between age bands 1 and 2, and (3) those in the lower tertile of observed neuroticism change between age bands 1 and 2. NR = neuroticism.

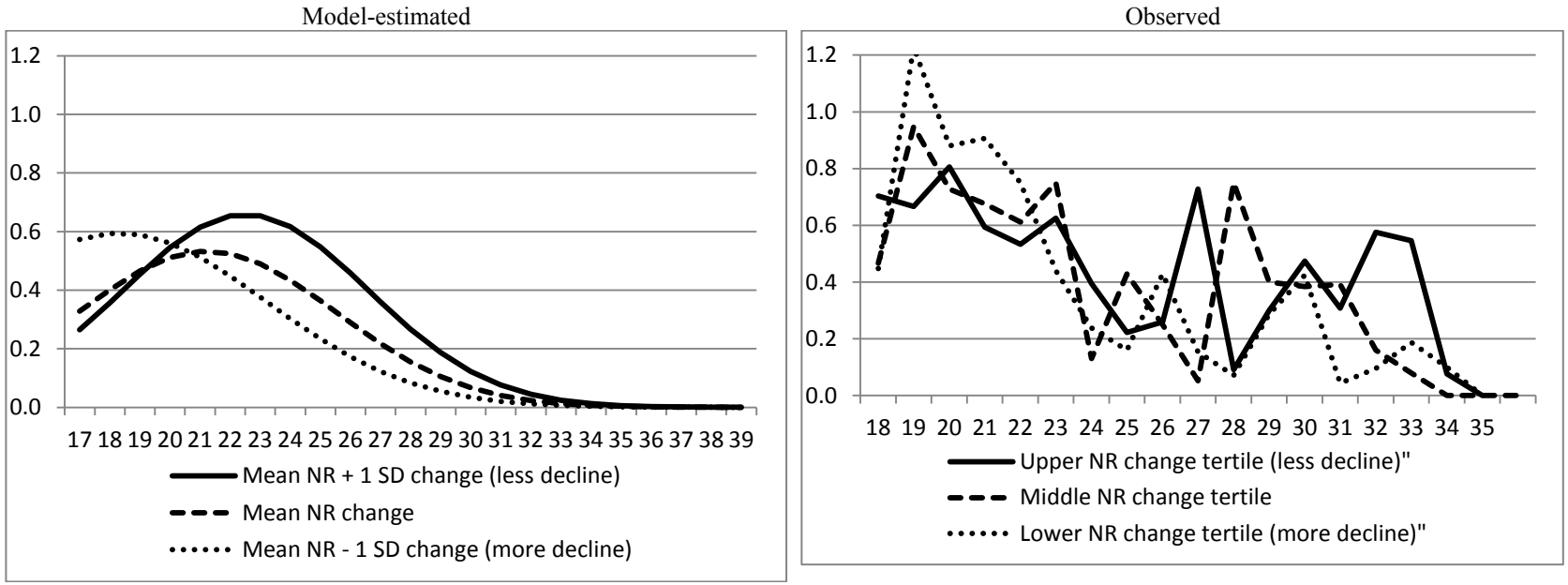

Figure B7. The left panel presents model-estimated conditional drinking consequence growth curves at different levels of neuroticism change based on probing effects of neuroticism change on the linear and quadratic slopes. These conditional growth curves are depicted at one standard deviation below the mean of neuroticism change (a neuroticism decrease of 0.71), at the mean of neuroticism change (a neuroticism decrease of 0.12), and at one standard deviation above the mean of neuroticism change (a neuroticism increase of 0.47). For comparison, the right panel presents observed drinking consequence means by age for those in the lower tertile of observed neuroticism change between age bands 1 and 2, those in the middle tertile of observed neuroticism change between age bands 1 and 2, and those in the lower tertile of observed neuroticism change between age bands 1 and 2. NR = neuroticism.

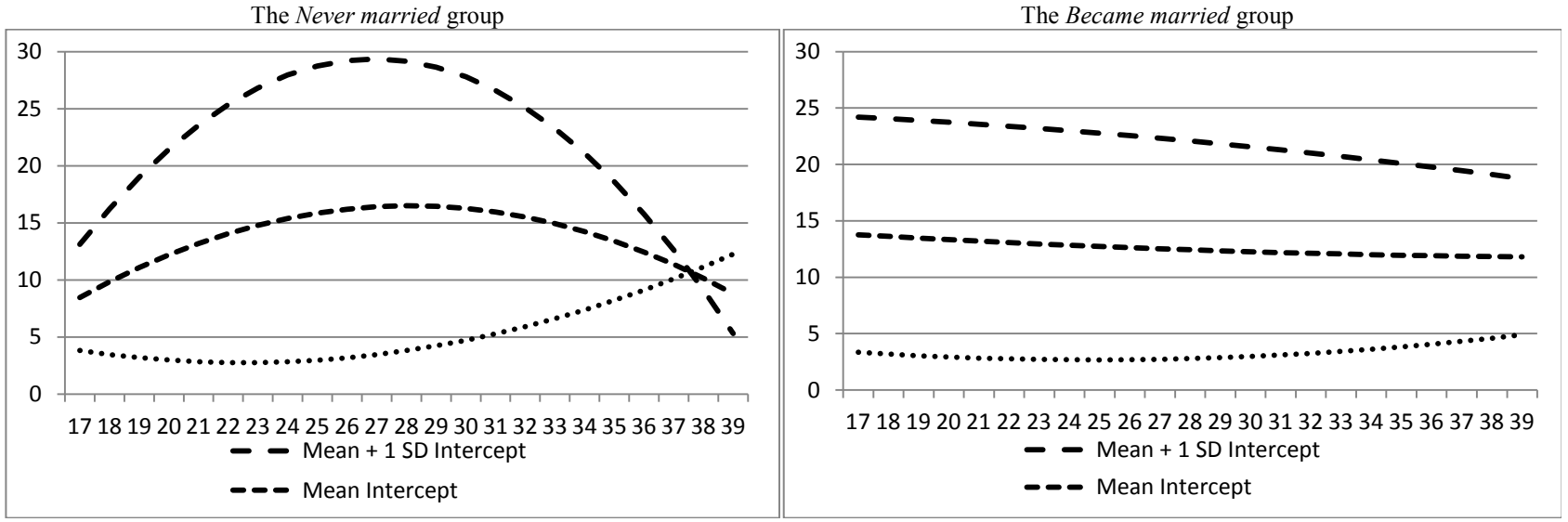

Figure B8. Separately for the *never married* group (left panel) and the *became married* group (right panel), model-estimated conditional alcohol consumption growth curves are presented at three different levels of the alcohol consumption intercept: At one standard deviation below the intercept mean (2.830), at the intercept mean (13.199), and at one standard deviation above the intercept mean (23.568).

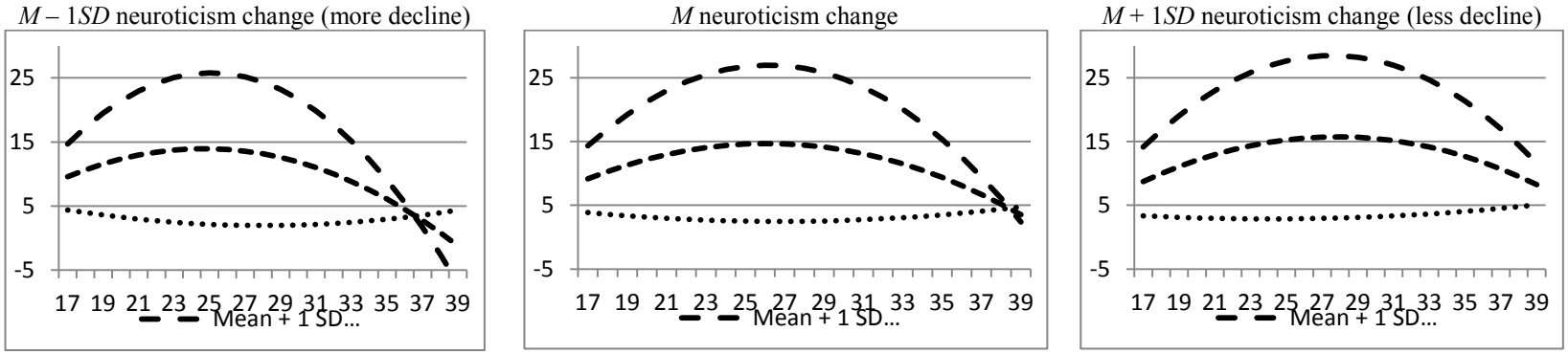

Figure B9. Based on probing the intercept-by-neuroticism-change interaction predicting alcohol consumption, model-estimated conditional alcohol consumption growth curves are presented separately at low (left panel), mean (center panel), and high (right panel) levels of neuroticism change and at three different levels of the alcohol consumption intercept: (1) At one standard deviation below the intercept mean (2.830), (2) at the intercept mean (13.199), and (3) at one standard deviation above the intercept mean (23.568).

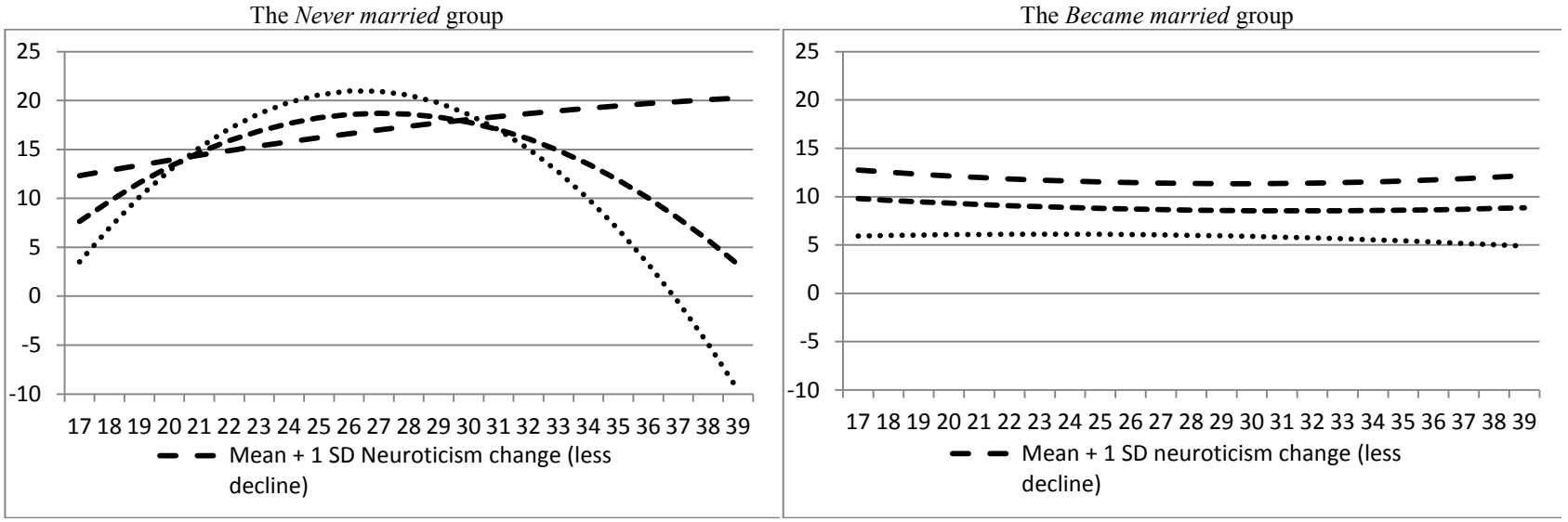

Figure B10. Separately for the *never married* group (left panel) and the *became married* group (right panel), model-estimated conditional alcohol consumption growth curves are presented at three different levels of neuroticism change: At one standard deviation below the neuroticism change mean (a neuroticism decrease of 0.71), at the neuroticism change mean (a neuroticism decrease of 0.12), and at one standard deviation above the neuroticism change mean (a neuroticism increase of 0.47).

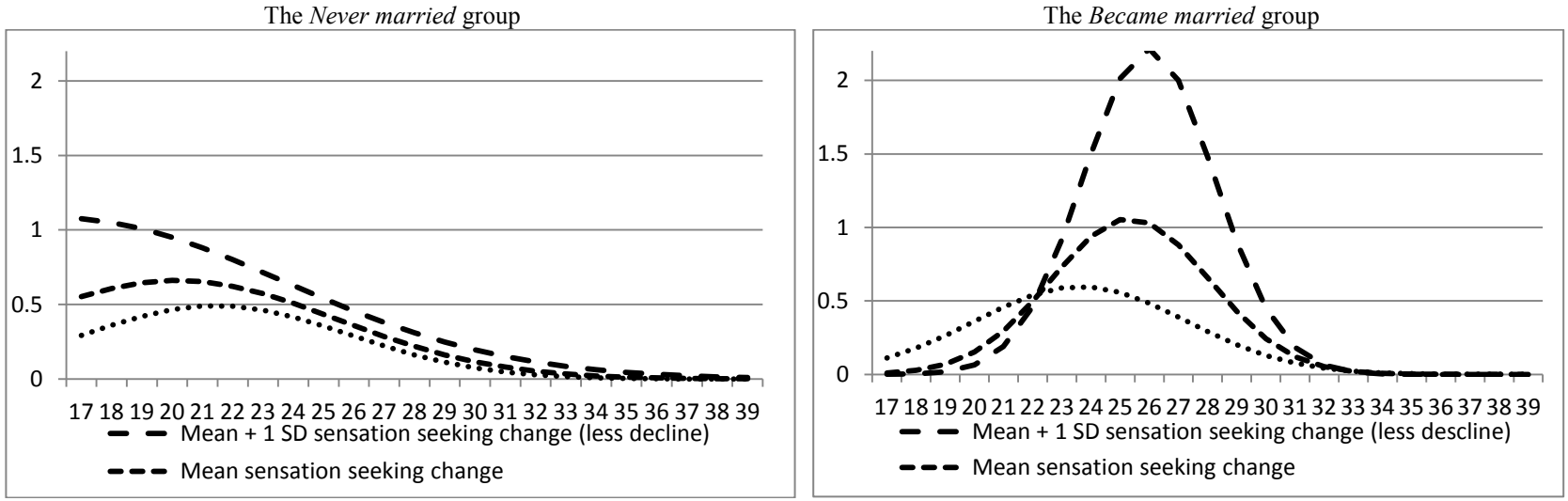

Figure B11. Separately for the *never married* group (left panel) and the *became married* group (right panel), model-estimated conditional drinking consequence growth curves are presented at three different levels of sensation-seeking change: At one standard deviation below the sensation-seeking change mean (a sensation-seeking decrease of 0.74), at the sensation-seeking change mean (a sensation-seeking decrease of 0.11), and at one standard deviation above the sensation-seeking change mean (a sensation-seeking increase of 0.52).

APPENDIX C

ANALYSES TESTING PERSONALITY MAIN AND INTERACTION EFFECTS WITH ALL FOUR METHODS OF MODELING CHANGE IN PERSONALITY

Although the analyses presented in the main body of this document tested effects of personality change using personality change scores only, supplemental analyses tested effects of personality change by estimating effects of age band 2 personality while controlling for age band 1 personality. In addition, when testing main effects of personality, both of these approaches were carried out (a) using simple observed personality variables and (b) using model-estimated latent personality variables. Latent variable models were initially planned for testing interactions as well, but these models frequently failed to converge and thus are not presented or discussed further. Results of all four methods are presented in this appendix. In addition, the final section of this appendix notes the discrepancies in final conclusions of the current study across methods. Note that these models do not control for parental alcoholism and gender because they were tested prior to the inclusion of these covariates.

Hypothesis-testing step 4: Testing personality effects on the intercept, linear slope, and quadratic slope.

As a preliminary step toward estimating models with latent personality variables, latent personality measurement models were constructed for both sensation-seeking and neuroticism. One-factor, single-time-point models showed good fit at both age band 1 and age band 2 for both sensation-seeking and neuroticism (see columns 1 and 2 of Tables C1 and C2). However, subsequent two-factor, two-time-point models showed unacceptable fit for both sensation-seeking and neuroticism (see column 3 of Tables C1 and C2). Modification indices suggested that item-specific autocorrelations were needed between age bands 1 and 2, and adding these autocorrelations resulted in good fitting models for both sensation-seeking and neuroticism (see column 4 of Tables C1 and C2). These models were then used to test measurement invariance between age bands 1 and 2. For both sensation-seeking and neuroticism, Wald χ^2 tests supported invariance of both factor loadings ($\chi^2(5)=7.982$; $p=0.157$; $\chi^2(12)=9.535$; $p=0.657$; respectively) and residual variances ($\chi^2(5)=4.501$; $p=0.480$; $\chi^2(12)=15.501$; $p=0.215$; respectively), but did not support invariance of intercepts ($\chi^2(5)=39.147$; $p<0.0001$; $\chi^2(12)=90.211$; $p<0.0001$; respectively). Subsequent models constraining factor loadings and residual variances between the two age bands showed good fit (see Column 5 of Tables C1 and C2), so these constraints were maintained in all subsequent single-group models. Finally, these models were modified to include latent change scores reflecting sensation-seeking and neuroticism change between age bands 1 and 2 (see column 6 of Tables C1 and C2).

Upon estimating these latent personality measurement models, the final quadratic alcohol consumption and drinking consequence models from hypothesis-testing step 1 were modified to test effects of personality on the growth intercept, the linear slope, and the quadratic slope. As explained above, models included those testing effects of personality change scores and those testing effects of age band 2 personality controlling for effects of age band 1 personality, and both types of models were estimated with both observed and latent personality variables, thus resulting in a total of four models for sensation-seeking and four models for neuroticism.

Alcohol consumption model results: Effects of sensation-seeking. Across the four alcohol consumption models testing sensation-seeking effects (see Tables C3 and C4), sensation-seeking generally significantly predicted both the linear and the quadratic alcohol consumption slope. Further, Wald χ^2 tests of sensation-seeking effects on both slopes simultaneously were significant in both the latent and the observed sensation-seeking change models and marginally significant in both the latent and the observed variable models testing age band 2 sensation-seeking effects (while controlling for age band 1 sensation-seeking). See the main document for probing and interpretation of the observed sensation-seeking change effect

Alcohol consumption model results: Effects of neuroticism. Across the four alcohol consumption models testing neuroticism effects (see Tables C3 and C4), neuroticism failed to significantly predict the alcohol consumption linear or quadratic slope. However, Wald χ^2 tests of neuroticism effects on both slopes simultaneously were significant in the observed neuroticism change model and marginally significant in the latent variable model testing age band 2 neuroticism effects while controlling for age band 1 neuroticism. See the main document for probing and interpretation of the observed neuroticism change effect.

Drinking consequence model results: Effects of sensation-seeking. Across the four drinking consequence models testing sensation-seeking effects, sensation-seeking generally failed to significantly predict the drinking consequences linear or quadratic slope (see Tables C5 and C6). However, Wald χ^2 tests of sensation-seeking effects on both slopes simultaneously were marginally significant in the latent

sensation-seeking change model and significant in the both the latent and observed variable models testing age band 2 sensation-seeking controlling for age band 1 sensation-seeking. Because this effect was not detected with the observed change score models presented in the main document, it was not probed in the main document. Thus, the latent sensation-seeking change effect was probed here in this appendix by obtaining and plotting conditional alcohol consumption growth intercepts and slopes at three different levels of latent sensation-seeking change (see Table C5 and Figure C1). Figure C1 suggests that greater decreases in sensation-seeking corresponded with earlier and more dramatic declines in drinking consequences, although the magnitude of this effect appears quite minimal.

Drinking consequence model results: Effects of neuroticism. Across the four drinking consequence models testing neuroticism effects (see Tables C5 and C6), neuroticism generally predicted the linear but not the quadratic drinking consequences slope. However, Wald χ^2 tests of neuroticism effects on both slopes simultaneously were significant across all four models. See the main document for probing and interpretation of the observed neuroticism change effect.

Hypothesis-testing step 6: Testing growth-intercept-by-personality interaction effects on the linear slope and the quadratic slope.

The final quadratic alcohol consumption and drinking consequence models from hypothesis-testing step 1 were modified to test interactions of the growth intercept with sensation-seeking and neuroticism. As explained above, models included those testing effects of personality change scores and those testing effects of age band 2 personality controlling for effects of age band 1 personality, and only observed variable models are presented because latent variable models frequently failed to converge. For all models, the linear slope and the quadratic slope were predicted by the growth intercept, the personality variable (either personality change or age band 2 personality), and a growth-intercept-by-personality interaction (specified using the Mplus command XWITH).

Alcohol consumption model results: Growth-intercept-by-sensation-seeking interactions. In both alcohol consumption models testing growth-intercept-by-sensation-seeking interactions (see Tables C7 and C8), the interactions failed to significantly predict either the linear or the quadratic alcohol consumption slope. Further, Wald χ^2 tests of interaction effects on both slopes simultaneously were non-significant for both models. Thus, these interactions were not probed.

Alcohol consumption model results: Growth-intercept-by-neuroticism interactions. In both alcohol consumption models testing growth-intercept-by-neuroticism interactions (see Tables C7 and C8), the interactions failed to significantly predict either the linear or quadratic alcohol consumption slope. However, for the neuroticism change score model only (see Table C7), a Wald χ^2 test of interaction effects on both slopes simultaneously was marginally significant. See the main document for probing and interpretation of this interaction.

Drinking consequence model results: Intercept-by-sensation-seeking interactions. In both drinking consequence models testing growth-intercept-by-sensation-seeking interactions (see Tables C9 and C10), the interactions failed to significantly predict either the linear or quadratic drinking consequence slope both when these effects were tested separately and when they were tested simultaneously. Thus, these interactions were not probed.

Drinking consequence model results: Intercept-by-neuroticism interactions. In the drinking consequence model testing the growth intercept's interaction with neuroticism change (see Table C9), the interaction failed to significantly predict either the linear or quadratic drinking consequence slope when both of these effects were tested separately and when they were tested simultaneously. In contrast, in the drinking consequence model testing the growth intercept's interaction with age band 2 neuroticism (controlling for age band 1 neurticism), the interaction significantly predicted the quadratic slope but not the linear slope, and a Wald χ^2 test of these two effects simultaneously was marginally significant (see Table C10). Because this interaction was not detected in the neuroticism change score model presented in the main document, it was not probed in the main document. Thus, this interaction was probed here in this appendix as described below.

Effects of age band 2 neuroticism were obtained at three different levels of the growth intercept (see Table C10), effects of the growth intercept were obtained at three different levels of age band 2 neuroticism (see Table C10), and conditional linear and quadratic slope estimates were obtained and plotted at the nine different combinations of these three growth intercept and age band 2 neuroticism levels (see Table C10 and Figure C2). Consistent with hypotheses, higher drinking consequence growth intercept values most strongly predicted decreased drinking consequences at relatively low levels of age band 2

neuroticism, and lower age band 2 neuroticism most strongly predicted decreased drinking consequences at relatively high levels of the drinking consequence growth intercept. Thus, the earliest and most dramatic drinking consequence decreases were observed when relatively high late adolescent drinking consequences were combined with relatively dramatic decreases in neuroticism.

Hypothesis-testing step 7: Testing personality-by-marriage interaction effects on the linear slope and the quadratic slope.

The final quadratic alcohol consumption and drinking consequence models from hypothesis-testing step 1 were modified to test interactions of sensation-seeking and neuroticism with marriage. Specifically, as was done when testing main effects of marriage in hypothesis-testing step 3, the final models from hypothesis-testing step 1 were estimated as multiple-group models with a *never married* group (n=198), a *became married* group (*n*=143), and an *other* group (*n*=503). However, unlike in hypothesis-testing step 3, personality variables were included as predictors of the linear and quadratic slope. Thus, personality-by-marriage interactions were tested through Wald χ^2 tests of whether personality effects on the slopes differed between the *never married* group and the *became married* group. As explained above, models included those testing effects of personality change scores and those testing effects of age band 2 personality controlling for effects of age band 1 personality, and only observed variable models are presented because latent variable models frequently failed to converge.

Alcohol consumption model results: Sensation-seeking-by-marriage interactions. In both alcohol consumption models with sensation-seeking variables (see Tables C11 and C12), Wald χ^2 tests consistently failed to show evidence for sensation-seeking-by-marriage interactions. Specifically, in both models, sensation-seeking effects on both the linear slope and the quadratic slope did not differ between the *never married* group and the *became married* group either when these differences were tested separately or when they were tested simultaneously. Thus, these interactions were not probed.

Alcohol consumption model results: Neuroticism-by-marriage interactions. In the alcohol consumption models with neuroticism variables, there was some support for the neuroticism-by-marriage interaction in the neuroticism change model (see Table C11) but not in the age band 2 neuroticism model (see Table C12). Specifically, in the neuroticism change model, the effect of neuroticism change on the quadratic slope differed marginally significantly between the two marriage groups, although the neuroticism effect on the linear slope did not differ between the two groups and a Wald χ^2 test of both group differences simultaneously was non-significant. In contrast, in the age band 2 neuroticism model, neuroticism effects on both the linear slope and the quadratic slope did not differ significantly between the two marriage groups either when tested separately or when tested simultaneously. See the main document for probing and interpretation of the neuroticism change interaction.

Drinking consequence model results: Sensation-seeking-by-marriage interactions. In the drinking consequence models with sensation-seeking variables, there was support for the sensation-seeking-by-marriage interaction in the sensation-seeking change model only. Specifically, in the sensation-seeking change model (see Table C13), sensation-seeking effects on both the linear slope and the quadratic slope differed significantly between the two marriage groups both when these differences were tested separately and when they were tested simultaneously. In contrast, in the age band 2 sensation-seeking model (see Table C14), although the sensation-seeking effect on the linear slope differed marginally significantly between the two marriage groups, the sensation-seeking effect on the quadratic slope did not differ between the two groups and a Wald χ^2 test of both group differences simultaneously was non-significant. See the main document for probing and interpretation of the sensation-seeking change interaction.

Drinking consequence model results: Neuroticism-by-marriage interactions. In both drinking consequence models with neuroticism variables (see Tables C13 and C14), Wald χ^2 tests consistently failed to show evidence for neuroticism-by-marriage interactions. Specifically, for both models, neuroticism effects on both the linear slope and the quadratic slope did not differ significantly between the two marriage groups either when these differences were tested separately or when they were tested simultaneously. Thus, these interactions were not probed.

Hypothesis-testing step 8: Testing hypothesized personality main effects and interactions controlling for parental alcoholism and gender

As explained in the main body of this document, earlier models were re-estimated with parental alcoholism and gender included as covariates to assess the extent to which effects were altered by controlling for these covariates. Whereas the main body of this document only presents these analyses for

personality change score models, below results are also presented for models that tested effects of age band 2 personality while controlling for age band 1 personality.

Alcohol consumption model results: Main personality effects. Upon controlling for parental alcoholism and gender, personality effects were extremely similar to those obtained without these covariates (see Table C15). Thus, analyses controlling for parental alcoholism and gender confirmed earlier evidence for main effects of sensation-seeking with both methods as well as the earlier evidence for neuroticism effects only with the observed neuroticism change method.

Drinking consequence model results: Main personality effects. Upon controlling for parental alcoholism and gender (see Table C16), effects of neuroticism with both methods and effects on sensation-seeking change were very similar to those obtained without these covariates. In contrast, the effect of age band 2 neuroticism went from marginally significant to non-significant when predicting the quadratic slope and went from significant to marginally significant when predicting both slopes simultaneously. Thus, analyses controlling for parental alcoholism and gender confirmed earlier evidence for main effects of neuroticism with both methods, confirmed the earlier lack of evidence for sensation-seeking change effects, and provided weaker evidence for age band 2 sensation-seeking effects.

Alcohol consumption model results: Growth-intercept-by-personality interactions. Upon controlling for covariates (see Table C17), the growth-intercept-by-neuroticism-change interaction went from marginally significant to non-significant when predicting both slopes simultaneously, whereas when tested separately effects on the two slopes were non-significant both before and after controlling for covariates. The three other growth-intercept-by-personality interactions were consistently non-significant both with and without covariates. Thus, analyses controlling for parental alcoholism and gender resulted in a lack of any evidence for growth-intercept-by-personality interactions.

Drinking consequence model results: Growth-intercept-by-personality interactions. Effects of the four growth-intercept-by-personality interactions were extremely similar before and after controlling for covariates (see Table C18). Thus, analyses controlling for parental alcoholism and gender confirmed the earlier weak evidence for the growth-intercept-by-age-band-2-neuroticism interaction and confirmed the earlier lack of evidence for the other three growth-intercept-by-personality interactions.

Alcohol consumption model results: Personality-by-marriage interactions. Both before and after controlling for covariates (see Table C17), the neuroticism-change-by-marriage interaction was marginally significant when predicting the quadratic slope only. Also, upon controlling for covariates, the age-band-2-sensation-seeking-by-marriage interaction went from non-significant to marginally significantly when predicting the quadratic slope only. The other two personality-by-marriage interactions were consistently non-significant both before and after controlling for covariates. Thus, analyses controlling for parental alcoholism and gender confirmed the earlier weak evidence for a neuroticism-change-by-marriage interaction, provided the first evidence (albeit weak) for an age-band-2-sensation-seeking-by-marriage interaction, and confirmed the earlier lack of evidence for the other two personality-by-marriage interactions.

The newly detected age-band-2-sensation-seeking-by-marriage interaction was probed as is shown in Figure C3. Similar to the previously detected neuroticism-change-by-marriage interaction, effects of age-band-2-sensation-seeking were more pronounced among the *never married* group. However, in contrast to the neuroticism-change-by-marriage interaction, marriage effects (i.e., slope differences between marriage groups) were more pronounced at relatively *high* levels of age-band-2-sensation-seeking.

Drinking consequence model results: Personality-by-marriage interactions. Whereas the sensation-seeking-change-by-marriage interaction initially significantly predicted both slopes when tested separately and when tested simultaneously, upon controlling for covariates this interaction predicted the linear slope but not the quadratic slope and marginally significantly predicted both slopes simultaneously (see Table C18). The other three personality-by-marriage interactions were consistently non-significant both before and after controlling for covariates. Thus, analyses controlling for parental alcoholism and gender provided weaker evidence for the sensation-seeking-change-by-marriage interaction and confirmed the earlier lack of evidence for the other three personality-by-marriage interactions.

Hypothesis-testing step 9: Testing parental alcoholism and gender moderation of main personality effects.

Analyses were conducted to test whether main personality effects were moderated by parental alcoholism or gender. Whereas the main body of this document only presents these analyses for personality

change score models, below results are also presented for models that tested effects of age band 2 personality while controlling for age band 1 personality.

Parental alcoholism moderation. When predicting the alcohol consumption slopes (see Table C19), among the four main personality effects, parental alcoholism only moderated the effect of neuroticism change when predicting both slopes simultaneously. This interaction was such that neuroticism change effects were non-significant among non-COAs ($\chi^2(2)=0.415$, $p=0.813$) but significant among COAs ($\chi^2(2)=11.782$, $p=0.003$). When predicting the drinking consequence slopes (see Table C19), parental alcoholism did not moderate any of the four main personality effects.

Gender moderation. When predicting the alcohol consumption slopes (see Table C20), among the four main personality effects, gender moderated effects of both age band 2 sensation-seeking and age band 2 neuroticism. These interactions were such that among females the sensation-seeking effect was significant ($\chi^2(2)=15.03$, $p=0.005$) and the neuroticism effect was marginally significant ($\chi^2(2)=5.31$, $p=0.070$), whereas among males both effects were non-significant ($\chi^2(2)=2.239$, $p=0.327$; $\chi^2(2)=1.46$, $p=0.482$; respectively). When predicting the drinking consequence slopes (see Table C20), gender did not moderate any of the four main personality effects.

Hypothesis-testing step 10: Mediated effects of parental alcoholism and gender through personality.

Models were estimated to test parental alcoholism and gender as distal predictors of alcohol consumption and drinking consequence slopes with mediated effects through personality. Whereas the main body of this document only presents these analyses for personality change score models, below results are also presented for models that tested effects of age band 2 personality while controlling for age band 1 personality.

Parental alcoholism mediation model results. When predicting the alcohol consumption slopes, among the four personality effects, there was evidence for mediated effects of parental alcoholism only through age band 2 sensation-seeking (controlling for age band 1 levels; see Table C21). Specifically, parental alcoholism predicted higher levels of age band 2 sensation-seeking, which in turn predicted the alcohol consumption slopes. The same was found when the predicting drinking consequence slopes (see Table C21) except that the effect of age band 2 sensation-seeking on the drinking consequence slopes was only marginally significant and only found when predicting the two slopes simultaneously.

Gender mediation model results. When predicting the alcohol consumption slopes, among the four personality effects, there was evidence for mediated effects of gender through both sensation-seeking effects but not through either of the neuroticism effects (see Table C22). Specifically, male gender predicted both higher sensation-seeking change scores (i.e., less decline) and higher age band 2 sensation-seeking (controlling for age band 1 levels), and these two variables in turn predicted the alcohol consumption slopes. In contrast, when predicting the drinking consequence slopes, there was only evidence for gender mediation through age band 2 sensation-seeking (see Table C22). Specifically, although male gender again predicted both higher sensation-seeking change and higher age band 2 sensation-seeking, sensation-seeking change failed to predict either slope whereas age band 2 sensation-seeking marginally significantly predicting the two slopes only when tested simultaneously.

Comparing results of the observed personality change score method to results of other methods

As explained above, this final section of this appendix discusses the discrepancies of results of the observed change score method with the results of other methods. Because final conclusions regarding personality main and personality interaction effects with growth intercepts and marriage will be based on the analyses controlling for parental alcoholism and gender, this section will discuss discrepancies in these effects from analyses controlling for parental alcoholism and gender only. This section will also discuss discrepancies in results of tests of moderation of personality effects by parental alcoholism and gender, as well as tests of mediation of parental alcoholism and gender effects by personality.

Main personality effects. When predicting the alcohol consumption slopes (see Table C15), sensation-seeking effects were supported both by the change score method and by the age band 2 method (controlling for age band 1), whereas neuroticism effects were only supported by the change score method. When predicting the drinking consequence slopes (see Table C16), sensation-seeking effects were supported only marginally significantly by the age band 2 method, whereas neuroticism effects were supported by both methods.

G**rowth-intercept-by-personality interactions.** When predicting the alcohol consumption slopes (see Table C17), neither of the two methods supported either sensation-seeking or neuroticism interactions with the growth intercept. When predicting the drinking consequence slopes (see Table C18), neither of the

two methods supported sensation-seeking-by-growth-intercept interactions, and neuroticism-by-growth intercept interactions were supported only marginally significantly by the age band 2 method.

Marriage-by-personality interactions. When predicting the alcohol consumption slopes (see Table C17), sensation-seeking-by-marriage interactions were supported only marginally significantly by the age band 2 method, whereas neuroticism-by-marriage interactions were supported only marginally significantly by the change score method. When predicting the drinking consequence slopes (see Table C18), sensation-seeking by marriage interactions were supported only marginally significantly by the change score method, whereas neither method supported neuroticism-by-marriage interactions.

Moderation of personality effects by parental alcoholism. When predicting the alcohol consumption slopes (see Table C19), parental alcoholism was not found to moderate sensation-seeking effects with either method, whereas parental alcoholism was found to moderate neuroticism effects only with the change score method. When predicting the drinking consequence slopes (see Table C19), parental alcoholism was not found to moderate sensation-seeking or neuroticism effects with either of the two methods.

Moderation of personality effects by gender. When predicting the alcohol consumption slopes (see Table C20), gender was found to moderate both sensation-seeking and neuroticism effects only with the age band 2 method. When predicting the drinking consequence slopes (see Table C21), gender was not found to moderate sensation-seeking or neuroticism effects with either of the two methods.

Mediated effects of parental alcoholism through personality. When predicting the alcohol consumption slopes (see Table C21), sensation-seeking was found to mediate the parental alcoholism effect only with the age band 2 method, whereas neuroticism was not found to mediate the parental alcoholism effect with either method. Similarly, when predicting the drinking consequence slopes (see Table C21), sensation-seeking was found to mediate the parental alcoholism effect only marginally significantly with the age band 2 method, whereas neuroticism was not found to mediate the parental alcoholism effect with either method.

Mediated effects of gender through personality. When predicting the alcohol consumption slopes (see Table C22), sensation-seeking was found to mediate the gender effect with both methods, whereas neuroticism was not found to mediate the gender effect with either method. In contrast, when predicting the drinking consequence slopes (see Table C22), sensation-seeking was found to mediate the gender effect only marginally significantly with the age band 2 method, whereas neuroticism was again not found to mediate the gender effect with either method.

Table C1

Results of latent sensation-seeking measurement models

	Age band 1 only		Age band 2 only		Age bands 1 & 2 unconstrained without autocorrelations		Age bands 1 & 2 unconstrained with autocorrelations		Age bands 1 & 2 constrained with autocorrelations		Age bands 1 & 2 constrained with autocorrelations & latent change scores	
	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value
Std. factor loadings												
AB1-SS item loadings												
Item 1	0.652	0.000	--	--	0.665	0.000	0.662	0.000	0.636	0.000	0.636	0.000
Item 2	0.669	0.000	--	--	0.656	0.000	0.656	0.000	0.596	0.000	0.596	0.000
Item 3	0.450	0.000	--	--	0.475	0.000	0.437	0.000	0.467	0.000	0.467	0.000
Item 4	0.590	0.000	--	--	0.588	0.000	0.593	0.000	0.580	0.000	0.580	0.000
Item 5	0.627	0.000	--	--	0.620	0.000	0.634	0.000	0.645	0.000	0.645	0.000
AB2-SS item loadings												
Item 1	--	--	0.640	0.000	0.640	0.000	0.638	0.000	0.660	0.000	0.660	0.000
Item 2	--	--	0.570	0.000	0.583	0.000	0.582	0.000	0.621	0.000	0.621	0.000
Item 3	--	--	0.521	0.000	0.539	0.000	0.512	0.000	0.491	0.000	0.491	0.000
Item 4	--	--	0.595	0.000	0.588	0.000	0.592	0.000	0.605	0.000	0.605	0.000
Item 5	--	--	0.681	0.000	0.667	0.000	0.678	0.000	0.669	0.000	0.669	0.000
Unstd. regression paths												
AB1-SS to AB2-SS	--	--	--	--	--	--	--	--	--	--	@1	--
Unstd. factor loadings												
Δ-SS by AB2-SS	--	--	--	--	--	--	--	--	--	--	@1	--
Std. factor covariances												
AB1-SS with AB2-SS	--	--	--	--	0.680	0.000	0.593	0.000	0.597	0.000	--	--
AB1-SS with Δ-SS	--	--	--	--	--	--	--	--	--	--	-0.390	0.000
Std. item autocorrelations												
Item 1 with item 1	--	--	--	--	--	--	0.295	0.000	0.296	0.000	0.296	0.000
Item 2 with item 2	--	--	--	--	--	--	0.311	0.000	0.313	0.000	0.313	0.000
Item 3 with item 3	--	--	--	--	--	--	0.418	0.000	0.416	0.000	0.416	0.000
Item 4 with item 4	--	--	--	--	--	--	0.196	0.004	0.190	0.005	0.190	0.005
Item 5 with item 5	--	--	--	--	--	--	0.158	0.014	0.158	0.014	0.158	0.014
Std. factor variances												
AB1-SS	@1	--	--	--	@1	--	@1	--	@1	--	@1	--
AB2-SS	--	--	@1	--	@1	--	@1	--	@1	--	--	--
Δ-SS	--	--	--	--	--	--	--	--	--	--	@1	--
Unstd. residual variances												
AB2-SS	--	--	--	--	--	--	--	--	--	--	@0	--
Fit indices												
χ^2	$\chi^2(5)=17.720$ ($p=0.003$)		$\chi^2(5)=20.609$ ($p=0.001$)		$\chi^2(34)=174.463$ ($p=0.000$)		$\chi^2(29)=58.931$ ($p=0.001$)		$\chi^2(38)=69.122$ ($p=0.002$)		$\chi^2(38)=69.122$ ($p=0.002$)	
RMSEA	0.071		0.071		0.075		0.037		0.033		0.033	
CFI	0.968		0.965		0.867		0.972		0.970		0.970	
TLI	0.935		0.930		0.824		0.956		0.965		0.965	
SRMR	0.027		0.029		0.061		0.035		0.046		0.046	

Note. AB1-SS = age band 1 sensation-seeking factor; AB2-SS = age band 2 sensation-seeking factor; Δ-SS = latent sensation-seeking change score. Item numbering above is consistent with item numbering in appendix A.

Table C2

Results of latent neuroticism measurement models

	Age band 1 only		Age band 2 only		Age bands 1 & 2 unconstrained without autocorrelations		Age bands 1 & 2 unconstrained with autocorrelations		Age bands 1 & 2 constrained with autocorrelations		Age bands 1 & 2 constrained with autocorrelations & latent change scores	
	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value
Std. factor loadings												
AB1-NR item loadings												
Item 1	0.354	0.000	--	--	0.358	0.000	0.348	0.000	0.349	0.000	0.349	0.000
Item 2	0.506	0.000	--	--	0.503	0.000	0.513	0.000	0.486	0.000	0.486	0.000
Item 3	0.586	0.000	--	--	0.587	0.000	0.586	0.000	0.589	0.000	0.589	0.000
Item 4	0.599	0.000	--	--	0.595	0.000	0.593	0.000	0.619	0.000	0.619	0.000
Item 5	0.633	0.000	--	--	0.630	0.000	0.629	0.000	0.600	0.000	0.600	0.000
Item 6	0.702	0.000	--	--	0.704	0.000	0.705	0.000	0.720	0.000	0.720	0.000
Item 7	0.487	0.000	--	--	0.489	0.000	0.489	0.000	0.522	0.000	0.522	0.000
Item 8	0.474	0.000	--	--	0.471	0.000	0.474	0.000	0.474	0.000	0.474	0.000
Item 9	0.680	0.000	--	--	0.688	0.000	0.684	0.000	0.678	0.000	0.678	0.000
Item 10	0.585	0.000	--	--	0.585	0.000	0.587	0.000	0.573	0.000	0.573	0.000
Item 11	0.552	0.000	--	--	0.560	0.000	0.566	0.000	0.555	0.000	0.555	0.000
Item 12	0.540	0.000	--	--	0.552	0.000	0.553	0.000	0.559	0.000	0.559	0.000
AB2-NR loadings												
Item 1	--	--	0.375	0.000	0.378	0.000	0.374	0.000	0.372	0.000	0.372	0.000
Item 2	--	--	0.494	0.000	0.493	0.000	0.495	0.000	0.512	0.000	0.512	0.000
Item 3	--	--	0.620	0.000	0.620	0.000	0.620	0.000	0.616	0.000	0.616	0.000
Item 4	--	--	0.660	0.000	0.662	0.000	0.664	0.000	0.646	0.000	0.646	0.000
Item 5	--	--	0.607	0.000	0.605	0.000	0.607	0.000	0.627	0.000	0.627	0.000
Item 6	--	--	0.757	0.000	0.752	0.000	0.754	0.000	0.745	0.000	0.745	0.000
Item 7	--	--	0.572	0.000	0.573	0.000	0.572	0.000	0.549	0.000	0.549	0.000
Item 8	--	--	0.497	0.000	0.500	0.000	0.502	0.000	0.501	0.000	0.501	0.000
Item 9	--	--	0.706	0.000	0.705	0.000	0.703	0.000	0.703	0.000	0.703	0.000
Item 10	--	--	0.592	0.000	0.590	0.000	0.590	0.000	0.600	0.000	0.600	0.000
Item 11	--	--	0.582	0.000	0.576	0.000	0.575	0.000	0.583	0.000	0.583	0.000
Item 12	--	--	0.594	0.000	0.589	0.000	0.590	0.000	0.587	0.000	0.587	0.000
Unstd. regression paths												
AB1-NR to AB2-NR	--	--	--	--	--	--	--	--	--	--	@1	--
Unstd. factor loadings												
Δ-NR by AB2-NR	--	--	--	--	--	--	--	--	--	--	@1	--
Std. factor covariances												
AB1-NR with AB2-NR	--	--	--	--	0.711	0.000	0.681	0.000	0.681	0.000	--	--
AB1-NR with Δ-NR	--	--	--	--	--	--	--	--	--	--	-0.323	0.000
Std. error covariances												
Item 1 with item 1	--	--	--	--	--	--	0.270	0.000	0.270	0.000	0.270	0.000
Item 2 with item 2	--	--	--	--	--	--	0.303	0.000	0.300	0.000	0.300	0.000
Item 3 with item 3	--	--	--	--	--	--	0.258	0.000	0.260	0.000	0.260	0.000

Item 4 with item 4	--	--	--	--	--	--	0.163	0.005	0.156	0.007	0.156	0.007
Item 5 with item 5	--	--	--	--	--	--	0.190	0.002	0.191	0.002	0.191	0.002
Item 6 with item 6	--	--	--	--	--	--	0.079	0.200	0.077	0.212	0.077	0.212
Item 7 with item 7	--	--	--	--	--	--	0.192	0.000	0.191	0.000	0.191	0.000
Item 8 with item 8	--	--	--	--	--	--	0.387	0.000	0.386	0.000	0.386	0.000
Item 9 with item 9	--	--	--	--	--	--	0.204	0.002	0.202	0.002	0.202	0.002
Item 10 with item 10	--	--	--	--	--	--	0.091	0.123	0.091	0.125	0.091	0.125
Item 11 with item 11	--	--	--	--	--	--	0.215	0.000	0.212	0.000	0.212	0.000
Item 12 with item 12	--	--	--	--	--	--	0.384	0.000	0.383	0.000	0.383	0.000
Std. factor variances												
AB1-NR	@1	--	--	--	@1	--	@1	--	@1	--	@1	--
AB2-NR	--	--	@1	--	@1	--	@1	--	@1	--	--	--
Δ-NR	--	--	--	--	--	--	--	--	--	--	@1	--
Unstd. error variances												
AB2-NR	--	--	--	--	--	--	--	--	--	--	@0	--
Fit indices												
χ^2	$\chi^2(54)=157.246$ ($p=0.000$)		$\chi^2(54)=185.531$ ($p=0.000$)		$\chi^2(251)=729.863$ ($p=0.000$)		$\chi^2(239)=483.023$ ($p=0.000$)		$\chi^2(262)=503.308$ ($p=0.000$)		$\chi^2(262)=503.308$ ($p=0.000$)	
RMSEA	0.061		0.062		0.051		0.037		0.035		0.035	
CFI	0.918		0.926		0.868		0.933		0.933		0.933	
TLI	0.900		0.910		0.855		0.922		0.930		0.930	
SRMR	0.043		0.042		0.054		0.043		0.047		0.047	

Note. AB1-NR = age band 1 neuroticism factor; AB2-NR = age band 2 neuroticism factor; Δ-NR = latent neuroticism change score. Item numbering above is consistent with item numbering in appendix A.

Table C3

Results of models testing effects of sensation-seeking change and neuroticism change on the alcohol consumption growth intercept, linear slope, and quadratic slope

	Sensation-seeking models				Neuroticism models			
	Observed change score model		Latent change score model		Observed change score model		Latent change score model	
Initial model results	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value
Effects of personality change								
Predicting the growth intercept	0.758	0.468	3.145	0.057	-0.945	0.413	-0.882	0.683
Predicting the linear slope	0.777	0.006	1.121	0.002	0.255	0.437	0.811	0.157
Predicting the quadratic slope	-0.042	0.073	-0.062	0.020	0.013	0.570	-0.025	0.615
Intercepts[a]								
Growth intercept	13.206	0.000	13.221	0.000	13.189	0.000	13.177	0.000
Linear slope	0.444	0.001	0.433	0.001	0.456	0.001	0.463	0.001
Quadratic slope	-0.042	0.000	-0.042	0.000	-0.044	0.000	-0.044	0.000
Covariances								
Growth intercept with linear slope	5.914	0.037	5.247	0.068	6.576	0.017	6.512	0.033
Growth intercept with quadratic slope	-0.597	0.004	-0.562	0.007	-0.635	0.002	-0.631	0.007
Linear slope with quadratic slope	-0.054	0.157	-0.045	0.244	-0.068	0.082	-0.069	0.254
Wald χ^2 tests								
Personality change effects on both the linear and the quadratic slope	$\chi^2(2)=9.15$ ($p=0.010$)		$\chi^2(2)=11.03$ ($p=0.004$)		$\chi^2(2)=7.91$ ($p=0.019$)		$\chi^2(2)=4.41$ ($p=0.111$)	
Conditional growth intercepts and slopes at different levels of latent sensation-seeking change[b]								
One SD below the mean (decrease of 0.74)								
Growth intercept	11.423	0.000	--	--	13.510	0.000	--	--
Linear slope	-0.207	0.384	--	--	0.187	0.372	--	--
Quadratic slope	-0.006	0.745	--	--	-0.036	0.044	--	--
At the mean (decrease of 0.11)								
Growth intercept	13.221	0.000	--	--	13.177	0.000	--	--
Linear slope	0.433	0.001	--	--	0.463	0.001	--	--
Quadratic slope	-0.042	0.000	--	--	-0.044	0.000	--	--
One SD above the mean (increase of 0.52)								
Growth intercept	15.019	0.000	--	--	12.901	0.000	--	--
Linear slope	1.074	0.000	--	--	0.729	0.004	--	--
Quadratic slope	-0.077	0.000	--	--	-0.052	0.013	--	--

Note. Variances, residual variances, and measurement model estimates (from latent variable models) were omitted above to focus on key estimates.

[a] Because observed personality change scores were initially mean centered and latent personality change scores have a mean of zero, the intercepts provided in the initial model results represent growth intercepts, linear slopes, and quadratic slopes conditional on the mean of personality change.

[b] As explained above, growth intercept and slope estimates conditional on the mean of latent sensation seeking change were obtained directly from the initial model results. Conditional linear and quadratic slopes at other levels of latent sensation seeking change were computed based on model results using the Mplus MODEL CONSTRAINT option. This approach was necessary because conditional slopes could not be obtained by re-scaling the personality variables and re-estimating the model as can be done when probing observed variable interactions.

Table C4

Results of models testing effects of age band 2 sensation-seeking and neuroticism on the alcohol consumption growth intercept, linear slope, and quadratic slope controlling for age band 1 sensation-seeking and neuroticism, respectively

	Sensation-seeking models				Neuroticism models			
	Observed variable age bands 1 and2 model		Latent variable age bands 1 and 2 model		Observed variable age bands 1 and 2 model		Latent variable age bands 1 and 2 model	
Initial model results	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value
Effects of age band 1 personality								
Predicting the growth intercept	2.971	0.006	2.997	0.046	0.404	0.741	1.498	0.544
Predicting the linear slope	-0.608	0.024	-0.924	0.018	-0.243	0.420	-0.523	0.391
Predicting the quadratic slope	0.021	0.375	0.036	0.291	-0.003	0.889	-0.007	0.897
Effects of age band 2 personality								
Predicting the growth intercept	4.514	0.000	5.215	0.000	-0.241	0.834	-0.982	0.665
Predicting the linear slope	0.644	0.023	0.930	0.017	0.422	0.168	0.889	0.143
Predicting the quadratic slope	-0.042	0.048	-0.057	0.051	-0.013	0.613	-0.027	0.584
Intercepts[a]								
Growth intercept	13.161	0.000	13.151	0.000	13.174	0.000	13.173	0.000
Linear slope	0.454	0.000	0.463	0.000	0.462	0.001	0.462	0.001
Quadratic slope	-0.043	0.000	-0.043	0.000	-0.044	0.000	-0.044	0.000
Covariances								
Growth intercept with linear slope	5.444	0.054	5.253	0.068	6.401	0.028	6.438	0.026
Growth intercept with quadratic slope	-0.528	0.013	-0.508	0.019	-0.626	0.004	-0.624	0.004
Linear slope with quadratic slope	-0.061	0.248	-0.056	0.319	-0.068	0.149	-0.067	0.138
Wald χ^2 tests								
Age band 2 personality effects on both the linear and the quadratic slope	$\chi^2(2)=5.21$ ($p=0.074$)		$\chi^2(2)=5.90$ ($p=0.052$)		$\chi^2(2)=4.17$ ($p=0.125$)		$\chi^2(2)=4.70$ ($p=0.095$)	

Note. Variances, residual variances, and measurement model estimates (from latent variable models) were omitted above to focus on key estimates.

[a] Because observed age band 1 and 2 personality variables were initially mean centered and the latent age band 1 and 2 personality variables have a mean of zero, the intercepts provided in the initial model results represent growth intercepts, linear slopes, and quadratic slopes conditional on the means of the age band 1 and 2 personality variables.

Table C5

Results of models testing effects of sensation-seeking change and neuroticism change on the drinking consequence growth intercept, linear slope, and quadratic slope

	Sensation-seeking models				Neuroticism models			
	Observed change score model		Latent change score model		Observed change score model		Latent change score model	
Initial model results	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value
Effects of personality change								
Predicting the growth intercept	-0.011	0.953	0.235	0.355	-0.097	0.585	0.253	0.465
Predicting the linear slope	-0.016	0.823	0.017	0.850	0.083	0.114	0.299	0.003
Predicting the quadratic slope	0.007	0.395	0.009	0.313	0.002	0.741	-0.013	0.215
Intercepts[a]								
Growth intercept	-0.648	0.023	-0.642	0.025	-0.621	0.032	-0.631	0.031
Linear slope	-0.006	0.939	-0.022	0.760	-0.004	0.959	0.013	0.865
Quadratic slope	-0.026	0.000	-0.024	0.000	-0.026	0.000	-0.027	0.000
Covariances								
Growth intercept with linear slope	-0.049	0.406	-0.037	0.520	-0.043	0.455	-0.067	0.249
Growth intercept with quadratic slope	0.009	0.072	0.008	0.146	0.010	0.057	0.011	0.029
Linear slope with quadratic slope	-0.002	0.156	-0.002	0.158	-0.002	0.136	-0.002	0.146
Wald χ^2 tests								
Personality change effects on both the linear and the quadratic slope	$\chi^2(2)=2.15$ ($p=0.341$)		$\chi^2(2)=5.83$ ($p=0.054$)		$\chi^2(2)=11.57$ ($p=0.003$)		$\chi^2(2)=12.09$ ($p=0.002$)	
Conditional growth intercepts and slopes at different levels of latent neuroticism change[b]								
One SD below the mean (decrease of 0.71)								
Growth intercept	--	--	-0.687	0.049	-0.669	0.021	--	--
Linear slope	--	--	-0.056	0.566	-0.112	0.114	--	--
Quadratic slope	--	--	-0.028	0.001	-0.021	0.001	--	--
At the mean (decrease of 0.12)								
Growth intercept	--	--	-0.425	0.157	-0.631	0.031	--	--
Linear slope	--	--	-0.032	0.685	0.013	0.865	--	--
Quadratic slope	--	--	-0.018	0.011	-0.027	0.000	--	--
One SD above the mean (increase of 0.47)								
Growth intercept	--	--	-0.687	0.049	-0.486	0.144	--	--
Linear slope	--	--	-0.056	0.566	0.091	0.288	--	--
Quadratic slope	--	--	-0.028	0.001	-0.030	0.000	--	--

Note. Variances, residual variances, and measurement model estimates (from latent variable models) were omitted above to focus on key

estimates.

[a] Because observed change scores were initially mean centered and latent personality change scores have a mean of zero, the intercepts provided in the initial model results represent growth intercepts, linear slopes, and quadratic slopes conditional on the mean of personality change.

[b] As explained above, growth intercept and slope estimates conditional on the mean of latent neuroticism change were obtained directly from the initial model results. Conditional growth intercepts and slopes conditional on other levels of latent neuroticism change were computed based on model results using the Mplus MODEL CONSTRAINT option. This approach was necessary because conditional slopes could not be obtained by re-scaling the personality variables and re-estimating the model as can be done when probing observed variable interactions.

Table C6

Results of models testing effects of age band 2 sensation-seeking and neuroticism on the drinking consequence growth intercept, linear slope, and quadratic slope controlling for age band 1 sensation-seeking and neuroticism, respectively

	Sensation-seeking models				Neuroticism models			
	Observed variable age bands 1 and 2 model		Latent variable age bands 1 and 2 model		Observed variable age bands 1 and 2 model		Latent variable age bands 1 and 2 model	
Initial model results	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value
Effects of age band 1 personality								
Predicting the growth intercept	0.425	0.013	0.483	0.046	0.217	0.223	0.410	0.261
Predicting the linear slope	-0.018	0.790	-0.021	0.824	-0.100	0.051	-0.219	0.039
Predicting the quadratic slope	-0.002	0.735	-0.006	0.577	0.004	0.532	0.008	0.477
Effects of age band 2 personality								
Predicting the growth intercept	0.450	0.015	0.489	0.059	0.300	0.071	0.465	0.165
Predicting the linear slope	-0.047	0.492	-0.053	0.588	0.127	0.014	0.250	0.015
Predicting the quadratic slope	0.012	0.064	0.016	0.085	-0.005	0.407	-0.009	0.396
Intercepts[a]								
Growth intercept	-0.866	0.001	-0.884	0.001	-0.588	0.036	-0.577	0.037
Linear slope	0.023	0.744	0.029	0.688	-0.003	0.964	-0.011	0.871
Quadratic slope	-0.027	0.000	-0.027	0.000	-0.026	0.000	-0.026	0.000
Covariances								
Growth intercept with linear slope	-0.066	0.266	-0.068	0.258	-0.053	0.321	-0.046	0.371
Growth intercept with quadratic slope	0.009	0.103	0.008	0.118	0.010	0.037	0.010	0.040
Linear slope with quadratic slope	-0.002	0.168	-0.002	0.162	-0.002	0.214	-0.002	0.235
Wald χ^2 tests								
Age band 2 personality effects on both the linear and the quadratic slope	$\chi^2(2)=7.01$ ($p=0.030$)		$\chi^2(2)=6.85$ ($p=0.033$)		$\chi^2(2)=9.68$ ($p=0.008$)		$\chi^2(2)=8.92$ ($p=0.012$)	

Note. Variances, residual variances, and measurement model estimates (from latent variable models) were omitted above to focus on key estimates.

[a] Because observed age band 1 and 2 personality variables were initially mean centered and the latent age band 1 and 2 personality variables have a mean of zero, the intercepts provided in the initial model results represent growth intercepts, linear slopes, and quadratic slopes conditional on the means of the age band 1 and 2 personality variables.

Table C7

Results of models testing growth-intercept-by-sensation-seeking-change and growth-intercept-by-neuroticism-change interactions predicting alcohol consumption slopes

	Observed sensation-seeking change model		Observed neuroticism change models	
Initial model results	Estimate	*p*-value	Estimate	*p*-value
Effects of personality change[a]				
Predicting the linear slope	0.632	0.028	0.231	0.399
Predicting the quadratic slope	-0.036	0.144	0.012	0.600
Effects of the growth intercept[a]				
Predicting the linear slope	0.058	0.147	0.085	0.044
Predicting the quadratic slope	-0.006	0.042	-0.008	0.012
Effects of the personality-by-growth-intercept interaction				
Predicting the linear slope	0.046	0.257	0.004	0.894
Predicting the quadratic slope	-0.003	0.446	0.002	0.425
Slope intercepts[a]				
Linear slope	0.611	0.001	0.682	0.001
Quadratic slope	-0.061	0.000	-0.067	0.000
Covariances				
Growth intercept with personality change	0.321	0.415	-0.472	0.220
Linear slope with quadratic slope	-0.055	0.613	-0.044	0.712
Wald χ^2 tests				
Interaction effects on both the linear and the quadratic slope tested simultaneously	$\chi^2(2)=2.36$ ($p=0.307$)		$\chi^2(2)=5.71$ ($p=0.058$)	
Conditional effects of neuroticism change at different levels of the growth intercept[b]				
One SD below the mean (2.830)				
Predicting the linear slope	--	--	0.186	0.522
Predicting the quadratic slope	--	--	-0.008	0.711
At the mean (13.199)				
Predicting the linear slope	--	--	0.231	0.399
Predicting the quadratic slope	--	--	0.012	0.600
One SD above the mean (23.568)				
Predicting the linear slope	--	--	0.284	0.577
Predicting the quadratic slope	--	--	0.033	0.454
Conditional effects of the growth intercept at different levels of neuroticism change[b]				
One SD below the mean (decrease of 0.71)				

Predicting the linear slope	--	--	0.083	0.024
Predicting the quadratic slope	--	--	-0.009	0.001
At the mean (decrease of 0.12)				
Predicting the linear slope	--	--	0.085	0.044
Predicting the quadratic slope	--	--	-0.008	0.012
One SD above the mean (increase of 0.47)				
Predicting the linear slope	--	--	0.088	0.100
Predicting the quadratic slope	--	--	-0.007	0.095
Conditional slopes at different combinations of neuroticism change and growth intercept levels[b]				
Low growth intercept, low personality change				
Linear slope	--	--	-0.281	0.402
Quadratic slope	--	--	0.020	0.458
Low growth intercept, mean personality change				
Linear slope	--	--	-0.171	0.591
Quadratic slope	--	--	0.015	0.545
Low growth intercept, high personality change				
Linear slope	--	--	-0.062	0.873
Quadratic slope	--	--	0.010	0.727
Mean growth intercept, low personality change				
Linear slope	--	--	0.545	0.005
Quadratic slope	--	--	-0.074	0.000
Mean growth intercept, mean personality change				
Linear slope	--	--	0.682	0.001
Quadratic slope	--	--	-0.067	0.000
Mean growth intercept, high personality change				
Linear slope	--	--	0.818	0.007
Quadratic slope	--	--	-0.060	0.014
High growth intercept, low personality change				
Linear slope	--	--	1.388	0.003
Quadratic slope	--	--	-0.170	0.000
High growth intercept, mean personality change				
Linear slope	--	--	1.556	0.005
Quadratic slope	--	--	-0.150	0.001
High growth intercept, high personality change				
Linear slope	--	--	1.691	0.029
Quadratic slope	--	--	-0.129	0.036

Note. Latent variable models are not presented because they could not be estimated (i.e., failed to converge). Variances and residual

variances were omitted above to focus on key estimates.

[a] The observed personality change scores were initially mean centered and the alcohol consumption variables were initially centered at the growth intercept's mean value . Thus, in the above initial model results, the effects of personality change are conditional on the mean level of the growth intercept, the effects of the growth intercept are conditional on the mean level of personality change, and the slope intercepts represent conditional linear and quadratic slopes at the mean levels of both personality change and the growth intercept.

[b] As explained above, the initial model results provide neuroticism change effects at the mean of the growth intercept, growth intercept effects at the mean of neuroticism change, and slope estimates at the mean of both neuroticism change and the growth intercept. Neuroticism change effects at other growth intercept levels, growth intercept effects at other neuroticism change levels, and slope estimates at different combinations of neuroticism change and growth intercept levels were obtained by re-estimating the model after re-scaling the neuroticism change and alcohol consumption variables.

Table C8

Results of models testing growth-intercept-by-age-band-2-sensation-seeking and growth-intercept-by-age-band-2-neuroticism interactions predicting alcohol consumption slopes (controlling for age-band 1 personality)

	Observed sensation-seeking age bands 1 & 2 model		Observed neuroticism age bands 1 & 2 model	
Initial model results	Estimate	*p*-value	Estimate	*p*-value
Effects of age band 1 personality				
Predicting the linear slope	-0.861	0.007	-0.139	0.668
Predicting the quadratic slope	0.044	0.110	-0.010	0.706
Effects of age band 2 personality[a]				
Predicting the linear slope	0.164	0.602	0.166	0.582
Predicting the quadratic slope	-0.003	0.896	0.010	0.703
Effects of the growth intercept[a]				
Predicting the linear slope	0.081	0.007	0.066	0.229
Predicting the quadratic slope	-0.007	0.003	-0.007	0.078
Effects of the age-band-2-personality-by-growth-intercept interaction				
Predicting the linear slope	0.008	0.772	0.015	0.673
Predicting the quadratic slope	0.000	0.927	-0.002	0.579
Intercepts[a]				
Linear slope	0.479	0.007	0.657	0.001
Quadratic slope	-0.044	0.001	-0.065	0.000
Covariances				
Growth intercept with age band 2 personality	2.786	0.000	-0.118	0.820
Linear slope with quadratic slope	-0.005	0.903	-0.065	0.659
Wald χ^2 tests				
Interaction effects on both the linear and the quadratic slope tested simultaneously	$\chi^2(2)=0.44$ ($p=0.802$)		$\chi^2(2)=0.41$ ($p=0.813$)	

Note. Latent variable models are not presented because they could not be estimated (i.e., failed to converge). Variances and residual variances were omitted above to focus on key estimates.

[a] The observed age band 2 personality variables were initially mean centered and the alcohol consumption variables were initially centered at the growth intercept's mean value. Thus, in the above initial model results, the effects of age band 2 personality are conditional on the mean level of the growth intercept, the effects of the growth intercept are conditional on the mean level of age band 2 personality, and the slope intercepts represent conditional linear and quadratic slopes at the mean levels of both age band 2 personality and the growth intercept.

Table C9

Results of models testing growth-intercept-by-sensation-seeking-change and growth-intercept-by-neuroticism-change interactions predicting drinking consequence slopes

	Observed sensation-seeking change model		Observed neuroticism change model	
Initial model results	Estimate	*p*-value	Estimate	*p*-value
Effects of personality change[a]				
Predicting the linear slope	-0.015	0.836	0.116	0.085
Predicting the quadratic slope	0.006	0.437	-0.001	0.847
Effects of the growth intercept[a]				
Predicting the linear slope	-0.080	0.047	-0.090	0.029
Predicting the quadratic slope	0.008	0.055	0.008	0.049
Effects of the personality-by-growth-intercept interaction				
Predicting the linear slope	0.024	0.693	-0.073	0.264
Predicting the quadratic slope	-0.007	0.249	0.008	0.260
Growth intercepts[a]				
Linear slope	0.004	0.934	0.046	0.430
Quadratic slope	-0.019	0.000	-0.026	0.000
Covariances				
Growth intercept with personality change	-0.014	0.840	-0.058	0.398
Wald χ^2 tests				
Interaction effects on both the linear and the quadratic slope tested simultaneously	$\chi^2(2)=2.65$ ($p=0.266$)		$\chi^2(2)=1.30$ ($p=0.522$)	

Note. Latent variable models are not presented because they could not be estimated (i.e., failed to converge). Variances, residual variances, and zero-inflation thresholds were omitted to focus on key estimates.

[a] The observed personality change scores were initially mean centered and the drinking consequence variables were un-centered (because negative and non-integar values are not permitted in Poisson count models). Thus, in the above initial model results, the effects of personality change are conditional on a growth intercept value of 1 drinking consequence (the raw value corresponding to a log transformed value of zero), the effects of the growth intercept are conditional on the mean level of personality change, and the slope intercepts represent conditional linear and quadratic slopes at the mean level of personality change and a growth intercept value of 1 drinking consequence.

Table C10

Results of models testing growth-intercept-by-age-band-2-sensation-seeking and growth-intercept-by-age-band-2-neuroticism interactions predicting drinking consequence slopes (controlling for age band 1 personality)

	Observed sensation-seeking age bands 1 & 2 model		Observed neuroticism age bands 1 & 2 model	
Initial model results	Estimate	*p*-value	Estimate	*p*-value
Effects of age band 1 personality				
Predicting the linear slope	-0.006	0.942	-0.077	0.192
Predicting the quadratic slope	-0.002	0.776	0.002	0.708
Effects of age band 2 personality[a]				
Predicting the linear slope	-0.013	0.856	0.135	0.037
Predicting the quadratic slope	0.008	0.221	-0.005	0.427
Effects of the growth intercept[a]				
Predicting the linear slope	-0.030	0.372	-0.057	0.105
Predicting the quadratic slope	0.004	0.223	0.007	0.025
Effects of the age-band-2-personality-by-growth-intercept interaction				
Predicting the linear slope	-0.035	0.295	0.016	0.602
Predicting the quadratic slope	0.001	0.847	-0.006	0.054
Intercepts[a]				
Linear slope	-0.011	0.813	-0.009	0.873
Quadratic slope	-0.021	0.000	-0.022	0.000
Covariances				
Growth intercept with age band 2 personality	0.327	0.000	0.217	0.003
Linear slope with quadratic slope	-0.001	0.379	0.000	0.700
Wald χ^2 tests				
Interaction effects on both the linear and the quadratic slope tested simultaneously	$\chi^2(2)=1.77$ ($p=0.413$)		$\chi^2(2)=5.45$ ($p=0.066$)	
Conditional effects of age band 2 neuroticism at different levels of the growth intercept[b]				
One SD below the mean (0.15 consequences)				
Predicting the linear slope	--	--	0.099	0.390
Predicting the quadratic slope	--	--	0.008	0.390
At the mean (0.52 consequences)				
Predicting the linear slope	--	--	0.122	0.126
Predicting the quadratic slope	--	--	0.000	0.960
One SD above the mean (1.83 consequences)				
Predicting the linear slope	--	--	0.145	0.011

Predicting the quadratic slope	--	--	-0.008	0.128
Conditional effects of the growth intercept at different levels of age band 2 neuroticism[b]				
At one SD below the AB2 personality mean				
Predicting the linear slope	--	--	-0.069	0.083
Predicting the quadratic slope	--	--	0.011	0.003
At the mean				
Predicting the linear slope	--	--	-0.057	0.105
Predicting the quadratic slope	--	--	0.007	0.025
At one SD above the AB2 personality mean				
Predicting the linear slope	--	--	-0.046	0.289
Predicting the quadratic slope	--	--	0.003	0.430
Conditional slopes at different combinations of age band 2 neuroticism and growth intercept levels[b]				
Low growth intercept, low T2 personality				
Linear slope	--	--	0.048	0.725
Quadratic slope	--	--	-0.043	0.001
Low growth intercept, mean T2 personality				
Linear slope	--	--	0.118	0.406
Quadratic slope	--	--	-0.037	0.001
Low growth intercept, high T2 personality				
Linear slope	--	--	0.187	0.313
Quadratic slope	--	--	-0.032	0.031
Mean growth intercept, low T2 personality				
Linear slope	--	--	-0.047	0.584
Quadratic slope	--	--	-0.027	0.000
Mean growth intercept, mean T2 personality				
Linear slope	--	--	0.039	0.668
Quadratic slope	--	--	-0.028	0.000
Mean growth intercept, high T2 personality				
Linear slope	--	--	0.125	0.321
Quadratic slope	--	--	-0.028	0.005
High growth intercept, low T2 personality				
Linear slope	--	--	-0.142	0.006
Quadratic slope	--	--	-0.012	0.025
High growth intercept, mean T2 personality				
Linear slope	--	--	-0.040	0.425
Quadratic slope	--	--	-0.018	0.000
High growth intercept, high T2 personality				

Linear slope	--	--	0.062	0.398
Quadratic slope	--	--	-0.024	0.000

Note. Latent variable models are not presented because they could not be estimated (i.e., failed to converge). Variances, residual variances, and zero-inflation thresholds were omitted to focus on key estimates.

[a] The observed age band 2 personality variables were initially mean centered and the drinking consequence variables were un-centered (because negative and non-integar values are not permitted in Poisson count models). Thus, in the above initial model results, the effects of age band 2 personality are conditional on a growth intercept value of 1 drinking consequence (the raw value corresponding to a log transformed value of zero), the effects of the growth intercept are conditional on the mean level of age band 2 personality, and the slope intercepts represent conditional linear and quadratic slopes at the mean level of age band 2 personality and a growth intercept value of 1 drinking consequence.

[b] Age band 2 neuroticism effects at other growth intercept levels, growth intercept effects at other age band 2 neuroticism levels, and slope estimates at different combinations of age band 2 neuroticism and growth intercept levels were computed based on model results using the Mplus MODEL CONSTRAINT option (see Table 8 notes for more on this approach). This approach was necessary because negative and non-integar values are not permitted in Poisson count models, so conditional slopes could not be obtained by re-scaling the drinking consequence variables and re-estimating the model (as was done for alcohol consumption).

Table C11

Results of models testing sensation-seeking-change-by-marriage and neuroticism-change-by-marriage interactions predicting the alcohol consumption intercept and slopes

	Observed sensation-seeking change model						Observed neuroticism change model					
	Never married group		*Became married* group		*Other* group		*Never married* group		*Became married* group		*Other* group	
Initial model results	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value
Effects of personality change												
Predicting the growth intercept	5.418	0.013	-1.641	0.356	-0.432	0.770	-0.095	0.972	5.026	0.082	-2.440	0.066
Predicting the linear slope	1.220	0.053	0.498	0.143	0.693	0.105	-1.407	0.056	-0.150	0.804	0.388	0.270
Predicting the quadratic slope	-0.074	0.282	-0.012	0.576	-0.042	0.235	0.167	0.020	0.011	0.782	-0.003	0.913
Intercepts[a]												
Growth intercept	1.072	0.331	-4.355	0.009	0.686	0.305	1.476	0.200	-4.002	0.016	0.461	0.490
Linear slope	0.981	0.000	-0.023	0.951	0.260	0.116	1.326	0.000	-0.127	0.737	0.326	0.064
Quadratic slope	-0.073	0.002	0.002	0.953	-0.036	0.005	-0.109	0.000	0.006	0.816	-0.039	0.003
Wald χ^2 tests of differences between marriage groups in personality change effects on the intercept and slopes (i.e., testing interactions)												
Effects on the linear slope			$\chi^2(1)=1.03$ ($p=0.311$)						$\chi^2(1)=1.75$ ($p=0.186$)			
Effects on the quadratic slope			$\chi^2(1)=0.73$ ($p=0.394$)						$\chi^2(1)=3.62$ ($p=0.057$)			
Effects on both slopes			$\chi^2(2)=1.03$ ($p=0.598$)						$\chi^2(2)=4.03$ ($p=0.133$)			
Conditional slopes at different levels of neuroticism change[b]												
One SD below the mean (- 0.71)												
Linear slope	--	--	--	--	--	--	2.134	0.000	0.022	0.939	0.096	0.672
Quadratic slope	--	--	--	--	--	--	-0.206	0.000	-0.005	0.820	-0.037	0.040
At the mean (- 0.12)												
Linear slope	--	--	--	--	--	--	1.326	0.000	-0.127	0.737	0.326	0.064
Quadratic slope	--	--	--	--	--	--	-0.109	0.000	0.006	0.816	-0.039	0.003
One SD above the mean (+ 0.47)												
Linear slope	--	--	--	--	--	--	0.487	0.278	-0.152	0.785	0.563	0.068
Quadratic slope	--	--	--	--	--	--	-0.009	0.821	0.009	0.818	-0.042	0.067
Wald χ^2 tests of differences between marriage groups (i.e., marriage effects) at different levels of neuroticism change												
One SD below the mean (- 0.71)												

Linear slope difference	--	$\chi^2(1)=11.26$ ($p=0.001$)
Quadratic slope difference	--	$\chi^2(1)=11.37$ ($p=0.001$)
Both slope differences	--	$\chi^2(2)=12.11$ ($p=0.002$)
At the mean (- 0.12)		
Linear slope difference	--	$\chi^2(1)=5.57$ ($p=0.018$)
Quadratic slope difference	--	$\chi^2(1)=4.23$ ($p=0.040$)
Both slope differences	--	$\chi^2(2)=5.61$ ($p=0.060$)
One SD above the mean (+ 0.47)		
Linear slope difference	--	$\chi^2(1)=0.80$ ($p=0.372$)
Quadratic slope difference	--	$\chi^2(1)=0.11$ ($p=0.744$)
Both slope differences	--	$\chi^2(2)=1.86$ ($p=0.395$)

Note. Latent variable models are not presented because they could not be estimated (i.e., failed to converge). Variances and residual variances were omitted above to focus on key estimates.

[a] Because the personality change variables were initially mean centered, the slope intercepts in the above initial model results represent estimates of the linear and quadratic slopes conditional on the mean of personality change.

[b] As explained above, conditional linear and quadratic slopes at the mean of neuroticism change were obtained directly from the initial model results. Conditional slopes at one standard deviation below and one standard deviation above the neuroticism change mean were obtained by re-estimating the model after re-scaling the neuroticism change variable.

Table C12

Results of models testing age-band-2-sensation-seeking-by-marriage and age-band-2-neuroticism-by-marriage interactions predicting the alcohol consumption intercept and slopes (controlling for age band 1 personality)

	Observed sensation-seeking age bands 1 and 2 model						Observed neuroticism age bands 1 and 2 model					
	Never married group		*Became married* group		*Other* group		*Never married* group		*Became married* group		*Other* group	
Initial model results	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value
Effects of age band 1 personality												
Predicting the growth intercept	-2.140	0.413	4.810	0.013	4.112	0.004	0.437	0.882	-4.476	0.182	0.897	0.501
Predicting the linear slope	-1.039	0.069	-0.434	0.290	-0.631	0.117	1.466	0.050	0.128	0.834	-0.573	0.127
Predicting the quadratic slope	0.081	0.228	0.005	0.861	0.022	0.512	-0.165	0.030	-0.006	0.886	0.027	0.388
Effects of age band 2 personality												
Predicting the growth intercept	7.621	0.000	1.363	0.549	4.087	0.002	1.908	0.461	3.102	0.256	-1.693	0.209
Predicting the linear slope	1.011	0.146	0.317	0.420	0.445	0.261	-1.184	0.132	0.283	0.624	0.583	0.110
Predicting the quadratic slope	-0.089	0.147	-0.002	0.936	-0.028	0.324	0.128	0.123	-0.018	0.663	-0.027	0.282
Intercepts[a]												
Growth intercept	0.705	0.493	-3.212	0.090	0.431	0.498	1.165	0.286	-3.913	0.021	0.519	0.441
Linear slope	1.021	0.000	-0.062	0.887	0.278	0.091	1.264	0.000	-0.107	0.783	0.342	0.054
Quadratic slope	-0.074	0.001	0.004	0.891	-0.036	0.004	-0.100	0.000	0.005	0.853	-0.041	0.002
Wald χ^2 tests of differences between marriage groups in age band 2 personality effects on the intercept and slopes (i.e., testing interactions)												
\ Effects on the linear slope	$\chi^2(1)=0.76$ ($p=0.382$)						$\chi^2(1)=2.27$ ($p=0.132$)					
Effects on the quadratic slope	$\chi^2(1)=1.65$ ($p=0.199$)						$\chi^2(1)=2.48$ ($p=0.115$)					
Effects on both slopes	$\chi^2(2)=1.94$ ($p=0.379$)						$\chi^2(2)=2.56$ ($p=0.279$)					

Note. Latent variable models are not presented because they could not be estimated (i.e., failed to converge). Variances and residual variances were omitted above to focus on key estimates.

[a] Because the age band 2 personality variables were initially mean centered, the slope intercepts in the above initial model results represent estimates of the linear and quadratic slopes conditional on the mean of age band 2 personality.

\Table C13

Results of models testing sensation-seeking-change-by-marriage and neuroticism-change-by-marriage interactions predicting the drinking consequence intercept and slopes

	Observed sensation-seeking change model						Observed neuroticism change model					
	Never married group		*Became married* group		*Other* group		*Never married* group		*Became married* group		*Other* group	
Initial model results	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value
Effects of personality change												
Predicting the growth intercept	0.464	0.152	-0.702	0.107	-0.126	0.565	-0.395	0.259	-0.032	0.953	-0.112	0.621
Predicting the linear slope	-0.088	0.520	0.619	0.009	-0.042	0.621	-0.008	0.940	-0.057	0.861	0.125	0.080
Predicting the quadratic slope	0.013	0.452	-0.048	0.031	0.007	0.388	0.019	0.086	0.026	0.382	-0.006	0.450
Intercepts[a]												
Growth intercept	-0.426	0.130	-1.225	0.029	-0.427	0.158	-0.528	0.080	-0.861	0.150	-0.689	0.032
Linear slope	-0.030	0.724	0.591	0.010	-0.051	0.528	0.005	0.958	0.288	0.133	0.033	0.712
Quadratic slope	-0.018	0.037	-0.068	0.000	-0.022	0.001	-0.022	0.011	-0.049	0.001	-0.026	0.000
Wald χ^2 tests of differences between marriage groups in personality change effects on the intercept and slopes (i.e., testing interactions)												
Effects on the linear slope			$\chi^2(1)=6.76$ ($p=0.009$)						$\chi^2(1)=0.02$ ($p=0.884$)			
Effects on the quadratic slope			$\chi^2(1)=4.75$ ($p=0.029$)						$\chi^2(1)=0.05$ ($p=0.827$)			
Effects on both slopes			$\chi^2(2)=6.82$ ($p=0.033$)						$\chi^2(2)=0.05$ ($p=0.975$)			
Conditional slopes at different levels of sensation-seeking change[b]												
One SD below the mean (- 0.74)												
Linear slope	0.024	0.867	0.201	0.286	-0.025	0.817	--	--	--	--	--	--
Quadratic slope	-0.026	0.127	-0.038	0.027	-0.026	0.005	--	--	--	--	--	--
At the mean (- 0.11)												
Linear slope	-0.030	0.724	0.591	0.010	-0.051	0.528	--	--	--	--	--	--
Quadratic slope	-0.018	0.037	-0.068	0.000	-0.022	0.001	--	--	--	--	--	--
One SD above the mean (+ 0.52)												
Linear slope	-0.086	0.358	0.987	0.004	-0.079	0.337	--	--	--	--	--	--
Quadratic slope	-0.009	0.354	-0.099	0.000	-0.017	0.019	--	--	--	--	--	--
Wald χ^2 tests of differences between marriage groups (i.e., marriage effects) at different levels of sensation-seeking change												
One SD below the mean (- 0.74)												

Linear slope difference	$\chi^2(1)=0.60$ ($p=0.437$)	--
Quadratic slope difference	$\chi^2(1)=0.24$ ($p=0.623$)	--
Both slope differences	$\chi^2(2)=0.71$ ($p=0.703$)	--
At the mean (- 0.11)		
Linear slope difference	$\chi^2(1)=7.07$ ($p=0.008$)	--
Quadratic slope difference	$\chi^2(1)=8.06$ ($p=0.005$)	--
Both slope differences	$\chi^2(2)=8.25$ ($p=0.016$)	--
One SD above the mean (+ 0.52)		
Linear slope difference	$\chi^2(1)=9.70$ ($p=0.002$)	--
Quadratic slope difference	$\chi^2(1)=11.58$ ($p=0.001$)	--
Both slope differences	$\chi^2(2)=11.63$ ($p=0.003$)	--

Note. Latent variable models are not presented because they could not be estimated (i.e., failed to converge). Variances, residual variances, and zero-inflated thresholds were omitted above to focus on key estimates.

[a] Because the personality change variables were initially mean centered, the slope intercepts in the above initial model results represent estimates of the linear and quadratic slopes conditional on the mean of age band 2 personality.

[b] As explained above, conditional linear and quadratic slopes at the mean of sensation seeking change were obtained directly from the initial model results. Conditional slopes at one standard deviation below and one standard deviation above the sensation seeking change mean were obtained by re-estimating the model after re-scaling the sensation seeking change variable.

Table C14

Results of models testing age-band-2-sensation-seeking-by-marriage and age-band-2-neuroticism-by-marriage interactions predicting the drinking consequence intercept and slopes (controlling for age band 1 personality)

	Observed sensation-seeking age bands 1 and 2 model						Observed neuroticism age bands 1 and 2 model					
	Never married group		*Became married* group		*Other* group		*Never married* group		*Became married* group		*Other* group	
Initial model results	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value
Effects of age band 1 personality												
Predicting the growth intercept	-0.263	0.458	0.907	0.023	0.565	0.005	0.463	0.146	0.507	0.311	0.140	0.516
Predicting the linear slope	-0.041	0.706	-0.643	0.003	0.061	0.522	-0.068	0.423	0.121	0.643	-0.116	0.085
Predicting the quadratic slope	0.006	0.711	0.046	0.043	-0.009	0.247	-0.007	0.408	-0.019	0.476	0.007	0.352
Effects of age band 2 personality												
Predicting the growth intercept	0.680	0.032	-0.514	0.447	0.395	0.071	0.239	0.428	-0.173	0.753	0.264	0.225
Predicting the linear slope	-0.095	0.450	0.339	0.082	-0.074	0.407	0.046	0.631	-0.139	0.657	0.184	0.019
Predicting the quadratic slope	0.011	0.446	-0.023	0.279	0.014	0.052	0.012	0.221	0.032	0.274	-0.015	0.032
Intercepts[a]												
Growth intercept	-0.591	0.023	-1.504	0.000	-0.804	0.003	-0.123	0.660	-0.520	0.372	-0.308	0.374
Linear slope	-0.005	0.953	0.644	0.002	-0.004	0.963	-0.011	0.891	0.231	0.306	0.047	0.638
Quadratic slope	-0.018	0.043	-0.069	0.000	-0.023	0.001	-0.021	0.006	-0.041	0.024	-0.030	0.000
Wald χ^2 tests of differences between marriage groups in age band 2 personality effects on the intercept and slopes (i.e., testing interactions)												
Effects on the linear slope	$\chi^2(1)=3.66$ ($p=0.056$)						$\chi^2(1)=0.32$ ($p=0.571$)					
Effects on the quadratic slope	$\chi^2(1)=1.91$ ($p=0.167$)						$\chi^2(1)=0.45$ ($p=0.503$)					
Effects on both slopes	$\chi^2(2)=4.05$ ($p=0.132$)						$\chi^2(2)=0.45$ ($p=0.799$)					

Note. Latent variable models are not presented because they could not be estimated (i.e., failed to converge).

Note. Variances, residual variances, and zero-inflated thresholds were omitted above to focus on key estimates.

[a] Because the age band 2 personality variables were initially mean centered, the slope intercepts in the above initial model results represent estimates of the linear and quadratic slopes conditional on the mean of age band 2 personality.

Table C15

Main personality effects predicting the alcohol consumption slopes both before and after controlling for parental alcoholism and gender.

Effects	Without parental alcoholism and gender		With parental alcoholism and gender	
	Estimate	*p*-value	Estimate	*p*-value
Effects of observed sensation-seeking change				
Predicting the linear slope	b = 0.777	0.006	b = 0.845	0.003
Predicting the quadratic slope	b = -0.042	0.073	b = -0.045	0.063
Predicting both slopes	$\chi^2(2)=9.15$	0.010	$\chi^2(2)=11.20$	0.004
Effects of observed age band 2 sensation-seeking				
Predicting the linear slope	b = 0.644	0.023	b = 0.772	0.007
Predicting the quadratic slope	b = -0.042	0.048	b = -0.046	0.032
Predicting both slopes	$\chi^2(2)=5.21$	0.074	$\chi^2(2)=7.62$	0.022
Effects of observed neuroticism change				
Predicting the linear slope	b = 0.255	0.437	b = 0.225	0.443
Predicting the quadratic slope	b = 0.013	0.570	b = 0.013	0.593
Predicting both slopes	$\chi^2(2)=7.91$	0.019	$\chi^2(2)=6.72$	0.035
Effects of observed age band 2 neuroticism				
Predicting the linear slope	b = 0.422	0.168	b = 0.406	0.185
Predicting the quadratic slope	b = -0.013	0.613	b = -0.013	0.609
Predicting both slopes	$\chi^2(2)=4.17$	0.125	$\chi^2(2)=3.55$	0.169

Note. Models testing effects of age band 2 personality controlled for age band 1 personality.

Table C16

Main personality effects predicting the drinking consequence slopes both before and after controlling for parental alcoholism and gender.

Effects	Without parental alcoholism and gender		With parental alcoholism and gender	
	Estimate	*p*-value	Estimate	*p*-value
Effects of observed sensation-seeking change				
Predicting the linear slope	b = -0.016	0.823	b = -0.001	0.992
Predicting the quadratic slope	b = 0.007	0.395	b = 0.005	0.510
Predicting both slopes	$\chi^2(2)=2.15$	0.341	$\chi^2(2)=1.97$	0.374
Effects of observed age band 2 sensation-seeking				
Predicting the linear slope	b = -0.047	0.492	b = -0.012	0.865
Predicting the quadratic slope	b = 0.012	0.064	b = 0.009	0.189
Predicting both slopes	$\chi^2(2)=7.01$	0.030	$\chi^2(2)=5.54$	0.063
Effects of observed neuroticism change				
Predicting the linear slope	b = 0.083	0.114	b = 0.091	0.071
Predicting the quadratic slope	b = 0.002	0.741	b = 0.002	0.776
Predicting both slopes	$\chi^2(2)=11.57$	0.003	$\chi^2(2)=11.75$	0.003
Effects of observed age band 2 neuroticism				
Predicting the linear slope	b = 0.127	0.014	b = 0.127	0.012
Predicting the quadratic slope	b = -0.005	0.407	b = -0.004	0.453
Predicting both slopes	$\chi^2(2)=9.68$	0.008	$\chi^2(2)=10.19$	0.006

Note. Models testing effects of age band 2 personality controlled for age band 1 personality.

Table C17

Personality interactions predicting the alcohol consumption slopes both before and after controlling for parental alcoholism and gender.

	Without parental alcoholism and gender		With parental alcoholism and gender	
Effects	Estimate	*p*-value	Estimate	*p*-value
Sensation-seeking-change-by-growth-intercept interaction				
Predicting the linear slope	b = 0.046	0.257	b = 0.050	0.231
Predicting the quadratic slope	b = -0.003	0.446	b = -0.003	0.426
Predicting both slopes	$\chi^2(2)$=2.36	0.307	$\chi^2(2)$=2.65	0.265
Age-band-2-sensation-seeking-by-growth-intercept interaction				
Predicting the linear slope	b = 0.008	0.772	b = 0.015	0.595
Predicting the quadratic slope	b = 0.000	0.927	b = -0.001	0.786
Predicting both slopes	$\chi^2(2)$=0.44	0.802	$\chi^2(2)$=0.86	0.651
Neuroticism-change-by-growth-intercept interaction				
Predicting the linear slope	b = 0.004	0.894	b = -0.002	0.947
Predicting the quadratic slope	b = 0.002	0.425	b = 0.002	0.396
Predicting both slopes	$\chi^2(2)$=5.71	0.058	$\chi^2(2)$=4.55	0.103
Age-band-2-neuroticism-by-growth-intercept interaction				
Predicting the linear slope	b = 0.015	0.673	b = 0.014	0.693
Predicting the quadratic slope	b = -0.002	0.579	b = -0.002	0.567
Predicting both slopes	$\chi^2(2)$=0.41	0.813	$\chi^2(2)$=0.53	0.767
Sensation-seeking-change-by-marriage interaction (i.e., differences between marriage groups in sensation-seeking-on-slope effects)				
Predicting the linear slope	$\chi^2(1)$=1.03	0.311	$\chi^2(1)$=2.80	0.094
Predicting the quadratic slope	$\chi^2(1)$=0.73	0.394	$\chi^2(1)$=1.59	0.208
Predicting both slopes	$\chi^2(2)$=1.03	0.598	$\chi^2(2)$=2.86	0.239
Age-band-2-sensation-seeking-by-marriage interaction (i.e., differences between marriage groups in sensation-seeking-on-slope-effects)				
Predicting the linear slope	$\chi^2(1)$=0.76	0.382	$\chi^2(1)$=2.23	0.136
Predicting the quadratic slope	$\chi^2(1)$=1.65	0.199	$\chi^2(1)$=3.41	0.065
Predicting both slopes	$\chi^2(2)$=1.94	0.379	$\chi^2(2)$=3.46	0.178
Neuroticism-change-by-marriage interaction (i.e., differences between marriage groups in neuroticism-on-slope-effects)				
Predicting the linear slope	$\chi^2(1)$=1.75	0.186	$\chi^2(1)$=1.48	0.224
Predicting the quadratic slope	$\chi^2(1)$=3.62	0.057	$\chi^2(1)$=3.23	0.072
Predicting both slopes	$\chi^2(2)$=4.03	0.133	$\chi^2(2)$=3.57	0.168
Age-band-2-neuroticism-by-marriage interaction (i.e., differences between marriage groups in neuroticism-on-slope effects)				

Predicting the linear slope	$\chi^2(1)=2.27$	0.132	$\chi^2(1)=1.83$	0.176
Predicting the quadratic slope	$\chi^2(1)=2.48$	0.115	$\chi^2(1)=2.15$	0.142
Predicting both slopes	$\chi^2(2)=2.56$	0.279	$\chi^2(2)=2.19$	0.335

Note. Models testing effects of age band 2 personality controlled for age band 1 personality.

Table C18

Personality interactions predicting the drinking consequence slopes both before and after controlling for parental alcoholism and gender.

	Without parental alcoholism and gender		With parental alcoholism and gender	
Effects	Estimate	*p*-value	Estimate	*p*-value
Sensation-seeking-change-by-growth-intercept interaction				
Predicting the linear slope	b = 0.024	0.693	b = 0.020	0.730
Predicting the quadratic slope	b = -0.007	0.249	b = -0.008	0.229
Predicting both slopes	$\chi^2(2)$=2.65	0.266	$\chi^2(2)$=3.11	0.212
Age-band-2-sensation-seeking-by-growth-intercept interaction				
Predicting the linear slope	b = -0.035	0.295	b = -0.028	0.491
Predicting the quadratic slope	b = 0.001	0.847	b = 0.002	0.623
Predicting both slopes	$\chi^2(2)$=1.77	0.413	$\chi^2(2)$=0.49	0.782
Neuroticism-change-by-growth-intercept interaction				
Predicting the linear slope	b = -0.073	0.264	b = -0.074	0.339
Predicting the quadratic slope	b = 0.008	0.260	b = 0.008	0.339
Predicting both slopes	$\chi^2(2)$=1.30	0.522	$\chi^2(2)$=0.93	0.628
Age-band-2-neuroticism-by-growth-intercept interaction				
Predicting the linear slope	b = 0.016	0.602	b = 0.020	0.547
Predicting the quadratic slope	b = -0.006	0.054	b = -0.006	0.054
Predicting both slopes	$\chi^2(2)$=5.45	0.066	$\chi^2(2)$=4.98	0.083
Sensation-seeking-change-by-marriage interaction (i.e., differences between marriage groups in sensation-seeking-on-slope effects)				
Predicting the linear slope	$\chi^2(1)$=6.76	0.009	$\chi^2(1)$=4.96	0.025
Predicting the quadratic slope	$\chi^2(1)$=4.75	0.029	$\chi^2(1)$=1.97	0.159
Predicting both slopes	$\chi^2(2)$=6.82	0.033	$\chi^2(2)$=5.13	0.076
Age-band-2-sensation-seeking-by-marriage interaction (i.e., differences between marriage groups in sensation-seeking-on-slope-effects)				
Predicting the linear slope	$\chi^2(1)$=3.66	0.056	$\chi^2(1)$=0.11	0.731
Predicting the quadratic slope	$\chi^2(1)$=1.91	0.167	$\chi^2(1)$=0.00	0.956
Predicting both slopes	$\chi^2(2)$=4.05	0.132	$\chi^2(2)$=3.21	0.200
Neuroticism-change-by-marriage interaction (i.e., differences between marriage groups in neuroticism-on-slope-effects)				
Predicting the linear slope	$\chi^2(1)$=0.02	0.884	$\chi^2(1)$=0.00	0.940
Predicting the quadratic slope	$\chi^2(1)$=0.05	0.827	$\chi^2(1)$=0.02	0.883
Predicting both slopes	$\chi^2(2)$=0.05	0.975	$\chi^2(2)$=0.04	0.978
Age-band-2-neuroticism-by-marriage interaction (i.e., differences between marriage groups in neuroticism-on-slope effects)				

Predicting the linear slope	$\chi^2(1)=0.32$	0.571	$\chi^2(1)=0.19$	0.661
Predicting the quadratic slope	$\chi^2(1)=0.45$	0.503	$\chi^2(1)=0.34$	0.556
Predicting both slopes	$\chi^2(2)=0.45$	0.799	$\chi^2(2)=0.41$	0.812

Note. Models testing effects of age band 2 personality controlled for age band 1 personality.

Table C19

Testing parental alcoholism as a moderator of personality effects on the alcohol consumption and drinking consequence slopes.

Effects	Predicting alcohol consumption slopes		Predicting drinking consequence slopes	
	Estimate	*p*-value	Estimate	*p*-value
Parental-alcoholism-by-sensation-seeking-change interaction				
Predicting the linear slope	b = -0.784	0.155	b = -0.165	0.267
Predicting the quadratic slope	b = 0.055	0.233	b = 0.023	0.152
Predicting both slopes	$\chi^2(2)=2.04$	0.360	$\chi^2(2)=2.202$	0.333
Parental-alcoholism-by-age-band-2-sensation-seeking interaction				
Predicting the linear slope	b = -0.527	0.196	b = -0.107	0.289
Predicting the quadratic slope	b = 0.025	0.419	b = 0.005	0.623
Predicting both slopes	$\chi^2(2)=2.92$	0.232	$\chi^2(2)=2.102$	0.350
Parental-alcoholism-by-neuroticism-change interaction				
Predicting the linear slope	b = 0.583	0.320	b = 0.081	0.478
Predicting the quadratic slope	b = 0.018	0.717	b = -0.002	0.875
Predicting both slopes	$\chi^2(2)=7.99$	0.018	$\chi^2(2)=1.150$	0.563
Parental-alcoholism-by-age-band-2-neuroticism interaction				
Predicting the linear slope	b = 0.770	0.094	b = 0.114	0.199
Predicting the quadratic slope	b = -0.045	0.216	b = -0.003	0.684
Predicting both slopes	$\chi^2(2)=3.66$	0.160	$\chi^2(2)=4.165$	0.125

Note. Models testing effects of age band 2 personality controlled for age band 1 personality.

Table C20

Testing gender as a moderator of personality effects on the alcohol consumption and drinking consequence slopes.

Effects	Predicting alcohol consumption slopes		Predicting drinking consequence slopes	
	Estimate	*p*-value	Estimate	*p*-value
Gender-by-sensation-seeking-change interaction				
Predicting the linear slope	b = -0.359	0.549	b = -0.076	0.603
Predicting the quadratic slope	b = 0.024	0.625	b = 0.001	0.925
Predicting both slopes	$\chi^2(2)=0.37$	0.832	$\chi^2(2)=0.974$	0.615
Gender-by-age-band-2-sensation-seeking interaction				
Predicting the linear slope	b = -0.779	0.071	b = -0.133	0.206
Predicting the quadratic slope	b = 0.063	0.046	b = 0.005	0.632
Predicting both slopes	$\chi^2(2)=4.05$	0.132	$\chi^2(2)=3.421$	0.181
Gender-by-neuroticism-change interaction				
Predicting the linear slope	b = 0.426	0.456	b = 0.022	0.826
Predicting the quadratic slope	b = -0.013	0.782	b = -0.004	0.733
Predicting both slopes	$\chi^2(2)=1.33$	0.515	$\chi^2(2)=0.129$	0.938
Gender-by-age-band-2-neuroticism interaction				
Predicting the linear slope	b = 0.124	0.777	b = 0.015	0.872
Predicting the quadratic slope	b = -0.041	0.233	b = -0.008	0.394
Predicting both slopes	$\chi^2(2)=6.45$	0.040	$\chi^2(2)=2.659$	0.265

Note. Models testing effects of age band 2 personality controlled for age band 1 personality.

Table C21

Results of models testing mediated effects of parental alcoholism through growth personality predicting alcohol consumption and drinking consequence slopes

	Predicting alcohol consumption slopes		Predicting drinking consequence slopes	
	Estimate	*p*-value	Estimate	*p*-value
Mediated effects through sensation-seeking change				
A path: Parental alcoholism to sensation-seeking change	b = 0.009	0.895	b = 0.008	0.899
B path: Sensation-seeking change to linear slope	b = 0.826	0.004	b = -0.004	0.954
B path: Sensation-seeking change to quadratic slope	b = -0.043	0.075	b = 0.005	0.483
B paths: Wald χ^2 test: Sensation-seeking change to both slopes	$\chi^2(2)$=10.68	0.005	$\chi^2(2)$=1.94	0.379
Direct effect: Parental alcoholism to linear slope	b = 0.250	0.310	b = 0.040	0.446
Direct effect: Parental alcoholism to quadratic slope	b = -0.030	0.126	b = 0.000	0.937
Direct effect: Wald χ^2 test: Parental alcoholism to both slopes	$\chi^2(2)$=3.32	0.019	$\chi^2(2)$=1.58	0.454
Mediated effects through age band 2 sensation-seeking				
A path: Parental alcoholism to age band 2 sensation-seeking	b = 0.103	0.035	b = 0.106	0.032
B path: Age band 2 sensation-seeking to linear slope	b = 0.709	0.016	b = -0.028	0.687
B path: Age band 2 sensation-seeking to quadratic slope	b = -0.042	0.054	b = 0.010	0.128
B paths: Wald χ^2 test: Age band 2 sensation-seeking to both slopes	$\chi^2(2)$=6.22	0.045	$\chi^2(2)$=5.54	0.063
Direct effect: Parental alcoholism to linear slope	b = 0.178	0.474	b = 0.039	0.459
Direct effect: Parental alcoholism to quadratic slope	b = -0.023	0.247	b = -0.001	0.842
Direct effect: Wald χ^2 test: Parental alcoholism to both slopes	$\chi^2(2)$=1.98	0.372	$\chi^2(2)$=1.11	0.575
Mediated effects through neuroticism change				
A path: Parental alcoholism to neuroticism change	b = -0.050	0.406	b = -0.047	0.445
B path: Neuroticism change to linear slope	b = 0.229	0.434	b = 0.093	0.067
B path: Neuroticism change to quadratic slope	b = 0.013	0.593	b = 0.001	0.803
B paths: Wald χ^2 test: Neuroticism change to both slopes	$\chi^2(2)$=6.90	0.032	$\chi^2(2)$=11.88	0.003
Direct effect: Parental alcoholism to linear slope	b = 0.256	0.305	b = 0.036	0.497
Direct effect: Parental alcoholism to quadratic slope	b = -0.028	0.159	b = 0.001	0.862
Direct effect: Wald χ^2 test: Parental alcoholism to both slopes	$\chi^2(2)$=2.39	0.303	$\chi^2(2)$=2.24	0.327
Mediated effects through age band 2 neuroticism				
A path: Parental alcoholism to age band 2 neuroticism	b = -0.006	0.898	b = -0.006	0.906
B path: Age band 2 neuroticism to linear slope	b = 0.420	0.169	b = 0.129	0.010
B path: Age band 2 neuroticism to quadratic slope	b = -0.014	0.568	b = -0.004	0.446
B paths: Wald χ^2 test: Age band 2 neuroticism to both slopes	$\chi^2(2)$=3.69	0.158	$\chi^2(2)$=10.56	0.005
Direct effect: Parental alcoholism to linear slope	b = 0.251	0.326	b = 0.027	0.607
Direct effect: Parental alcoholism to quadratic slope	b = -0.027	0.169	b = 0.001	0.817

Direct effect: Wald χ^2 test: Parental alcoholism to both slopes	$\chi^2(2)=2.36$	0.307	$\chi^2(2)=1.69$	0.429

Note. Results other than a paths, b paths, and direct effects (i.e., c' paths) were omitted to focus on key estimates. Models testing effects of age band 2 personality controlled for age band 1 personality.

Table C22

Results of models testing mediated effects of gender through personality predicting alcohol consumption and drinking consequence slopes

	Predicting alcohol consumption slopes		Predicting drinking consequence slopes	
	Estimate	*p*-value	Estimate	*p*-value
Mediated effects through sensation-seeking change				
A path: Gender to sensation-seeking change	$b = 0.149$	0.018	$b = 0.153$	0.016
B path: Sensation-seeking change to linear slope	$b = 0.826$	0.004	$b = -0.004$	0.954
B path: Sensation-seeking change to quadratic slope	$b = -0.043$	0.075	$b = 0.005$	0.483
B paths: Wald χ^2 test: Sensation-seeking change to both slopes	$\chi^2(2)=10.68$	0.005	$\chi^2(2)=1.94$	0.379
Direct effect: Gender to linear slope	$b = -0.497$	0.037	$b = -0.111$	0.054
Direct effect: Gender to quadratic slope	$b = 0.019$	0.299	$b = 0.012$	0.032
Direct effect: Wald χ^2 test: Gender to both slopes	$\chi^2(2)=8.57$	0.014	$\chi^2(2)=4.65$	0.098
Mediated effects through age band 2 sensation-seeking				
A path: Gender to age band 2 sensation-seeking	$b = 0.239$	0.000	$b = 0.240$	0.000
B path: Age band 2 sensation-seeking to linear slope	$b = 0.709$	0.016	$b = -0.028$	0.687
B path: Age band 2 sensation-seeking to quadratic slope	$b = -0.042$	0.054	$b = 0.010$	0.128
B paths: Wald χ^2 test: Age band 2 sensation-seeking to both slopes	$\chi^2(2)=6.22$	0.045	$\chi^2(2)=5.54$	0.063
Direct effect: Gender to linear slope	$b = -0.512$	0.040	$b = -0.109$	0.062
Direct effect: Gender to quadratic slope	$b = 0.024$	0.184	$b = 0.011$	0.037
Direct effect: Wald χ^2 test: Gender to both slopes	$\chi^2(2)=6.44$	0.040	$\chi^2(2)=4.39$	0.111
Mediated effects through neuroticism change				
A path: Gender to neuroticism change	$b = -0.029$	0.628	$b = -0.034$	0.569
B path: Neuroticism change to linear slope	$b = 0.229$	0.434	$b = 0.093$	0.067
B path: Neuroticism change to quadratic slope	$b = 0.013$	0.593	$b = 0.001$	0.803
B paths: Wald χ^2 test: Neuroticism change to both slopes	$\chi^2(2)=6.90$	0.032	$\chi^2(2)=11.88$	0.003
Direct effect: Gender to linear slope	$b = -0.356$	0.126	$b = -0.110$	0.049
Direct effect: Gender to quadratic slope	$b = 0.012$	0.500	$b = 0.013$	0.017
Direct effect: Wald χ^2 test: Gender to both slopes	$\chi^2(2)=5.41$	0.067	$\chi^2(2)=5.66$	0.059
Mediated effects through age band 2 neuroticism				
A path: Gender to age band 2 neuroticism	$b = -0.071$	0.126	$b = -0.077$	0.100
B path: Age band 2 neuroticism to linear slope	$b = 0.420$	0.169	$b = 0.129$	0.010
B path: Age band 2 neuroticism to quadratic slope	$b = -0.014$	0.568	$b = -0.004$	0.446
B paths: Wald χ^2 test: Age band 2 neuroticism to both slopes	$\chi^2(2)=3.69$	0.158	$\chi^2(2)=10.56$	0.005
Direct effect: Gender to linear slope	$b = -0.335$	0.149	$b = -0.115$	0.034
Direct effect: Gender to quadratic slope	$b = 0.009$	0.605	$b = 0.014$	0.011

Direct effect: Wald χ^2 test: Gender to both slopes	$\chi^2(2)=5.97$	0.051	$\chi^2(2)=6.54$	0.038

Note. Results other than a paths, b paths, and direct effects (i.e., c' paths) were omitted to focus on key estimates. Models testing effects of age band 2 personality controlled for age band 1 personality.

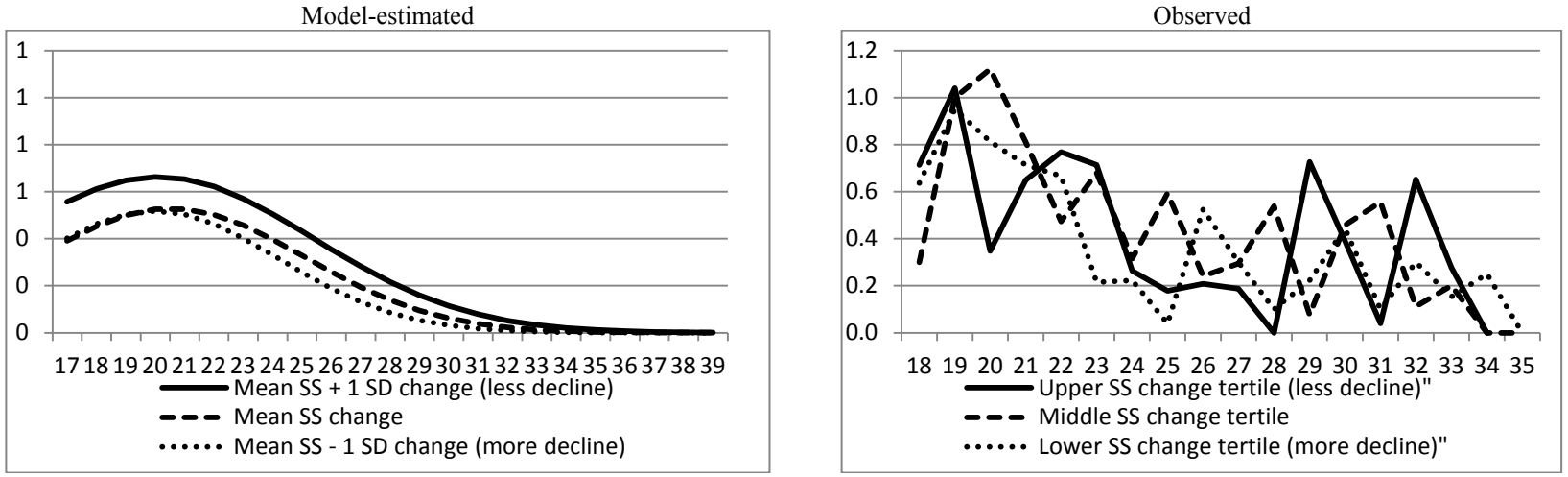

Figure C1. The left panel presents model-estimated conditional drinking consequence growth curves at different levels of latent sensation seeking change based on probing effects of latent sensation seeking change on the linear and quadratic slopes. These conditional drinking consequence growth curves are depicted at one standard deviation below the mean of latent sensation seeking change (a decrease of 0.74), at the mean of latent sensation seeking change (a decrease of 0.11), and at one standard deviation above the mean of latent sensation seeking change (an increase of 0.52). For comparison, the right panel presents observed drinking consequence means by age for (1) those in the lower tertile of observed sensation seeking change between age bands 1 and 2, (2) those in the middle tertile of observed sensation seeking change between age bands 1 and 2, and (3) those in the lower tertile of observed sensation seeking change between age bands 1 and 2. SS = sensation seeking.

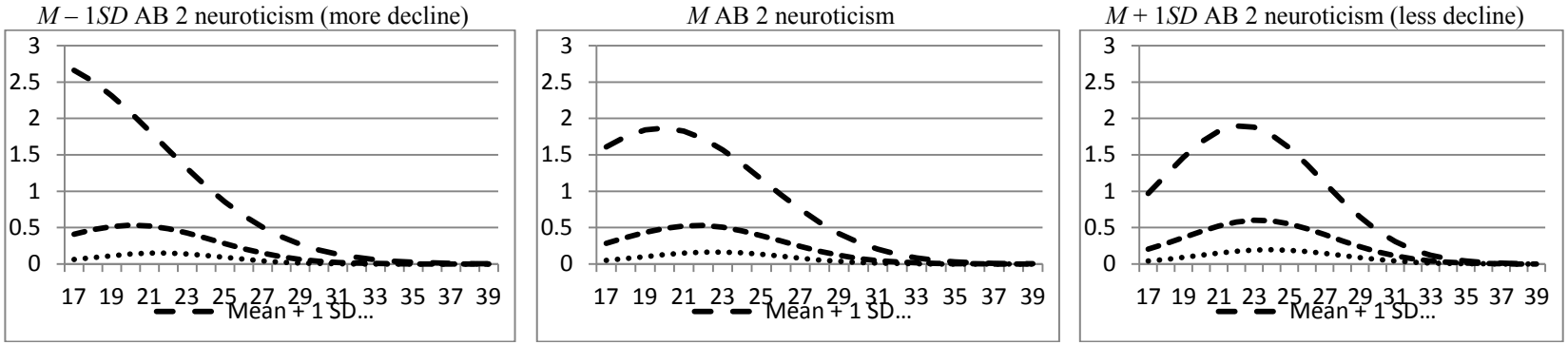

Figure C2. Based on probing the intercept-by-age-band-2-neuroticism interaction predicting drinking consequences, model-estimated conditional drinking consequence growth curves are presented separately at low (left panel), mean (center panel), and high (right panel) levels of neuroticism change and at three different levels of the drinking consequence intercept: (1) At one standard deviation below the intercept mean (0.15 consequences), (2) at the intercept mean (0.52 consequences), and (3) at one standard deviation above the intercept mean (1.83 consequences). AB = age band.

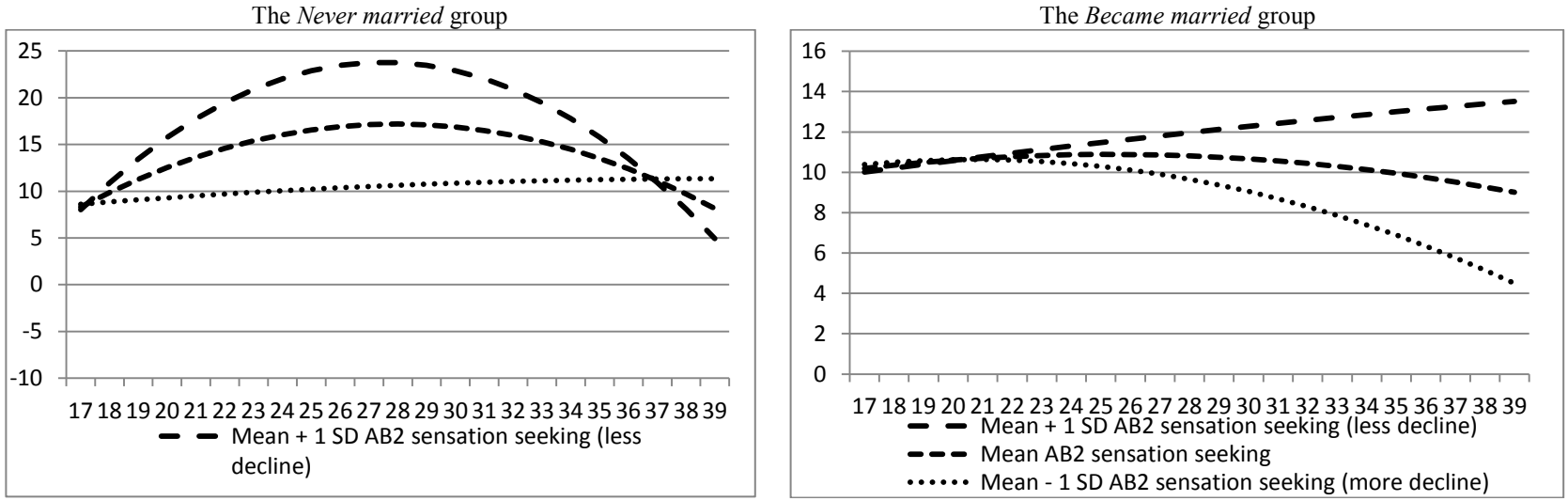

Figure C3. Separately for the *never married* group (left panel) and the *became married* group (right panel), model-estimated conditional alcohol consumption growth curves are presented at three different levels of age band 2 sensation-seeking: At one standard deviation below the age band 2 sensation seeking mean (a sensation-seeking value of 2.56), at age band 2 sensation-seeking mean (a sensation-seeking value of 3.20), and at one standard deviation above the age band 2 sensation-seeking mean (a sensation-seeking value of 3.84). These results are from the model controlling for parental alcoholism and gender.

APPENDIX D

ANALYSES TESTING INTERACTIONS BETWEEN SENSATION-SEEKING AND NEUROTICISM

As was suggested in my proposal meeting, supplemental analyses tested interactions between sensation-seeking and neuroticism as predictors of both alcohol consumption and drinking consequence slopes. These interactions were tested with observed sensation-seeking and neuroticism change scores variables (see Table D1) and with observed age band 2 sensation-seeking and neuroticism variables (while controlling for age band 1 levels; see Table D2). Across these analyses, no support was found for sensation-seeking-by-neuroticism interactions predicting either alcohol consumption slopes or drinking consequence slope.

Table D1

Results of models testing sensation-seeking-change-by-neuroticism-change interactions predicting alcohol consumption and drinking consequence slopes

	Predicting alcohol consumption slopes		Predicting drinking consequence slopes	
Initial model results	Estimate	*p*-value	Estimate	*p*-value
Effects of sensation-seeking change[a]				
Predicting the growth intercept	0.813	0.433	0.011	0.950
Predicting the linear slope	0.753	0.007	-0.035	0.629
Predicting the quadratic slope	-0.042	0.062	0.007	0.371
Effects of the neuroticism change[a]				
Predicting the growth intercept	-0.886	0.437	-0.130	0.461
Predicting the linear slope	0.187	0.496	0.071	0.204
Predicting the quadratic slope	0.016	0.458	0.004	0.565
Effects of the sensation-seeking-by-neuroticism interaction				
Predicting the growth intercept	0.640	0.721	-0.036	0.898
Predicting the linear slope	-0.117	0.796	-0.090	0.296
Predicting the quadratic slope	0.043	0.287	0.014	0.132
Intercepts[a]				
Growth intercept	13.198	0.000	-0.733	0.014
Linear slope	0.455	0.001	0.028	0.711
Quadratic slope	-0.044	0.000	-0.028	0.000
Wald χ^2 tests				
Interaction effects on both the linear and the quadratic slope tested simultaneously	$\chi^2(2)=3.21$ ($p=0.201$)		$\chi^2(2)=2.50$ ($p=0.286$)	

Note. Variances, residual variances, residual covariances, and zero-inflation thresholds were omitted to focus on key estimates.

[a] The observed personality change scores were mean centered. Thus, in the above initial model results, the effects of sensation-seeking change are conditional on a mean value of neuroticism change, the effects of neuroticism are conditional on a mean value of sensation-seeking change, and intercepts of the growth intercept and the two slopes represent conditional growth intercept and slope estimates at the mean levels of both personality change variables.

Table D2

Results of models testing age-band-2-sensation-seeking-by-age-band-2-neuroticism interactions predicting alcohol consumption and drinking consequence slopes (controlling for age-band 1 personality variables)

	Predicting alcohol consumption slopes		Predicting drinking consequence slopes	
Initial model results	Estimate	*p*-value	Estimate	*p*-value
Effects of age band 1 sensation-seeking				
Predicting the growth intercept	2.913	0.007	0.381	0.018
Predicting the linear slope	-0.621	0.020	-0.017	0.791
Predicting the quadratic slope	0.023	0.336	-0.002	0.731
Effects of age band 1 neuroticism				
Predicting the growth intercept	0.307	0.793	0.242	0.182
Predicting the linear slope	-0.215	0.452	-0.097	0.062
Predicting the quadratic slope	-0.006	0.809	0.003	0.592
Effects of age band 2 sensation-seeking[a]				
Predicting the growth intercept	4.683	0.000	0.518	0.004
Predicting the linear slope	0.681	0.015	-0.038	0.543
Predicting the quadratic slope	-0.046	0.026	0.012	0.051
Effects of age band 2 neuroticism[a]				
Predicting the growth intercept	-0.014	0.989	0.318	0.071
Predicting the linear slope	0.448	0.125	0.129	0.018
Predicting the quadratic slope	-0.013	0.590	-0.004	0.532
Effects of the age-band-2-sensation-seeking-by-age-band-2-neuroticism interaction				
Predicting the growth intercept	-0.267	0.823	-0.035	0.847
Predicting the linear slope	-0.491	0.152	-0.061	0.399
Predicting the quadratic slope	0.037	0.101	0.002	0.696
Intercepts[a]				
Growth intercept	13.140	0.000	-0.824	0.002
Linear slope	0.456	0.001	0.021	0.778
Quadratic slope	-0.044	0.000	-0.027	0.000
Wald χ^2 tests				
Interaction effects on both the linear and the quadratic slope tested simultaneously	$\chi^2(2)=2.76$ ($p=0.251$)		$\chi^2(2)=1.39$ ($p=0.499$)	

Note. Variances, residual variances, and residual covariances, and zero-inflation thresholds were omitted above to focus on key estimates.

[a] The observed age band 2 personality variables were mean centered. Thus, in the above initial model results, the effects of age band 2 sensation-seeking are conditional on the mean level age band 2 neuroticism, the effects of age band 2 neuroticism are conditional on the mean level of age band 2 sensation-seeking, and the intercepts of the growth intercept and the two slopes represent conditional intercept and slope estimates at the mean levels of both age band 2 personality variables.