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Integrating Social-Contextual and Intrapersonal Mechanisms of “Maturing Out”: Joint Influences of Familial-Role Transitions and Personality Maturation on Problem-Drinking Reductions

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Abstract

Background—“Maturing out” of problem drinking is associated with both role transitions (e.g., getting married) and personality development. However, little is known concerning how these two mechanisms jointly influence problem-drinking desistance. This study investigated whether salutary effects of role transitions and personality occur at different points in young-adult development and whether they mediate one another’s effects.

Methods—Participants were initially recruited as first-year undergraduates, with family history of alcoholism overrepresented by design ($N=489$; Sher et al., 1991). Using four waves of data at roughly ages 21, 25, 29, and 34, cross-lagged panel models estimated prospective relations among familial-role transitions (marriage or parenthood), personality (disinhibition, conscientiousness, and neuroticism), and problem drinking.

Results—Mixed support was found for the prediction of roles being more strongly associated with earlier maturing out of problem drinking and personality being more strongly associated with later maturing out. Regarding mediation, no evidence was found for the expectation that role effects would be mediated by personality. However, results did support mediation of personality effects by role transitions. Specifically, lower disinhibition and higher conscientiousness in emerging adulthood predicted role adoption, which, in turn, predicted later problem-drinking reductions. Family history of alcoholism also distally influenced these mediation processes.

Conclusions—The differential timing of role and personality effects is consistent with the notion of decreasing contextual influences and increasing intrapersonal influences across development. In light of role incompatibility theory, results suggest that, over the course of development, the association of familial roles with problem drinking may increasingly reflect problem-drinking effects on role entry (i.e., role selection) and decreasingly reflect role entry effects on problem drinking (i.e., role socialization). As emerging-adult disinhibition and conscientiousness were associated with an apparent developmental cascade of both direct and indirect effects, findings highlight their potential importance as etiologic mechanisms and intervention targets.

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Keywords

Alcohol; young adulthood; maturing out; familial-role transitions; personality maturation

Introduction

A key finding informing a developmental understanding of pathological drinking is the dramatic reduction in alcohol use and related pathology beginning in young adulthood (Johnston, O'Malley, Bachman, Schulenberg, & Miech, 2014; Li, Hewitt, & Grant, 2007). Despite this overall trend toward “maturing out,” some individuals show developmentally stable or escalating patterns of drinking pathology (Jackson & Sher, 2005). Thus, understanding factors that differentiate developmentally-limited versus persistent patterns of risky drinking is a central research objective, as this might clarify the nature of drinking pathology and inform policy and clinical interventions (Watson & Sher, 1998). These are key public health objectives, as alcohol use disorders (AUDs) are among the most prevalent mental health problems in the U.S. (Kessler et al., 2005), costing \$224 billion annually and representing the third leading preventable cause of mortality (Bouchery et al., 2011; Mokdad et al., 2004). This study aimed to advance understanding of natural desistance by extending and integrating past research on mechanisms of young-adult maturing out.

Role Transitions and Maturing Out

The most common explanation for young-adult maturing out is that it is driven by transitions into roles like marriage, parenthood, and employment (Bachman, Wadsworth, O'Malley, & Johnston, 1997). Young adulthood is marked by widespread adoption of such roles (Bachman et al., 1997), and well-established developmental theory views these transitions as key young-adult developmental tasks (Erikson, 1968). Indeed, particularly for marriage and parenthood, empirical evidence strongly supports these roles' influences on drinking reductions (Bachman et al., 1997; Gotham, Sher, and Wood, 2003; Lee, Chassin, & MacKinnon, 2010; Staff et al., 2010), presumably because the demands and obligations of these roles are incompatible with a heavy drinking lifestyle (Yamaguchi & Kandel, 1985).

Personality and Maturing Out

A vast, longstanding literature exists linking personality with alcohol involvement (Littlefield & Sher, 2010). However, perhaps due to increased recent interest in developmentally-normative personality change (Roberts, Walton, & Viechtbauer, 2006), personality maturation has only recently been considered as a possible mechanism of young-adult maturing out of problem drinking. Littlefield, Sher, and Wood (2009, 2010) showed that decreases in problem drinking from age 18- 35 corresponded with parallel increases in conscientiousness and decreases in disinhibition and neuroticism.

Advancing Integrative Models of Role and Personality Influences on Maturing Out

Beyond evidence that familial-role transitions and personality maturation *uniquely* predict young-adult maturing out (Littlefield et al., 2009, 2010), many questions remain regarding how these processes operate within the context of one another. The current study evaluated

an integrative model of social-contextual and intrapersonal mechanisms of maturing out by investigating (1) differential developmental timing of role and personality effects and (2) mediation among these effects.

Differential timing hypotheses—Role transitions and personality change may convey their strongest effects on maturing out at different points in young-adult development. There is considerable support for the general notion that, across development, environmental factors decrease and intrapersonal factors increase in their influences on problem behaviors (Kendler et al., 2007). This may occur, in part, because individuals increasingly construct their own environments with age (Scarr & McCartney, 1983). We therefore hypothesized that familial-role effects on problem drinking would be more substantial in early young adulthood, whereas stronger personality effects would emerge later.

Mediation hypotheses—There are theoretical reasons to hypothesize both directions of influence between role transitions and personality maturation. These form the basis for two different hypotheses regarding how these two mechanisms may mediate one another's effects on problem drinking. The *social investment principle* (Roberts, Wood, & Smith, 2005) holds that personality matures in response to new adult responsibilities. Thus, young-adult role transitions may goad personality maturation, which may then influence problem-drinking reductions. We therefore hypothesized a mediational process whereby role transitions would predict personality maturation and personality maturation would, in turn, predict problem-drinking reductions.

Alternatively, personality may be minimally influenced by context, with personality maturation instead biologically programmed to unfold in particular ways over development (McCrae et al., 2000). This implies that any influences between personality and roles would be in the direction of personality maturation spurring role adoption. We therefore also hypothesized a mediational process whereby personality maturation would predict role transitions and role transitions would, in turn, predict problem-drinking reductions.

These two hypothesized mediational processes are not necessarily mutually exclusive, as bidirectionality of effects between personality and roles is plausible. Thus, we anticipated that findings could show both (1) personality mediating role effects on problem drinking and (2) roles mediating personality effects on problem drinking.

The Current Study—We investigated the above hypotheses through cross-lagged panel models of four longitudinal assessments spanning ages 21-34. Analyses focused on the familial roles of marriage and parenthood and the personality domains of disinhibition, conscientiousness, and neuroticism.

Materials and Methods

Participants

Participants were a high-risk sample initially recruited as first-time freshman at a large Midwestern University ($N=489$; $M_{\text{age}}=18.6$; $SD_{\text{age}}=0.97$; 53% male; 86% non-Hispanic Caucasian; Sher, Walitzer, Wood, & Brent, 1991). By design, approximately half (48.7%) of

the sample had a family history of AUD (see Recruitment). Data were collected annually for Waves 1-4 and over a subsequent span of 14 years for Waves 5-7. Retention of Wave-1 participants was 96.3%, 93.5%, 83.8%, and 78.3% at Waves 4, 5, 6, and 7, respectively. Analyses used data from Waves 4-7 (as some personality measures were not assessed earlier) and excluded six participants who abstained from alcohol across these waves. Following this exclusion, the current sample of those assessed at least once across Waves 4-7 ($N=465$) had mean ages of 21.3 ($SD=0.93$), 24.5 ($SD=0.98$), 29.0 ($SD=1.03$), and 34.3 ($SD=0.82$) at Waves 4, 5, 6, and 7, respectively. This sample was 49.2% familial-AUD-positive, 53% male, 86% non-Hispanic Caucasian, 8% Native-American, 5% African-American, 1% Asian, and <1% Hispanic; and 56% had a parent who graduated college. See Table 1 for more demographics.

Recruitment

Initially, 3,156 freshmen were screened for parental drinking problems using an adapted version (Crews & Sher, 1992) of the Short Michigan Alcoholism Screening Test (S-MAST; Selzer, Vinokur, & van Rooijen, 1975). Only 808 respondents tentatively classified as either high-risk (S-MAST ≥ 4 for either biological parent) or low-risk (S-MAST ≤ 1 for both biological parents) were further assessed using sections of the Family History-Research Diagnostic Criteria interview (FH-RDC; Endicott, Andreasen, & Spitzer, 1978). Respondents were retained in the final high-risk group ($n=238$) if the FH-RDC confirmed paternal AUD (regardless of maternal AUD).¹ (Just 20 respondents reported only maternal AUD, so paternal AUD was required for inclusion to provide a single high-risk group.) Respondents were retained in the final low-risk group ($n=251$) if the FH-RDC detected no first- or second-degree relative with alcohol or drug disorder and no first-degree relative with antisocial personality disorder. For recruitment details, see Sher et al. (1991).

Measures

Problem drinking—*Problem drinking* was a count of 27 past-year, “yes/no” items, with 14 items assessing negative consequences of drinking (e.g., physical fights, complaints from others) and 13 items reflecting alcohol dependence symptomatology (e.g., tolerance/withdrawal, loss of control; consistent with the alcohol dependence syndrome described by Edwards & Gross, 1976). Some items were derived from the Michigan Alcoholism Screening Test (Selzer, 1971), with additional items generated to produce a comprehensive assessment of drinking consequences and symptomatology (Hurlburt & Sher, 1992). Across Waves 4-7, coefficient alphas ranged from .87-.90.

Role transitions—At Waves 5, 6, and 7, two items assessing marital and parenthood status (respectively) were used to classify participants as either (1) being never married or a parent at a given wave or (2) having become married or a parent in the interval since the previous wave. Participants were treated as missing at a given wave if they had already transitioned to one of these roles prior to the previous wave (see Analyses). For example, the

¹Due to the scarcity of male high-risk potential participants, 15 males scoring a three on the paternal S-MAST were screened further and included as high-risk participants in the final Wave-1 sample on the basis of subsequent FH-RDC interviews assessing paternal problem drinking. A number of analyses comparing these 15 participants with the other high-risk males on study variables failed to show any significant differences (Sher et al., 1991).

Wave-6 role transition variable contrasted those who had never become married or parents by Wave 6 versus those who became married or parents between Waves 5 and 6, and those who became married or parents before Wave 5 were treated as missing on this variable. Marriage and parenthood were combined because correlations between separate marriage and parenthood transition variables in preliminary analyses raised concerns regarding multicollinearity (r s from .65-.79 across Waves 5-7). Respectively, n s for the “never transitioned” and “recently transitioned” groups were 287 and 130 at Wave 5, 129 and 116 at Wave 6, and 67 and 49 at Wave 7. Table 1 reports rates of other study variables within these groups, but note that analyses adjusted for possible differences between the role transition groups on other modeled variables.

Personality—Disinhibition was assessed with three items from the Eysenck Personality Inventory (EPI; Eysenck & Eysenck, 1968) and one item from the Novelty Seeking subscale of the Tridimensional Personality Questionnaire (TPQ; Cloninger, Przybeck, & Svrakic, 1991). These are four of the ten “impulsivity” items used by Littlefield et al. (2009, 2010), as the other six items were not assessed at Wave 4. In light of evidence for the multifaceted nature of disinhibition (Cyders, & Smith, 2007), it is noteworthy that the content of these items predominantly represents the “lack of planning” disinhibition facet (see Limitations).² Beginning at Wave 4, *conscientiousness* and *neuroticism* were assessed with the 60-item NEO Five-Factor Inventory (NEO-FFI; Costa & McCrae, 1989). Across Waves 4-7, coefficient alphas ranged from .59-.67 for disinhibition, .83-.84 for conscientiousness, and .85-.87 for neuroticism.

Familial AUD—As described in the Recruitment section, family-history-positive participants had an alcoholic biological father (regardless of alcoholism in the biological mother); family-history-negative participants had no first or second-degree relative with alcohol or drug disorder and no first-degree relative with antisocial personality disorder.

Results

Analytic Plan

All models were estimated with MPlus version 7.11, using a mean- and variance-adjusted weighted least-squares estimator (WLSMV) and Theta parameterization to account for non-normality and the categorical role transition variables (Muthén & Muthén, 1998-2012). Models allowed missing data on endogenous variables, facilitating inclusion of the full current sample ($N=465$) despite missing data from attrition (see Participants) and our strategic use of missing data assignment on the role transition variables (discussed below).

Cross-lagged panel models were estimated to characterize prospective effects among role transitions, personality, and problem drinking across Waves 4-7 (i.e., ages 21, 25, 29, and 34).³ Each personality measure was analyzed separately, thus resulting in separate models for disinhibition, conscientiousness, and neuroticism. Figure 1 illustrates all regression paths

²The four items are (1) “I do and say things without stopping to think” (EPI), (2) “I often do things spur of moment” (EPI), (3) “I think things over before doing anything” (EPI; reverse-coded) and (4) “I nearly always think about all the facts in detail before I make a decision, even when other people demand a quick decision” (TPQ; reverse-coded).

and residual covariances that were simultaneously estimated in each of these three models. Table 2 reports estimates for all regression paths and residual covariances from these three models, and Figure 2 presents only significant regression paths from these models.

Model details—As depicted in the Figure 1's upper-left panel, each of the three models estimated longitudinal cross-lagged effects among problem drinking, role transitions, and one of the three personality variables. As depicted in Figure 1's upper-right panel, all three models also estimated autoregressive effects of personality and problem drinking across waves. For problem drinking, autoregressive paths included Wave-4 (i.e., age-21) problem-drinking effects on Waves 6 and 7 (ages 29 and 34) problem drinking, as preliminary models with only lag-1 effects yielded modification indices supporting these additional lag-2 and lag-3 effects. Autoregressive paths were not estimated among role transition variables because these variables themselves reflect change across waves, so it was unnecessary to adjust for values on an earlier role transition variable when predicting a later role transition variable. Thus, as depicted in Figure 1's lower-left panel, residual covariances were instead estimated among the role transition variables, along with residual covariances accounting for contemporaneous (i.e., within-wave) associations among problem drinking, role transitions, and personality. Finally, as depicted in Figure 1's lower-right panel, familial AUD and sex were treated as covariates and thus modeled as exogenous predictors of all other model variables.

Explanation is warranted regarding our approach of modeling role transitions at a given wave by contrasting those who had not adopted a role by that wave versus those who adopted a role since the previous wave, with those who adopted a role earlier than the previous wave treated as missing (see Measures). In other contexts where role transitions are either exogenous predictors or non-mediating endogenous outcomes, they can be treated as having more than two categories, for instance including never, recently, and previously transitioned. However, our approach was chosen given our interest in recent role transitions as a mediator, as methods are not well-established for modeling a nominal mediator with more than two categories (Muthén & Muthén, 1998-2012).⁴

³Note that a number of ancillary analyses produced results that were highly consistent with those of our primary models, thereby supporting the robustness of our findings (also see Footnote 4). This included re-estimating our primary models except excluding one key construct at a time to examine prospective effects among just the other two (e.g., excluding role transitions to test effects among only problem drinking and personality; see Models 2-4 in Online Supplements Tables S1-S3). In addition, two sets of analyses re-estimated our models controlling for prospective effects of (1) occupational and educational role status within different waves and (2) transitions in occupational and educational statuses between waves (see Online Supplements Tables S4 and S5). Although generally consistent with our key findings, the single noteworthy exception was that, when controlling for employment and student role statuses, greater age-21 conscientiousness significantly predicted lower age-25 problem drinking.

⁴This method we employed to isolate effects of *recent* role transitions is similar to an approach for modeling events in discrete-time survival analysis with time-varying covariates (Muthén & Masyn, 2005). In these models, as with our models, the contrast of interest at a given time point is those who have not yet experienced an event versus those who first reported the event at that time point, so those who already reported the event at any earlier time points are treated as missing. This is also consistent with the recommended practice of treating cases with “non-applicable” values for a given variable as having missing data on that variable to allow their inclusion in a larger model (e.g., Holman et al., 2004). Just as, for example, a measure of sibling characteristics is non-applicable for those without siblings and thus may be treated as missing for these participants, our measure contrasting those who never versus recently transitioned to a role is non-applicable for those who made earlier role transitions and thus may be treated as missing for these participants. It is also noteworthy that supplemental analyses were conducted to ensure confidence in this approach. These analyses showed the same effects of and on the role transition variables in models that included only one role transition variable at a time and excluded those initially treated as missing on that role transition variable (see Models 5-7 in Online Supplements Tables S1-S3).

Approach to testing differential timing and mediation hypotheses—Differential timing of role and personality effects was investigated via Wald χ^2 tests which assessed whether constraining a given construct's effects (e.g., personality effects) to be invariant across waves would significantly decrease model fit (Muthén & Muthén, 1998-2012).

Mediation was initially evaluated using the *joint significance test* by observing if any two paths comprising a potential mediated pathway were both significant (MacKinnon, 2008). For mediated pathways satisfying this initial test, mediation was confirmed by estimating the product of the two path estimates (i.e., the product of coefficients method; MacKinnon, 2008) along with bias-corrected bootstrap confidence intervals (CIs) for the product (accounting for the product's non-normal sampling distribution; Mplus MODEL INDIRECT and BCBOOTSTRAP commands; MacKinnon, 2008; Muthén & Muthén, 1998-2012).

Evidence for Differential Developmental Timing of Role and Personality Effects

Results preliminarily supported the hypothesis that role effects on problem drinking would be stronger in early-young-adulthood whereas personality effects would be stronger in later-young-adulthood (see Figure 2). All three models showed significant effects of age-25 role adoption on lower age-29 problem drinking, whereas effects of age-29 role adoption on age-35 problem drinking were consistently non-significant. In contrast, age-21 and age-25 personality effects on problem drinking were non-significant across the three personality measures, whereas both lower age-29 disinhibition and higher age-29 conscientiousness predicted lower age-35 problem drinking.

However, only some of these apparent differences in effects across waves were confirmed via Wald tests (see Table 3). For roles, these tests failed to confirm stronger effects of age-25 versus age-29 role transitions on subsequent problem drinking (p -values from .207-.279). However, for personality, an omnibus tests of differences among age-21, age-25, and age-29 disinhibition effects was significant ($p=.013$), while an analogous omnibus test for conscientiousness was just short of significant ($p=.058$). Pairwise follow-up tests showed that both disinhibition and conscientiousness effects were significantly stronger at age 29 than at age 25 (p -values of .003 and .031, respectively), while tests of whether these effects were significantly stronger at age 29 than at age 21 were just short of significant (p -values of .072 and .054, respectively). (Simulations indicated limited statistical power for these contrasts of effects across waves, especially for role transition effects.⁵)

A possible alternative explanation for role effects being significant at age 25 but not age 29 is that statistical power was greater at age 25, given that n s were larger for the “never transitioned” and “recently transitioned” groups at age 25 (287 and 130, respectively)

⁵Power simulations (see Online Supplements Table S6) were first conducted assuming true population values roughly equivalent to those obtained from the disinhibition and conscientiousness models. Results showed substantially higher power to detect effects of role transitions (.83-.93) and personality (.65-.83) on problem drinking when compared to power to detect differences across waves in effects of role transitions (.30-.33) and personality (.192-.645) on problem drinking. Further, a series of additional simulations assuming successively increasing true population values for these effects showed that, with standardized effects around .2 (~.1=“small”; ~.3=“medium”; Cohen, 1988), power exceeded .8 for role (.87-.89) and personality effects (.97-.98) on problem drinking. In contrast, power to detect differences in role transition effects exceeded .8 only with standardized role effects differing by around .3 between waves (.82), although power to detect differences in personality effects closely approached or exceeded .8 with standardized personality effects differing by about .2 between waves (.78-.83).

relative to age 29 (129 and 116, respectively). However, we believe this seems a less likely explanation when considering the pattern of results, as standardized regression coefficients were substantially larger at age 25 than at age 29. In fact, given Cohen's (1988) effect size guidelines where .1 is small and .3 is medium, role effects were small-to-medium-sized at age 25 (ranging from $-.20$ to $-.22$; ps from .007 to .002) and below small-sized at age 29 (ranging from $-.06$ to $-.07$; ps from .562 to .456).

Post hoc analyses motivated by role-selection-related model results—Although not hypothesized, results also showed a pattern where age-21 problem drinking did not predict age-25 role transitions, but age-25 problem drinking did predict a decreased likelihood of age-29 role transitions (see Figure 2). Note, though, that Wald tests (see Table 3) failed to show a significant difference between these two effects (simulations also indicated limited power for this contrast⁶). Nonetheless, we speculated that, if problem drinking has a greater effect of preventing role selection in *later* young adulthood, this may explain the above finding that later-young-adult role transitions have a less substantial effect on subsequent problem drinking. The selection process implies that, more so in this later period, those who adopted roles tended to be relatively low-risk drinkers prior to role adoption. Thus, in this later period, role effects may be more limited to those who defied this role selection process by adopting roles despite high problem drinking. Post hoc analyses supported this notion, showing moderation such that age-29 role transitions predicted lower age-35 problem drinking only among those with relatively high pre-role problem drinking (at age 25; see Table 4).

Evidence for Mediation

Personality Mediating Role Effects—Results provided no support for the hypothesis that personality maturation would mediate role transition effects on problem-drinking reductions, as role transitions consistently failed to predict personality maturation (see Figure 2).

Roles Mediating Personality Effects—Results supported the hypothesized mediation of personality effects by role adoption for disinhibition and conscientiousness (see Figure 2). Both lower disinhibition and higher conscientiousness at age 21 significantly predicted age-25 role adoption, which, in turn, significantly predicted lower age-29 problem drinking. Further, these mediated pathways were significant based on the product of coefficients method and corresponding bias-corrected bootstrap 95% CIs for both disinhibition (product=0.205; CIs: 0.014 to 0.617) and conscientiousness (product=-0.009; CIs: -0.026 to -0.001).

There was also evidence that both of the above mediated pathways extended earlier to include distal effect of familial AUD (see Figure 2; e.g., familial AUD to age-21 disinhibition, to age-25 role adoption, to age-29 problem drinking). Indeed, based on the

⁶The power simulations described in Footnote 5 (see Online Supplements Table S6) also showed that, when assuming true population values roughly equivalent to those obtained in our models, power to detect differences across waves in effects of problem drinking on role transitions ranged from .165-.171. Further, power to detect these differences reached .8 only with standardized problem drinking effects differing by around .3 between waves (.80).

product of coefficients method and corresponding bias-corrected bootstrap 95% CIs, three-path mediation originating from familial AUD was confirmed for both disinhibition (product=0.016; CIs: 0.002 to 0.061) and conscientiousness (product=0.019; CIs: 0.002 to 0.064). Analogous three-path mediation was also found originating from female sex predicting increase age-21 conscientiousness (see Figure 2; product=-0.014; CIs: -0.054 to -0.001).

Discussion

Past research has linked both role transitions and personality maturation to young-adult maturing out of problem drinking. However, our study is among the first to investigate these two processes within the same analytic frame. Findings discussed below include (1) evidence for differential timing of role and personality effects, (2) the lack of evidence for mediation of role effects by personality change, and (3) the evidence that lower disinhibition and higher conscientiousness can spur a cascade of ameliorative effects both directly and indirectly via familial-role adoption.

Differential developmental timing of role and personality effects

Findings tentatively supported the predicted differential timing of role and personality effects on maturing out of problem drinking. Role transition effects were observed only in early young adulthood, whereas disinhibition and conscientiousness effects were observed only in later young adulthood. However, the pattern of diminishing role effects with age should be interpreted with caution, as only personality effects differed significantly across waves, perhaps due to limited statistical power (see Footnote ⁵ regarding power simulations). Nonetheless, this pattern of findings is consistent with evidence that, across development, influences of contextual factors on problem behaviors decrease while influences of intrapersonal characteristics increase (Kendler et al., 2007).

Roles—Regarding the notion that contextual influences may diminish with development because individuals increasingly shape their own environments (Scarr & McCartney, 1983), such processes may be exemplified by our evidence for developmentally-increasing effects of problem drinking on subsequent role selection. As people increasingly select into or out of different environments based on individual characteristics (e.g., problem drinkers selecting out of familial-role entry), more often will individuals exposed to positive environments be at relatively low-risk prior to this exposure (those entering familial roles will tend to be low-risk drinkers prior to role entry). This may be one mechanism through which potentially salutary environments diminish in their influences over development. This interpretation is consistent with our post hoc evidence for moderation whereby later role effects occurred only for relatively high pre-role problem drinkers. Thus, later role effects may be more specific to those who defy developmentally-increasing role selection processes. Similar moderation was found by Lee, Chassin, and MacKinnon (2015) with a different sample, but the current findings add that this phenomenon may emerge or intensify with age due to developmental increases in role selection.

The above interpretation is consistent with role socialization theory (Yamaguchi & Kandel, 1985) which suggests that roles and problem behaviors can become associated through both

role selection and role socialization processes. In role selection, adoption of a given role may be more likely for individuals whose behaviors (e.g., drinking habits) are already compatible with demands of the role. In role socialization, adoption of a given role may result in subsequent changes in behaviors (e.g., drinking habits) due to behavioral incompatibility with role demands. Our findings suggest that, over time, the association between roles and problem drinking may increasingly reflect selection and decreasingly reflect socialization. This highlights the importance of empirically disentangling selection and socialization effects, as the overall association between roles and problem behaviors could remain developmentally stable but nonetheless result from different processes in different development periods. Future research should further explore this possibility, thereby extending role incompatibility theory into a developmental framework.

Although a level of nuance not captured here, role selection can also influence individually-varying role characteristics. For instance, heavy drinkers may be more likely to select a heavy-drinking spouse (i.e., assortative mating; Rhule-Louie & McMahon, 2007), and this may reinforce rather than mitigate existing patterns of problem drinking (Leonard, & Mudar, 2004). Thus, if this form of role selection also increases developmentally, this may be another mechanism through which influences of positive contextual factors like marriage diminish with age. This should be assessed in future studies employing detailed assessments of role characteristics (e.g., spouse drinking).

Personality—The current study also extended findings of correlated change between personality and problem drinking across emerging and young adulthood (Littlefield et al., 2009, 2010; using the same sample as the current study). For disinhibition and conscientiousness, our results (1) uniquely supported directional effects of personality on subsequent problem drinking and (2) clarified that these effects may emerge or intensify in later young adulthood. For neuroticism, we conclude that, despite correlated change with problem drinking (found by Littlefield et al. and replicated here by contemporaneous covariances [see Table 2]), directional neuroticism effects on subsequent problem drinking were not supported. An alternative prediction based on their correlated change is that heavy or consequential drinking may increase subsequent negative affect (McCarthy, Curtin, Piper, Baker, 2010), but directional problem-drinking effects on neuroticism were also not found. Other alternative explanations include (1) shorter-term transactional influences between the two constructs or (2) a “third variable” influence driving parallel changes in both constructs.

No Evidence that personality mediates role effects

The hypothesis that personality would mediate role effects on problem-drinking reductions was consistently not supported. The lack of role effects on personality is surprising, as it is inconsistent with past studies supporting the *maturity principle* by showing role-related influences on personality change (e.g., Robins, Caspi, & Moffitt, 2002; Roberts & Bogg, 2004). However, this past work has largely focused on how certain role characteristics can spur personality maturation, rather than influences of role transitions per se. For instance, marriage’s influence on neuroticism reductions may depend upon dimensions of relationship quality (e.g., support; Robins et al., 2002). In contrast, role-driven decreases in disinhibition and increases in conscientiousness may occur through processes of role incompatibility (i.e.,

behavioral conflict with role demands) similar to those believed to reduce risky behaviors. Indeed, maturation in these domains may even occur in part through behavioral changes (e.g., drinking reductions) that become internalized as self-perceived maturity (Roberts & Bogg, 2004). Broadly speaking, there may be different “active ingredients” of roles (e.g., support, role incompatibility) that determine how they will influence different aspects of intrapersonal maturation. A better understanding of this could aid future investigations of how personality maturation mediates role-driven maturing out.

Mediation of personality via role transitions

Toward establishing a more integrated conceptualization of contextual and intrapersonal maturing out mechanisms, a key finding was that role transitions mediated personality-maturation effects on problem-drinking reductions. For both disinhibition and conscientiousness, results suggested that greater emerging-adult intrapersonal maturity may spur subsequent early-young-adult familial-role adoption, which may then reduce problem drinking. Past work supports the importance of familial roles in maturing out of various problem behaviors (e.g., Bachman et al., 1997; Sampson, Laub, & Wimer, 2006). Our findings complement this work by showing that emerging-adult intrapersonal maturity can help initiate this key, subsequent process of young-adult role-driven maturing out. Further, as emerging-adult disinhibition and conscientiousness were distally influenced by familial AUD, our findings may illuminate long-term developmentally-cascading pathways (Masten et al., 2005) through which drinking pathology develops, persists, and escalates among high-risk individuals.

More generally, findings highlight the importance of emerging-adult disinhibition and conscientiousness by suggesting multiple pathways through which these domains of intrapersonal maturity may influence maturing out. Emerging-adult disinhibition and conscientiousness influenced drinking reductions both (1) by spurring early-young-adult role adoption and (2) by eventually contributing to later, more direct effects of intrapersonal maturity on problem-drinking reductions (via strong autoregressive effects spanning young adulthood). This elevates the importance of emerging-adult disinhibition and conscientiousness as etiologic influences and potentially fruitful intervention targets.

Littlefield et al. (2009) speculated that interventions aimed at fostering maturity in these domains might influence deeper and thus more durable changes in drinking behaviors. The current findings further support this avenue of intervention by suggesting multiple pathways through which the benefits can be conveyed, particularly if intervention occurs in emerging adulthood or earlier. Further, the distal influences of familial AUD on these pathways suggests that such interventions could buffer the deleterious influences of familial risk factors. Evidence from the behavior genetics literature has shown that such familial risk factors for adult alcohol problems are primarily genetic (Slutske et al., 2008), and that the correlation between alcohol involvement and impulsivity is largely due to genetic factors (Slutske et al., 2002). Therefore, such interventions may function by targeting individual predispositions that increase liability for AUD. The notion of interventions targeting personality change has received increased attention in the recent literature (e.g., Magidson, Roberts, Collado-Rodriguez, & Lejuez, 2014). Further, Moffitt et al. (2011) argued that

universal programs fostering early self-control could confer substantial benefits to most individuals and to the population as a whole, given their evidence that childhood disinhibition has persistent negative effects on various outcomes extending even into mid-adulthood (Moffitt et al., 2011). Our findings may illustrate just some pathways through which protective effects of such programs could cascade across multiple developmental stages and domains of life.

Limitations

Although this study makes an important contribution toward establishing a more integrated conceptualization of contextual and intrapersonal maturing out mechanisms, there are limitations. The first stems from our interest in characterizing directionality by testing prospective effects among constructs of interest. Given the broad time periods between waves, a considerable portion of the directional influences among these constructs may be represented within our models' more directionally-ambiguous within-wave covariances. Data with more frequent assessments could perhaps capture a greater portion of the prospective effects among these constructs. Second, sample size may have limited our statistical power, particularly when contrasting role effects across waves (see Footnote ⁵). Third, we focused only on transitions to *familial* roles, although we did show that results were robust when controlling for other role transitions associated with young adulthood (educational and occupational; see Footnote ³). Beyond this, we view focused investigations of these other roles as likely warranting separate consideration in future studies. Fourth, we chose a relatively dimensional measure of problem drinking to capture a range of variability on this construct, but our choice of this rather than a formal measure of AUD may limit certainty regarding clinical implications of our findings. Fifth, as noted earlier, our available disinhibition measure primarily represents the "lack of planning" facet of disinhibition. Future research should exploit recent developments in disinhibition assessment (Cyders, & Smith, 2007) to investigate how other disinhibition facets (e.g., negative and positive urgency) change developmentally and relate to maturing out. Sixth, the current sample is comprised of college-attending, primarily Caucasian participants, potentially limiting generalizability.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

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References

- Bachman, JG.; Wadsworth, KN.; O'Malley, PM.; Johnston, LD. Smoking, drinking, and drug use in young adulthood: The impacts of new freedoms and new responsibilities. Lawrence Erlbaum Associates, Inc.; Hillsdale, NJ, England: 1997.
- Bouchery EE, Harwood HJ, Sacks JJ, Simon CJ, Brewer RD. Economic costs of excessive alcohol consumption in the US, 2006. *American journal of preventive medicine*. 2011; 41(5):516–524. [PubMed: 22011424]

- Cloninger CR, Przybeck TR, Svrakic DM. The tridimensional personality questionnaire: US normative data. *Psychological reports*. 1991; 69(3):1047–1057. [PubMed: 1784653]
- Cohen, J. *Statistical power analysis for the behavioral sciences*. 2nd. Erlbaum; Hillsdale, NJ: 1988.
- Costa, P.; McCrae, R. *NEO PI/FFI manual supplement*. Psychological Assessment Resources; Odessa, Florida: 1989.
- Crews T, Sher KJ. Using adapted Short MASTs for assessing parental alcoholism: Reliability and validity. *Alcoholism: Clinical and Experimental Research*. 1992; 16:427–448.
- Cyders MA, Smith GT, Spillane NS, Fischer S, Annus AM, Peterson C. Integration of impulsivity and positive mood to predict risky behavior: Development and validation of a measure of positive urgency. *Psychological Assessment*. 2007; 19:107–118. doi:10.1037/1040-3590.19.1.107. [PubMed: 17371126]
- Edwards G, Gross MM. Alcohol dependence: Provisional description of a clinical syndrome. *British Medical Journal*. 1976; 1:1058–1061. [PubMed: 773501]
- Endicott, J.; Andreasen, N.; Spitzer, RL. *Family History-Research Diagnostic Criteria (FH-RDC)*. New York State Psychiatric Institute; New York: 1978.
- Erikson, EH. *Identity: youth and crisis*. Norton & Co.; Oxford, England: 1968.
- Eysenck, HJ.; Eysenck, SBG. *Manual of the Eysenck Personality Questionnaire*. Educational and Industrial Testing Services; San Diego, CA: 1968.
- Gotham HJ, Sher KJ, Wood PK. Alcohol involvement and developmental task completion during young adulthood. *Journal of Studies on Alcohol*. 2003; 64:32–42. [PubMed: 12608481]
- Holman R, Glas CA, Lindeboom R, Zwinderman AH, De Haan RJ. Practical methods for dealing with not applicable item responses in the AMC Linear Disability Score project. *Health and quality of life outcomes*. 2004; 2(1):16–29. [PubMed: 15038830]
- Hurlburt S, Sher K. Assessing alcohol problems in college students. *Journal of American College Health*. 1992; 41:49–58. [PubMed: 1460173]
- Jackson KM, Sher KJ. Similarities and differences of longitudinal phenotypes across alternate indices of alcohol involvement: A methodologic comparison of trajectory approaches. *Psychology of Addictive Behaviors*. 2005; 19:339–351. doi:10.1037/0893-164X.19.4.339. [PubMed: 16366806]
- Johnston, LD.; O'Malley, PM.; Bachman, JG.; Schulenberg, JE.; Miech, RA. *Monitoring the Future national survey results on drug use, 1975-2013: Volume II, college students and adults ages 19-55*. Institute for Social Research, The University of Michigan; Ann Arbor: 2014.
- Kendler KS, Jacobson KC, Gardner CO, Gillespie N, Aggen SA, Prescott CA. Creating a social world: a developmental twin study of peer-group deviance. *Archives of General Psychiatry*. 2007; 64(8): 958–965. [PubMed: 17679640]
- Kessler RC, Berglund P, Demler O, Jin R, Merikangas KR, Walters EE. Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of general psychiatry*. 2005; 62(6):593–602. [PubMed: 15939837]
- Lee MR, Chassin L, MacKinnon D. The effect of marriage on young adult heavy drinking and its mediators: Results from two methods of adjusting for selection into marriage. *Psychology of Addictive Behaviors*. 2010; 24:712–718. doi:10.1037/a0020983. [PubMed: 21198229]
- Lee MR, Chassin L, MacKinnon DP. Role Transitions and Young Adult Maturing Out of Heavy Drinking: Evidence for Larger Effects of Marriage Among More Severe Premarriage Problem Drinkers. *Alcoholism: Clinical and Experimental Research*. 2015; 39(6):1064–1074. PMID: 26009967 PMID: PMC4452406.
- Leonard KE, Mudar P. Husbands' influence on wives' drinking: Testing a relationship motivation model in the early years of marriage. *Psychology of Addictive Behaviors*. 2004; 18:340–349. [PubMed: 15631606]
- Li TK, Hewitt BG, Grant BF. Is there a future for quantifying drinking in the diagnosis, treatment, and prevention of alcohol use disorders? *Alcohol and Alcoholism*. 2007; 42(2):57–63. [PubMed: 17307789]
- Littlefield AK, Sher KJ. The multiple, distinct ways that personality contributes to alcohol use disorders. *Social and Personality Psychology Compass*. 2010; 4:767–782. doi:10.1111/j.1751-9004.2010.00296.x. [PubMed: 21170162]

- Littlefield AK, Sher KJ, Wood PK. Is “maturing out” of problematic alcohol involvement related to personality change? *The Journal of Abnormal Psychology*. 2009; 118:360–374. doi:10.1037/a0015125. [PubMed: 19413410]
- Littlefield AK, Sher KJ, Wood PK. A personality-based description of maturing out of alcohol problems: Extension with a five-factor model and robustness to modeling challenges. *Addictive Behaviors*. 2010; 35:948–954. doi:10.1016/j.addbeh.2010.06.008. [PubMed: 20598445]
- MacKinnon, DP. *Introduction to statistical mediation analysis*. Lawrence Erlbaum Associates; New York: 2008.
- Magidson JF, Roberts BW, Collado-Rodriguez A, Lejuez CW. Theory-driven intervention for changing personality: Expectancy value theory, behavioral activation, and conscientiousness. *Developmental psychology*. 2014; 50(5):1442–1450. [PubMed: 23106844]
- Masten A, Roisman G, Long J, Burt K, Obradovi J, Riley J, et al. Developmental cascades: Linking academic achievement and externalizing and internalizing symptoms over 20 years. *Developmental Psychology*. 2005; 41:733–746. [PubMed: 16173871]
- McCarthy, DE.; Curtin, JJ.; Piper, ME.; Baker, TB. Negative reinforcement: possible clinical implications of an integrative model. In: Kassel, JD., editor. *Substance Abuse and Emotion*. American Psychological Association; Washington, DC: 2010. p. 15-42.
- McCrae RR, Costa PT Jr, Ostendorf F, Angleitner A, Hrebickova M, Avia MD, et al. Nature over nurture: Temperament, personality, and life span development. *Journal of Personality and Social Psychology*. 2000; 78:173–186. [PubMed: 10653513]
- Moffitt TE, Arseneault L, Belsky D, Dickson N, Hancox RJ, Harrington H, Caspi A. A gradient of childhood self-control predicts health, wealth, and public safety. *Proceedings of the National Academy of Sciences*. 2011; 108(7):2693–2698.
- Mokdad AH, Marks JS, Stroup DF, Gerberding JL. Actual causes of death in the United States, 2000. *Jama*. 2004; 291(10):1238–1245. [PubMed: 15010446]
- Muthén B, Masyn K. Discrete-time survival mixture analysis. *Journal of Educational and Behavioral Statistics*. 2005; 30:27–28.
- Muthén, LK.; Muthén, BO. *Mplus User’s Guide*. Seventh. Muthén & Muthén; Los Angeles, CA: 1998-2012.
- Rhule-Louie DM, McMahon RJ. Problem behavior and romantic relationships: Assortative mating, behavior contagion, and desistance. *Clinical child and family psychology review*. 2007; 10(1):53–100. [PubMed: 17318381]
- Roberts BW, Bogg T. A longitudinal study of the relationships between conscientiousness and the social-environmental factors and substance-use behaviors that influence health. *Journal of Personality*. 2004; 72:325–353. [PubMed: 15016067]
- Roberts BW, Walton KE, Viechtbauer W. Patterns of mean-level change in personality traits across the life course: A meta-analysis of longitudinal studies. *Psychological Bulletin*. 2006; 132:1–25. doi:10.1037/0033-2909.132.1.1. [PubMed: 16435954]
- Roberts BW, Wood D, Smith JL. Evaluating five factor theory and social investment perspectives on personality trait development. *Journal of Research in Personality*. 2005; 39:166–184.
- Robins RW, Caspi A, Moffitt TE. It's not just who you're with, it's who you are: Personality and relationship experiences across multiple relationships. *Journal of personality*. 2002; 70(6):925–964. [PubMed: 12498360]
- Sampson RJ, Laub JH, Wimer C. Does marriage reduce crime? A counterfactual approach to within-individual causal effects. *Criminology*. 2006; 44:465–508.
- Scarr S, McCartney K. How people make their own environments: A theory of genotype→environment effects. *Child Development*. 1983:424–435. [PubMed: 6683622]
- Selzer M. The Michigan Alcoholism Screening Test: The quest for a new diagnostic instrument. *American Journal of Psychiatry*. 1971; 127:1653–1658. [PubMed: 5565851]
- Selzer M, Vinokur A, van Rooijen L. A self-administered Short Michigan Alcoholism Screening Test (SMAST). *Journal of Studies on Alcohol*. 1975; 36:117–126. [PubMed: 238068]
- Sher KJ, Walitzer KS, Wood P, Brent EE. Characteristics of children of alcoholics: Putative risk factors, substance use and abuse, and psychopathology. *Journal of Abnormal Psychology*. 1991; 100:427–448. [PubMed: 1757657]

- Staff J, Schulenberg JE, Maslowsky J, Bachman JG, O'Malley P,M, Maggs JL, Johnston LD. Substance use changes and social role transitions: Proximal developmental effects on ongoing trajectories from late adolescence through early adulthood. *Development and Psychopathology*. 2010; 22:917–932. doi:10.1017/S0954579410000544. [PubMed: 20883590]
- Slutske WS, D'Onofrio BM, Turkheimer E, Emery RE, Harden KP, Heath AC, Martin NG. Searching for an environmental effect of parental alcoholism on offspring alcohol use disorder: a genetically informed study of children of alcoholics. *Journal of Abnormal Psychology*. 2008; 117(3):534. [PubMed: 18729607]
- Slutske WS, Heath AC, Madden PA, Bucholz KK, Statham DJ, Martin NG. Personality and the genetic risk for alcohol dependence. *Journal of Abnormal Psychology*. 2002; 111(1):124. [PubMed: 11871377]
- Watson AL, Sher KJ. Resolution of alcohol problems without treatment: methodological issues and future directions of natural recovery research. *Clinical Psychology: Science and Practice*. 1998; 5:1–18.
- Yamaguchi K, Kandel DB. On the resolution of role incompatibility: A life event history analysis of family roles and marijuana use. *American Journal of Sociology*. 1985; 90:1284–1325.

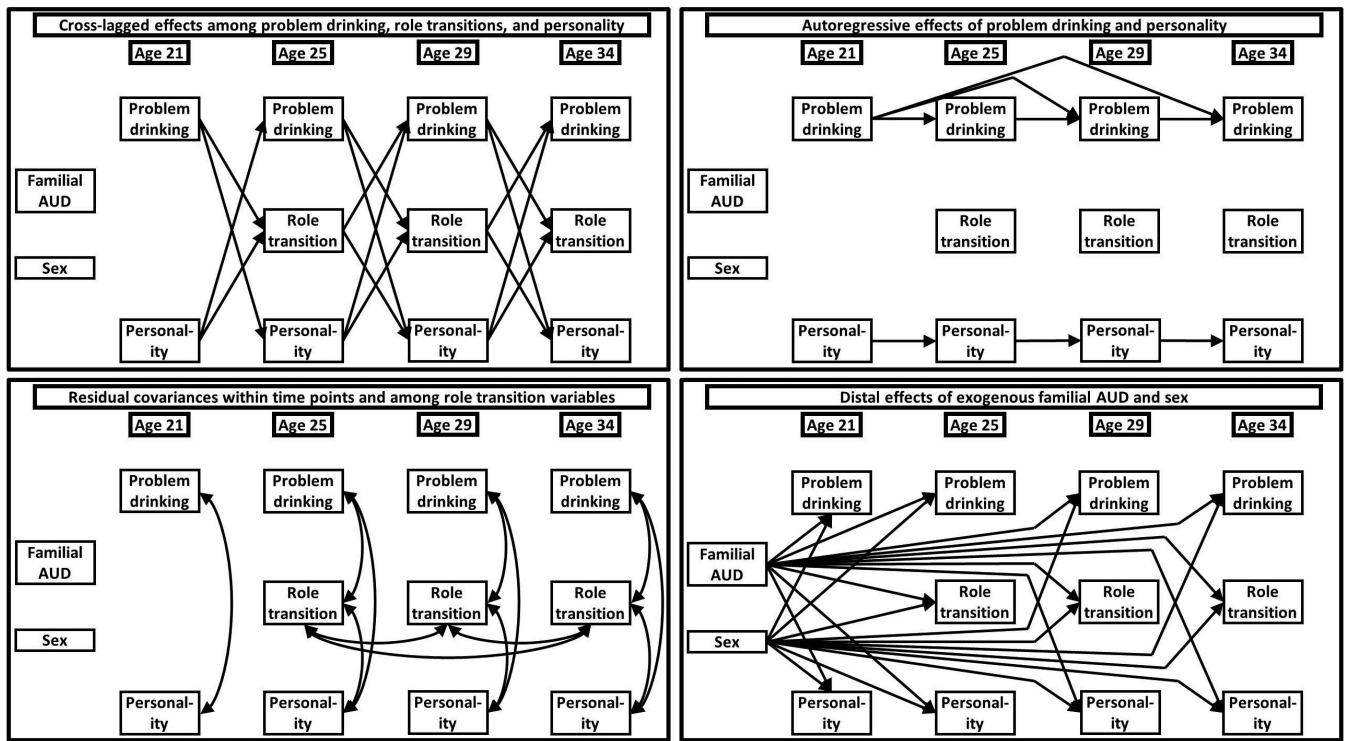


Figure 1. Four panels together depicting all parameters that were simultaneously estimated within any one of the three primary models. These models simultaneously estimated (1) cross-lagged effects among problem drinking, role transitions, and personality (of primary interest; upper left panel), (2) autoregressive effects of problem drinking and personality (upper right panel), (3) residual covariances among endogenous variables within a given time point and among the role transition variables (lower right panel), an (4) distal effects of exogenous familial AUD and sex (lower left panel).

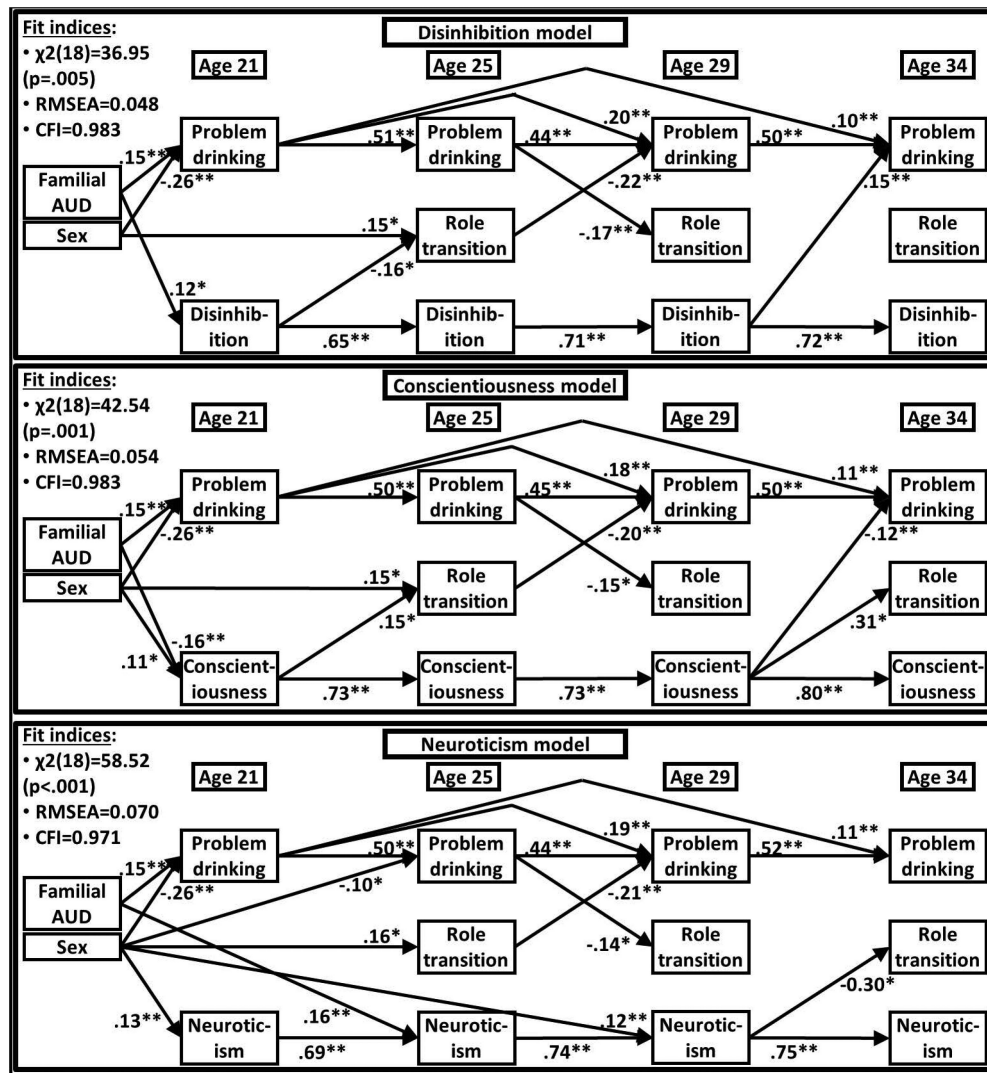


Figure 2. Path diagrams depicting significant standardized regression paths from cross-lagged panel models of problem drinking, role transitions, and personality across four longitudinal time points (N=465). Three separate models were estimated for the three different personality measures of interest: disinhibition (upper panel), conscientiousness (middle panel), and neuroticism (lower panel). Although only significant regression paths are depicted here, each of these three models estimated all of the paths and residual covariances depicted in Figure 1, and complete results for all of these estimates are reported in Table 2. For role transition: 0=remained unmarried and a non-parent; 1=became married or a parent. For familial AUD: 0=FH-; 1=FH+. For sex: 0=male; 1=female. *p < .05. **p < .01.

Table 1

Descriptive sample characteristics across waves and within levels of the role transition variables.

	Sample descriptives at Waves 5-7 within different levels of a given wave's role transition variable ²											
	Descriptives for the full Wave 1 sample and the current sample (excluding stable alcohol abstainers) within current study Waves 4-7			Wave 5 (age 25)			Wave 6 (age 29)			Wave 7 (age 34)		
	Full Wave 1 sample (N=489)	Current sample within current study Waves 4-7		No transition (N=286)	Recent transition (N=127)	Treated as missing ⁴ (N=38)	No transition (N=128)	Recent transition (N=116)	Treated as missing ⁴ (N=160)	No transition (N=67)	Recent transition (N=48)	Treated as missing ⁴ (N=262)
	W4 (age 21) (N=465)	W5 (age 25) (N=451)	W6 (age 29) (N=404)	W7 (age 34) (N=377)								
Time-invariant ³ categorical variable <i>ns</i> and percentages												
Familial AUD												
Positive	238 (48.7%)	228 (49.2%)	220 (48.9%)	187 (49.9%)	143 (50%)	63 (50%)	14 (36.8%)	73 (46.2%)	32 (47.8%)	25 (52.1%)	130 (50%)	
Negative	251 (51.3%)	235 (50.8%)	230 (51.1%)	188 (50.1%)	143 (50%)	63 (50%)	24 (63.2%)	85 (53.8%)	35 (52.2%)	23 (47.9%)	130 (50%)	
Sex												
Female	232 (47.4%)	221 (47.5%)	216 (47.9%)	184 (45.5%)	155 (54.2%)	50 (39.4%)	11 (28.9%)	61 (38.1%)	40 (59.7%)	25 (52.1%)	105 (40.1%)	
Male	257 (52.6%)	244 (52.5%)	235 (52.1%)	207 (54.9%)	131 (45.8%)	77 (60.6%)	27 (71.1%)	99 (61.9%)	27 (40.3%)	23 (47.9%)	157 (59.9%)	
Ethnicity												
Caucasian	418 (85.8%)	397 (85.7%)	386 (86%)	348 (86.6%)	241 (84.9%)	113 (89%)	32 (84.2%)	139 (86.9%)	60 (90.9%)	42 (87.5%)	217 (83.1%)	
Native American	36 (7.4%)	36 (7.8%)	35 (7.8%)	29 (7.2%)	26 (9.2%)	6 (4.7%)	3 (7.9%)	9 (5.6%)	3 (4.5%)	3 (6.3%)	24 (9.2%)	
African-American	25 (5.1%)	22 (4.8%)	20 (4.5%)	18 (4.8%)	13 (4.6%)	4 (3.1%)	3 (7.9%)	7 (6.1%)	2 (3%)	1 (2.1%)	15 (5.7%)	
Asian	5 (1%)	5 (1.1%)	5 (1.1%)	4 (1%)	2 (0.7%)	3 (2.4%)	1 (0.8%)	3 (1.9%)	1 (0.8%)	1 (2.1%)	4 (1.5%)	
Hispanic	3 (0.6%)	3 (0.6%)	3 (0.7%)	3 (0.7%)	2 (0.7%)	1 (0.8%)	2 (1.6%)	1 (0.6%)	1 (1.5%)	1 (2.1%)	1 (0.4%)	
Highest parent education												
Non-college graduate	220 (45%)	203 (43.7%)	200 (44.3%)	184 (45.5%)	118 (41.3%)	60 (47.2%)	22 (57.9%)	47 (40.5%)	81 (50.6%)	34 (50.7%)	19 (39.6%)	117 (44.7%)
College graduate	269 (55%)	262 (56.3%)	251 (55.7%)	220 (54.5%)	168 (58.7%)	67 (52.8%)	16 (42.1%)	79 (49.4%)	33 (49.3%)	29 (60.4%)	145 (55.3%)	
Time-varying ³ categorical variable <i>ns</i> and percentages												
Role transition												
No transition	--	--	286 (63.4%)	128 (31.7%)	67 (17.8%)	--	--	--	--	--	--	--
Recent transition	--	--	127 (28.2%)	116 (28.7%)	48 (12.7%)	--	--	--	--	--	--	--
Treated as missing ⁴	--	--	38 (8.4%)	160 (39.6%)	262 (69.5%)	--	--	--	--	--	--	--

	Sample descriptives at Waves 5-7 within different levels of a given wave's role transition variable ²													
	Descriptives for the full Wave 1 sample and the current sample (excluding stable alcohol abstainers) within current study Waves 4-7			Wave 5 (age 25)			Wave 6 (age 29)			Wave 7 (age 34)				
	Full Wave 1 sample (N=489)	W4 (age 21) (N=465)	W5 (age 25) (N=451)	W6 (age 29) (N=404)	W7 (age 34) (N=377)	No transition (N=286)	Recent transition (N=127)	Treated as missing ⁴ (N=38)	No transition (N=128)	Recent transition (N=116)	Treated as missing ⁴ (N=160)	No transition (N=67)	Recent transition (N=48)	Treated as missing ⁴ (N=262)
Student status														
Not fulltime student	11 (2.3%)	107 (23.2%)	360 (80.9%)	360 (92.1%)	348 (94.8%)	219 (78.2%)	105 (83.3%)	36 (92.3%)	111 (90.2%)	100 (90.9%)	149 (94.3%)	60 (90.9%)	44 (95.7%)	244 (95.7%)
Fulltime student	476 (97.7%)	355 (76.8%)	85 (19.1%)	31 (7.9%)	19 (5.2%)	61 (21.8%)	21 (16.7%)	3 (7.7%)	12 (9.8%)	10 (9.1%)	9 (5.7%)	6 (9.1%)	2 (4.3%)	11 (4.3%)
Employment status														
Not employed fulltime	477 (97.9%)	375 (82.2%)	126 (28.3%)	93 (23.8%)	103 (28.1%)	75 (26.8%)	40 (31.7%)	11 (28.2%)	25 (20.3%)	24 (21.8%)	44 (27.8%)	8 (12.1%)	10 (21.7%)	85 (33.3%)
Employed fulltime	10 (2.1%)	81 (17.8%)	319 (71.7%)	298 (76.2%)	264 (71.9%)	205 (73.2%)	86 (68.3%)	28 (71.8%)	98 (79.7%)	86 (78.2%)	114 (72.2%)	58 (87.9%)	36 (78.3%)	170 (66.7%)
DSM-III-R AUD ⁵														
No	NA	343 (73.8%)	344 (76.3%)	345 (85.4%)	333 (88.3%)	202 (70.6%)	110 (86.6%)	32 (84.2%)	101 (78.9%)	103 (88.8%)	141 (88.1%)	48 (71.6%)	43 (89.6%)	242 (92.4%)
Yes	NA	122 (26.2%)	107 (23.7%)	59 (14.6%)	44 (11.7%)	84 (29.4%)	17 (13.4%)	6 (15.8%)	27 (21.1%)	13 (11.2%)	19 (11.9%)	19 (28.4%)	5 (10.4%)	20 (7.6%)
Time-varying ³ categorical variable means and SDs														
Age	18.55 (0.97)	21.31 (0.93)	24.47 (0.98)	28.98 (1.03)	34.34 (0.82)	24.46 (0.8)	24.39 (0.66)	24.82 (2.24)	29.02 (1.01)	29.01 (0.77)	28.94 (1.2)	34.45 (1.34)	34.33 (0.6)	34.31 (0.67)
Problem Drinking	3.7 (3.39)	2.61 (3.05)	1.65 (2.45)	1.04 (1.97)	1.01 (1.96)	2.04 (2.59)	0.98 (2.2)	1.08 (1.44)	1.86 (2.62)	0.71 (1.28)	0.62 (1.55)	1.83 (2.79)	1.02 (1.81)	0.79 (1.65)
Disinhibition	0.5 (0.35)	0.58 (0.34)	0.62 (0.33)	0.66 (0.31)	0.69 (0.31)	0.59 (0.34)	0.68 (0.32)	0.62 (0.33)	0.62 (0.31)	0.65 (0.3)	0.7 (0.31)	0.67 (0.31)	0.69 (0.31)	0.69 (0.31)
Conscientiousness	NA	30.74 (6.76)	33.4 (6.19)	33.87 (5.63)	34.03 (5.97)	32.63 (6.36)	34.92 (5.77)	34.1 (5.31)	32.92 (5.99)	34.11 (5.33)	34.44 (5.47)	32.18 (6.4)	34.93 (5.8)	34.35 (5.82)
Neuroticism	NA	18.08 (7.34)	16.35 (7.32)	15.2 (6.53)	16.14 (7.41)	16.53 (7.6)	16.22 (7.03)	15.51 (6.21)	15.89 (6.87)	14.46 (6.5)	15.16 (6.26)	18.06 (7.93)	13.38 (5.85)	16.14 (7.39)

Note. NA=not assessed at the given wave. This table excludes those who were excluded from the current sample due to abstinence from alcohol across the waves used in the current study (Waves 4-7).

¹The Wave 1 N is the overall sample N at baseline. The Wave 4 N is the current study's sample size, as we used only Waves 4-7. Reductions in Ns across waves were the result of longitudinal attrition.

²In the role transition group labels, (1) "No transition" = those who had never become married or parents, (2) "Recent transition" = those who became married or parents since the previous wave, and (3) "Missing (transitioned earlier)" = those who became married or parents prior to the previous wave and were therefore treated as missing on the current wave's role transition variable.

³Time-invariant variables are stable across waves, so they differ by wave only as a function of longitudinal attrition. Time-varying variables were assessed at each wave, so differences across waves reflect how participants changed on these measures longitudinally.

⁴For a role transition variable at a given wave, participants were treated as missing if they transitioned to a role prior to the previous wave (see Measures).

⁵"AUD"=alcohol abuse or dependence.

Table 2

Standardized results from primary models (significant regression paths also depicted in Figure 2).

	Three separate models for the three personality measures		
	Disinhibition model	Conscientiousness model	Neuroticism model
Fit indices			
Chi square	$\chi^2(18)=36.9$ ($p=.005$)	$\chi^2(18)=42.5$ ($p=.001$)	$\chi^2(18)=58.5$ ($p<.001$)
RMSEA	0.048	0.054	0.070
CFI	0.983	0.983	0.971
Standardized regression paths			
Age 21 problem drinking on			
Sex	-0.258**	-0.258**	-0.258**
Familial AUD	0.145**	0.145**	0.145**
Age 21 personality on			
Sex	-0.040	0.113*	0.129**
Familial AUD	0.117*	-0.16**	0.083
Age 25 problem drinking on			
Age 21 problem drinking	0.505**	0.502**	0.499**
Age 21 personality	0.042	-0.04	0.051
Sex	-0.091	-0.089	-0.101*
Familial AUD	0.038	0.037	0.039
Age 25 personality on			
Age 21 personality	0.652**	0.729**	0.687**
Age 21 problem drinking	0.024	-0.003	0.013
Sex	-0.069	0.072	0.069
Familial AUD	0.031	-0.061	0.159**
Age 25 role transition			
Age 21 problem drinking	-0.094	-0.082	-0.117
Age 21 personality	-0.158*	0.154*	-0.03
Sex	0.153*	0.145*	0.157*
Familial AUD	0.028	0.033	0.015
Age 29 problem drinking on			
Age 25 problem drinking	0.435**	0.452**	0.435**
Age 21 problem drinking	0.199**	0.179**	0.185**
Age 25 personality	-0.009	-0.029	0.043
Age 25 role transition	-0.220**	-0.198**	-0.214**
Sex	0.092	0.092	0.082
Familial AUD	0.056	0.051	0.048
Age 29 personality on			
Age 25 personality	0.705**	0.731**	0.737**
Age 25 problem drinking	0.040	-0.026	-0.003

Three separate models for the three personality measures			
	Disinhibition model	Conscientiousness model	Neuroticism model
Age 25 role transition	-0.060	0.023	-0.028
Sex	0.059	-0.055	0.119*
Familial AUD	0.011	0.044	-0.02
Age 29 role transition			
Age 25 problem drinking	-0.165**	-0.153*	-0.136*
Age 25 personality	-0.002	0.055	-0.09
Sex	0.114	0.108	0.135
Familial AUD	0.001	0.009	0.017
Age 34 problem drinking on			
Age 29 problem drinking	0.502**	0.5**	0.519**
Age 21 problem drinking	0.104**	0.109**	0.111**
Age 29 personality	0.148**	-0.121**	0.05
Age 29 role transition	-0.074	-0.064	-0.059
Sex	-0.002	0.001	-0.017
Familial AUD	0.015	0.018	0.019
Age 34 personality on			
Age 29 personality	0.715**	0.799**	0.749**
Age 29 problem drinking	0.064	0.045	0.019
Age 29 role transition	0.098	-0.046	0.058
Sex	0.073	0.036	0.047
Familial AUD	0.012	-0.071	0.019
Age 34 role transition			
Age 29 problem drinking	-0.058	0.022	0.013
Age 29 personality	-0.001	0.311*	-0.297*
Sex	0.092	0.079	0.167
Familial AUD	-0.049	-0.032	-0.017
Standardized residual covariances (i.e., correlations)			
Age 29 role transition with			
Age 25 role transition	-0.057*	-0.067*	-0.054*
Age 34 role transition with			
Age 25 role transition	-0.065	-0.102	-0.062
Age 29 role transition	-0.018	-0.037	-0.052
Age 21 problem drinking with			
Age 21 personality	0.141**	-0.280**	0.274**
Age 25 problem drinking with			
Age 25 personality	0.138**	-0.028	0.235**
Age 25 role transition	-0.209**	-0.205**	-0.209**
Age 25 personality with			
Age 25 role transition	-0.038	0.146	-0.011

Three separate models for the three personality measures			
	Disinhibition model	Conscientiousness model	Neuroticism model
Age 29 problem drinking with			
Age 29 personality	0.036	-0.207**	0.137
Age 29 role transition	-0.349**	-0.353**	-0.359**
Age 29 personality with			
Age 29 role transition	-0.096	0.127	-0.158
Age 34 problem drinking with			
Age 34 personality	-0.062	0.090	0.112
Age 34 role transition	-0.190	-0.152	-0.177
Age 34 personality with			
Age 34 role transition	-0.053	0.023	-0.365**

Note. $N=465$. For role transition: 0=remained unmarried and non-parent; 1=became married or parent. For familial AUD: 0=FH-; 1=FH+. For sex: 0=male; 1=female.

* $p < .05$. ** $p < .01$.

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Table 3

Wald χ^2 tests of differences in role and personality effects on subsequent problem drinking across waves (i.e., ages)

Temporal invariance constraints	Disinhibition model	Conscientiousness model	Neuroticism model
Age 25 and age 29 role transition effects on problem drinking	$\chi^2(1)=1.423$ ($p=.233$)	$\chi^2(1)=1.170$ ($p=.279$)	$\chi^2(1)=1.596$ ($p=.207$)
Omnibus: Age 21, age 25, and age 29 personality effects on problem drinking	$\chi^2(2)=8.754$ ($p=.013$)	$\chi^2(2)=5.704$ ($p=.058$)	$\chi^2(2)=0.084$ ($p=.959$)
Follow-up: Age 21 and age 25 personality effects on problem drinking	$\chi^2(1)=1.262$ ($p=.261$)	$\chi^2(1)=0.100$ ($p=.751$)	--
Follow-up: Age 21 and age 29 personality effects on problem drinking	$\chi^2(1)=3.228$ ($p=.072$)	$\chi^2(1)=3.702$ ($p=.054$)	--
Follow-up: Age 25 and age 29 personality effects on problem drinking	$\chi^2(1)=8.754$ ($p=.003$)	$\chi^2(1)=4.650$ ($p=.031$)	--
Age 21 and age 25 problem drinking effects on role transitions	$\chi^2(1)=1.028$ ($p=.311$)	$\chi^2(1)=1.044$ ($p=.307$)	$\chi^2(1)=0.236$ ($p=.627$)

Table 4

Post Hoc Analyses Testing Pre-Role Problem Drinking as a Moderator of Role Effects on Subsequent Problem Drinking

	Standardized regression coefficients
Model 1: Moderation of Wave 5 role transition effects by Wave 4 problem drinking	
Age 29 problem drinking on	
Sex	0.048
Familial AUD	0.044
Age 21 problem drinking	0.174**
Age 25 problem drinking	0.470**
Age 25 role transition	-0.077
Interaction: Age 21 problem drinking by age 25 role transition	0.026
Conditional age 25 role transition effects at different levels of age 21 problem drinking ¹	
Age 21 problem drinking=0	-0.097
Age 21 problem drinking=2.62	-0.077
Age 21 problem drinking=5.67	-0.053
Model 2: Moderation of Wave 6 role transition effects by Wave 5 problem drinking	
Age 34 problem drinking on	
Sex	-0.027
Familial AUD	0.032
Age 25 problem drinking	0.284**
Age 29 problem drinking	0.471**
Age 29 role transition	-0.042
Interaction: Age 25 problem drinking by age 29 role transition	-0.207**
Conditional age 29 role transition effects at different levels of age 25 problem drinking ¹	
Age 25 problem drinking=0	0.061
Age 25 problem drinking=1.64	-0.042
Age 25 problem drinking=4.10	-0.194*

Note. For role transition: 0=remained unmarried and a non-parent; 1=became married or a parent. For familial AUD: 0=FH-; 1=FH+. For sex: 0=male; 1=female.

* $p < .05$. ** $p < .01$.

¹In initial models, pre-role problem drinking was mean centered such that results indicated the model-estimated role transition effect at the mean of pre-role problem drinking. Models were then re-estimated after re-centering pre-role problem drinking to obtain model-estimated role transition effects at low (0) and high (mean + 1SD) levels of pre-role problem drinking.