Using Parental Profiles to Predict Membership in a Subset of College Students Experiencing Excessive Alcohol Consequences: Findings From a Longitudinal Study

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ABSTRACT. Objective: Previous research identified a high-risk subset of college students experiencing a disproportionate number of alcohol-related consequences at the end of their first year. With the goal of identifying pre-college predictors of membership in this high-risk subset, the present study used a prospective design to identify latent profiles of student-reported maternal and paternal parenting styles and alcohol-specific behaviors and to determine whether these profiles were associated with membership in the high-risk consequences subset. **Method:** A sample of randomly selected 370 incoming first-year students at a large public university reported on their mothers' and fathers' communication quality, monitoring, approval of alcohol use, and modeling of drinking behaviors and on consequences experienced across the first year of college. **Results:** Students in the high-risk subset comprised 15.5% of the

sample but accounted for almost half (46.6%) of the total consequences reported by the entire sample. Latent profile analyses identified four parental profiles: positive pro-alcohol, positive anti-alcohol, negative mother, and negative father. Logistic regression analyses revealed that students in the negative-father profile were at greatest odds of being in the high-risk consequences subset at a follow-up assessment 1 year later, even after drinking at baseline was controlled for. Students in the positive pro-alcohol profile also were at increased odds of being in the high-risk subset, although this association was attenuated after baseline drinking was controlled for. **Conclusions:** These findings have important implications for the improvement of existing parent- and individual-based college student drinking interventions designed to reduce alcohol-related consequences. (*J. Stud. Alcohol Drugs*, 73, 434–443, 2012)

HIGH-RISK STUDENT DRINKING is a serious concern on campuses throughout the United States (Johnston et al., 2010) and is associated with a range of consequences (Hingson et al., 2009; Perkins, 2002). Although drinking is a predictor of consequences, studies have shown that drinking and consequences are only moderately correlated, leaving considerable variance unexplained (Larimer et al., 2004). In response, researchers have examined consequences as outcomes in their own right. One area of research has focused on identifying unique predictors of consequences that can be targets of change for interventions (Lee et al., 2010; Mallett et al., 2011c). A second line of research has examined subgroups of individuals who experience different patterns of consequences (Mallett et al., 2011a). The current study extends these two foci by examining predictors of students' membership in a subgroup experiencing a high-risk pattern of consequences.

Mallett and colleagues' (2011a) research revealed a high-risk subgroup of first-year students who experienced a

disproportionate number of consequences. Specifically, these individuals experienced more than six different consequences and more than five of these repeatedly during their first year. This subgroup comprised only 23% of the sample but accounted for almost half of all of the consequences reported by the entire study sample. Numerous studies have shown increases in drinking and consequences in the transition between high school and college (Baer et al., 1995; Schulenberg and Maggs, 2002; Wechsler et al., 1994). Therefore, early identification of this at-risk group has the potential to considerably reduce the number of alcohol-related problems.

The goal of the present study was to identify pre-college predictors of membership in a high-risk group experiencing excessive consequences. Such information could strengthen interventions by proactively targeting these individuals as they transition to college. Numerous pre-college factors have been identified as predictors of first-year drinking, including sensation seeking, gender, religiosity, coping, expectancies, motives, norms, and social organizations (Borsari et al., 2007). Borsari and colleagues (2007) also highlighted the continued importance of parental behaviors predicting drinking and consequences (Sessa, 2005; Turner et al., 2000; Turrisi et al., 2000; Wood et al., 2004). The majority of these studies either report direct effects of parenting on student drinking outcomes or show that effective parenting mitigates the effect of peer and

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environmental influences. Although undoubtedly important, environmental and peer influences tend to fluctuate during the transition from high school to college. In contrast, parents remain a relatively consistent source of influence, and previous work has demonstrated the importance of parenting during this time (Turrisi et al., 2000; Walls et al., 2009; Wood et al., 2004). Thus, the focus of the present study was to identify pre-college parent-related predictors of membership in the high-risk group.

The majority of studies investigating parenting and college student drinking have almost uniformly focused on relations between one or two parenting variables and drinking-related outcomes across the sample (LaBrie et al., 2011; Patock-Peckham and Morgan-Lopez, 2009a, 2009b; Turner et al., 2000; Wood et al., 2004). Several recent studies have explored the benefits of person-centered approaches, which can identify parental subgroups that are homogeneous but distinct from other subgroups along multiple dimensions of parenting (positive communication, negative communication, monitoring, approval of alcohol use, modeling of alcohol use). For example, Mallett et al. (2011b) examined multiple parenting dimensions (e.g., demandingness and responsiveness) and practices (e.g., monitoring and setting structure) and identified profiles similar to Baumrind's (1991) typologies. They found that students whose parents fit the authoritarian profile were at greatest risk for heavy drinking. The present study used a person-centered approach to examine the relationship between parental subgroups and membership in the high-risk consequences subset.

Supporting Darling and Steinberg's (1993) integrative parenting framework, the college drinking literature has consistently identified parenting styles (positive and negative communication) and behaviors (monitoring, approval of alcohol use, and modeling) as predictors of drinking (Abar and Turrisi, 2008; Wood et al., 2004). Specifically, positive parent-child communication has been associated with less drinking and fewer consequences (Booth-Butterfield and Sidelinger, 1998; Turrisi et al., 2000). In contrast, negative communication is associated with more alcohol consequences (Turner et al., 2000). Similarly, parental monitoring and parental disapproval have been consistently associated with less drinking and fewer consequences (Abar and Turrisi, 2008; Arria et al., 2008; Livingston et al., 2010; Walls et al., 2009; Wood et al., 2004). Finally, social learning theory highlights the influence of parental modeling on adolescents' developing behavior (Bandura and Walters, 1963), although findings in this area have been mixed (Abar et al., 2009; White et al., 2000).

Furthermore, although the literature supports an important association between parenting and student alcohol outcomes, previous work on the unique influence of both mothers and fathers has been limited. Typically, studies have assessed mothers (Madon et al., 2008; Turrisi et al.,

2000), the combined influence of both parents (e.g., Abar and Turrisi, 2008; Mallett et al., 2011b; Wood et al., 2004), or a limited number of maternal and paternal variables (Abar, 2011). This limitation is significant in light of several studies showing that maternal and paternal influences may differentially affect their children's drinking (Patock-Peckham et al., 2011; Turner et al., 2000). These studies together provide justification for examining both maternal and paternal influences.

Study objective

The current study used a prospective design to examine pre-college parental predictors and their association with membership in a high-risk subset of students who experienced excessive unique and repeated consequences during the first year of college (greater than six different consequences and greater than five consequences repeatedly; Mallett et al., 2011a). The present study should extend the scientific knowledge base about the effects of parents on college students and provide recommendations to strengthen the effects of future parent-based interventions and research. Our prior research has demonstrated that parent-based interventions can alter students' drinking (Turrisi et al., 2001, 2009, 2010). The logical next step is to focus on how parenting factors influence students who are experiencing disproportionate harm as a result of their drinking.

Based on studies showing that specific parenting behaviors (lower levels of monitoring, more conflict, approval of student drinking) are associated with negative outcomes (Patock-Peckham et al., 2011; Walls et al., 2009), we expected that students whose parents fit profiles characterized by multiple risky behaviors would be more likely to be in the high-risk consequences subset. With respect to mother- and father-specific influences, we expected that profiles where both mothers and fathers exhibited risky parenting (more conflict, higher levels of approval of alcohol) would be associated with membership in the high-risk group. In contrast, we expected that profiles where both mothers and fathers exhibited protective parenting (low conflict, low levels of approval of alcohol) would be associated with decreased membership in the high-risk group. Finally, we anticipated the presence of profiles in which mothers and fathers are inconsistent (one is protective and the other risky). We expected that, within these inconsistent profiles, the protective parent might offset the negative effects of the risky parent to some degree (Simons and Conger, 2007). In light of previous work showing that the relationship between parental influences and consequences may differ according to student gender (Patock-Peckham et al., 2011; Turner et al., 2000), a secondary aim was to examine whether gender moderates the association between parental profile and membership in the high-risk subset.

Method

Sample

The sample consisted of 370 students at a large, public university in the northeastern United States, comprising the control group from an intervention trial. The present sample was drawn from the same study as Mallett et al. (2011a) but included an additional cohort and included drinkers and nondrinkers. The sample was 57% female, and the mean age at recruitment was 17.9 ($SD = 0.35$) years. With respect to racial background, characteristics were as follows: 85.7% White, 4.9% Asian, 3.5% Black or African American, 3.0% other, 1.6% multiracial, 0.5% American Indian or Alaskan Native, and 0.5% Pacific Islander. The majority of the sample lived with their biological mothers (97.8%) and fathers (86.8%) before college; all but 14% of the sample lived with both biological parents. The demographic characteristics were representative of the campus community from which the sample was drawn.

Recruitment and procedures

A random sample was selected using the registrar's database of incoming first-year students. Potential participants received a mailed invitation in the summer before college matriculation describing the purpose, procedures, and compensation, along with the study URL and a personal identification number used to log in. Emails with the same information were sent at follow-up. The response rate was 66%, which is consistent with other web-delivered approaches with college populations (Larimer et al., 2007; McCabe et al., 2005; Thombs et al., 2005). Assessments were collected at two time points: (a) baseline (during the summer before college matriculation) and (b) follow-up (during the fall of the second year of college [15 months later]). In addition to these time points, participants completed brief surveys at 3, 5, and 8 months that did not assess consequences or parenting.

Participants received \$25 for completing the baseline survey and \$30 for the follow-up survey. There was a 77% retention rate from baseline to follow-up ($n = 284$ at follow-up). There were no significant differences in baseline levels of weekly drinking or frequency of heavy drinking when we compared those who completed the study with those who were lost to follow-up. The local institutional review board approved the study.

Measures

Indicators assessed at pre-college baseline (Time 1). The following student-reported measures of parenting were assessed before college entrance. All parenting items were assessed separately for mothers and fathers.

POSITIVE AND NEGATIVE PARENTAL COMMUNICATION: Positive dimensions of communication were assessed using four items adapted from previous work (Abar, 2011): "My (mother/father) gives me good advice," "I can trust my (mother/father) when we talk," "My (mother/father) wants to understand my side of things when we talk," and "When we talk about important things, I know my (mother/father) will support me." Response options were coded from 1 = *disagree* to 4 = *agree*. Items were summed to create an index of positive maternal ($\alpha = .85$) and paternal ($\alpha = .81$) communication.

Negative parental communication was assessed with two items (mother $\alpha = .88$; father $\alpha = .90$): "My (mother/father) and I end up fighting when we talk," and "No matter what I say when we talk, my (mother/father) and I seem to end up arguing."

PARENTAL MONITORING: Monitoring was assessed using four items (Wood et al., 2004). Participants indicated the degree to which their mother/father tries to know and actually knows "what you do during your free time" and "about your drinking." Response items ranged from 1 = *doesn't know/try* to 3 = *knows/tries a lot* (mother: $\alpha = .67$; father: $\alpha = .75$).

PARENTAL APPROVAL OF ALCOHOL USE: Perceived parental approval of alcohol use was assessed with three items adapted from Abar et al. (2009): "My (mother/father) thinks it is OK if I drink alcohol on special occasions," "My (mother/father) disapproves of me drinking alcohol under any circumstances," and "My (mother/father) doesn't mind if I drink alcohol once in a while." Response options were 1 = *strongly disagree* to 5 = *strongly agree*, and items were recoded so that higher scores indicated greater perceived approval of alcohol use (mother: $\alpha = .81$; father: $\alpha = .80$).

PARENTAL ALCOHOL USE: Participants' perceptions of the amount of alcohol that their mothers and fathers typically consumed over the past year were assessed using two items: "How often do you think your (mother/father) drank alcohol?" and "How many drinks do you think that your (mother/father) had per occasion?" Response options for the frequency item ranged from 1 = *not at all* to 9 = *every day*. Response options for the quantity item ranged from 1 = *zero drinks* to 9 = *nine or more drinks*. Items were standardized and then summed.

STUDENT DRINKING: The Daily Drinking Questionnaire (Collins et al., 1985) was used to assess how many drinks students consumed on a typical Monday, Tuesday, Wednesday, etc. These responses were summed to create a measure of the number of drinks consumed in a typical week.

Consequence outcome assessed at follow up (Time 2)—high-risk consequences subset. The Young Adult Alcohol Problems Screening Test (Hurlbut and Sher, 1992) assessed alcohol-related consequences at the longitudinal follow-up during the fall of the second year of college. Participants who reported experiencing more than six unique consequences and more than five repeated consequences were coded with a 1 to indicate that they belonged to the high-

risk subset. All other participants were coded to 0. This is the identical coding scheme used by Mallett and colleagues (2011a).

Data analysis plan

The analyses had two aims: (a) to identify latent profiles of maternal and paternal parenting styles and alcohol-specific behaviors and (b) to determine whether these profiles were associated with membership in the high-risk alcohol consequences subset identified at the follow-up assessment.

Latent profile analysis. The goal of latent profile analysis (LPA) is to identify distinct subgroups of individuals that are similar to each other based on selected continuous indicators. For the current study, maternal and paternal indicators (positive communication, negative communication, monitoring, approval, and parental alcohol use) were included simultaneously in the LPA, totaling 10 indicators.

LPA was conducted according to the suggestions of Lanza et al. (2007) using Mplus (Muthén and Muthén, 2011). A restricted one-profile solution was first fit to the data. Additional profiles were added iteratively until the best-fitting solution was determined. Goodness of fit determination was based on the Akaike Information Criteria (AIC; Akaike, 1974), the Bayesian Information Criteria (BIC; Schwarz, 1978), and log likelihood values. For each of these indices, relatively lower values suggested better fit. In addition, the Lo–Mendell–Rubin likelihood ratio test (LMR-LRT; Lo et al., 2001) is a statistical test that compares lower- versus higher-profile solutions. A significant LMR-LRT provides evidence that the lower-class solution is the better-fitting model. In addition, entropy values can range from 0 to 1, and values closer to 1 suggest good classification quality (the degree of accuracy with which individuals were classified into the “correct” profile).

Mplus uses full information maximum likelihood estimates to account for missing data (Schafer and Graham, 2002). Therefore, if students had missing data for one or more indicators, they were still assigned to a most-likely class based on a maximum likelihood solution.

After determining the number of latent profiles, descriptive characteristics of the profiles were examined. Means on each indicator for each profile were used to characterize the profiles, and variances were assumed to be equal across profiles. LPA provides estimates of the proportion of the sample that fit into each profile, along with the posterior probability for each individual in each profile. Posterior probabilities can be used to assign individuals to their most-likely profile. After classifying individuals into their most-likely profile, profiles can be compared in terms of outcome variables of interest. This “classify and analyze” approach can be used if the entropy value for the LPA solution is at least .80 (Agarwal et al., 2007).

Association between latent profiles and consequence subgroup. To achieve the second aim, all individuals in the sample were assigned to their most-likely profile, and logistic regression was used to determine whether belonging to the high-risk consequences subset was associated with parental profile membership, and whether there was a significant interaction between gender and parent profile. Furthermore, the relationship between pre-college drinking and pre-college parenting, and the relationship between pre-college parenting and membership in the high-risk subgroup, while pre-college drinking was controlled for, were examined. For the former, one-way analysis of variance determined whether baseline drinking differed as a function of parental profile. For the latter, a logistic regression testing the association between parental profile and membership in the high-risk consequences subgroup (while pre-college drinking was controlled for) was conducted.

Results

Descriptives—high-risk subgroup

There were 44 students (15.5% of the total sample) in the high-risk subgroup at follow-up, based on the coding criteria described above. The proportion of students in the high-risk subset was lower than the 23% identified in the original Mallett et al. (2011a) study, likely because of the inclusion of nondrinkers in the present study.

The mean numbers of different and repeated consequences for the high-risk subgroup were 9.27 ($SD = 2.49$) and 7.18 ($SD = 2.13$), respectively. The mean numbers of different and repeated consequences for students not in the high-risk subgroup were 2.54 ($SD = 2.23$) and 1.36 ($SD = 1.39$), respectively. The frequency distributions of different and repeated consequences were used to calculate the total number of consequences reported by the entire sample and by the high-risk subgroup. There were 948 different consequences reported by the entire sample, and 408 (43.0%) were attributed to the high-risk subgroup. Furthermore, 604 repeated consequences were reported by the entire sample, and the high-risk subgroup accounted for 316 (52.3%) of these repeated consequences. Taken together, this indicates that, of the 1,552 total consequences reported by the sample, 724 (46.6%) were reported by the high-risk subgroup.

Latent profile solution

Selection of the best-fitting solution. Starting with a one-profile solution, the AIC and BIC values decreased as profiles two, three, four, and five were added. However, with the addition of a fifth profile, the number of individuals in each profile dropped below 20, making interpretation and the ability to test between-profile differences difficult. Therefore, the four-profile solution was retained. The LMR-LRT con-

TABLE 1. AIC, BIC, log likelihood, and entropy values for the one- through five-profile solutions

Variable	AIC	BIC	Log likelihood	Entropy
One profile	15,935.98	16,014.25	-7,947.99	
Two profiles	15,595.39	15,716.71	-7,766.69	.82
Three profiles	15,400.65	15,565.02	-7,658.33	.79
Four profiles	15,280.42	15,487.84	-7,587.21	.82
Five profiles	15,180.83	15,431.29	-7,526.41	.85

Notes: AIC = Akaike Information Criteria; BIC = Bayesian Information Criteria.

firmed that the four-profile solution provided a better fit for the data relative to the three-profile solution (adjusted LRT = 119.75, $p < .05$). Table 1 lists AIC, BIC, log likelihood, and entropy values for the one- through five-profile solutions. All models converged normally, and the classification quality for the final four-profile model was good (entropy = .82). Table 2 lists the means of the indicators for each of the profiles. Indicator means were examined to determine the qualitative characteristics of each of the profiles.

Description of the four parental profiles. The profile containing the largest proportion of the sample ($n = 140$; 37.8%) was characterized by protective parental influences, such as high mother- and father-specific positive communication and monitoring and low mother- and father-specific negative communication. However, students fitting this profile also reported that both their mothers and fathers had higher levels of approval of alcohol use and that their mothers and fathers consumed greater amounts of alcohol. This profile was labeled *positive pro-alcohol*.

The second largest profile ($n = 128$; 34.6%) was similar to the positive pro-alcohol profile with respect to protective characteristics (high positive and low negative communica-

tion), but students described their parents as being lower in alcohol approval and consumption. This profile was labeled *positive anti-alcohol*.

The third profile comprised a smaller proportion of the sample ($n = 72$; 19.5%). Students whose parents fit this profile reported that their relationships with their mothers were marked by conflict (lower positive communication and higher negative communication.) They also reported relatively low levels of both maternal and paternal monitoring. Mothers' and fathers' alcohol use and alcohol approval were moderate. This profile was labeled *negative mother*.

The fourth and smallest profile ($n = 30$; 8.1% of sample) reported similar negative interactions as in the negative mother profile, but with their fathers. They reported lower positive communication and higher negative communication and reported that their fathers were heavier drinkers than fathers in the other profiles. Mothers' alcohol use was moderate relative to the other profiles. Similar to the negative-mother profile, students in this profile reported relatively lower levels of maternal and paternal monitoring. This profile was labeled *negative father*.

Trends across the four profiles. Certain trends emerged when the overall characteristics of the profiles were examined. For example, in all profiles the means for monitoring were higher for mothers than for fathers, even in profiles in which monitoring was relatively low and in which the mother-student relationship was negative. In addition, there was a level of consistency of mothers' and fathers' general parenting and alcohol-specific parenting. For instance, in the two largest profiles (positive pro-alcohol and positive anti-alcohol), maternal and paternal communication quality and monitoring were both relatively high. Similarly, in the negative mother profile, even though the mother was a

TABLE 2. Means and variances for each of the 10 parenting indicators by profile

Variable	Positive pro-alcohol ($n = 140$)	Positive anti-alcohol ($n = 128$)	Negative mother ($n = 72$)	Negative father ($n = 30$)
Mother positive communication ($\sigma^2 = 3.83$)	14.09	14.53	9.15	11.87
Mother negative communication ($\sigma^2 = 2.07$)	3.34	3.12	5.94	4.47
Mother monitoring ($\sigma^2 = 3.02$)	10.00	10.50	8.36	8.89
Mother approval of alcohol use ($\sigma^2 = 6.82$)	10.14	4.73	7.95	7.78
Mother alcohol use ($\sigma^2 = 4.46$)	2.36	0.35	1.30	1.49
Father positive communication ($\sigma^2 = 4.40$)	13.98	14.42	11.92	8.73
Father negative communication ($\sigma^2 = 1.43$)	2.91	2.79	3.27	6.87
Father monitoring ($\sigma^2 = 4.16$)	8.58	9.44	7.70	6.97
Father approval of alcohol use ($\sigma^2 = 6.30$)	10.63	5.08	8.35	7.24
Father alcohol use ($\sigma^2 = 1.72$)	-0.30	-1.43	-1.07	-0.45

TABLE 3A. Odds ratios and 95% confidence intervals [in brackets]

Variable	Positive pro-alcohol, (n = 97)	Positive anti-alcohol, (n = 107)	Negative mother, (n = 58)	Negative father, (n = 22)	$\chi^2(df)$
High-risk consequence subset	3.89* [1.58, 9.62]	1 (ref.)	1.84 [0.61, 5.59]	5.93** [1.80, 19.51]	13.87(3)

Note: Ref. = reference.

*Denotes an odds ratio significantly different from 1 ($p < .05$); **denotes an odds ratio significantly different from 1 ($p < .01$).

more negative influence, the means for the father-specific indicators were still low. In terms of comparing the different profiles, mothers and fathers within the same pair appear to be consistent.

To determine whether the parental profile was related to student gender, chi-square analyses revealed that the association was not significant, and there were no significant differences in attrition by parental profile.

Associations between parental profiles and pre-college drinking

Results from a one-way analysis of variance revealed that there was a significant association between parental profile and pre-college drinking, $F(3, 364) = 13.39, p < .01$. Tukey's post hoc analyses showed the mean number of drinks reported by students in the positive pro-alcohol profile (5.13, $SD = 7.04$) was significantly higher than in the positive anti-alcohol profile (1.00, $SD = 3.10$), the negative mother profile (3.06, $SD = 5.83$), and the negative father profile (1.76, $SD = 3.28$).

Associations between parental profiles and membership in the high-risk consequences subset

Using the positive anti-alcohol profile as the reference group, logistic regression indicated that parental profiles significantly predicted membership in the high-risk consequences subset, $\chi^2(3) = 13.87, p < .01$. Table 3a shows that students in the negative father profile were at 5.93 greater odds of being in the high-risk consequences subset when compared with students in the positive anti-alcohol profile. Second, students in the positive pro-alcohol profile were at 3.89 greater odds of being in the high-risk consequences subset when compared with students in the positive anti-

alcohol profile. Finally, students in the negative-mother profile were not at increased odds of belonging to the high-risk consequences subset, compared with students in the positive anti-alcohol profile. Additional regression analyses found no significant student Gender $\times$ Parental Profile interaction.

A second set of analyses testing the association between parental profile and membership in the high-risk consequences subgroup, after pre-college drinking was controlled for, revealed slightly different results. Parenting still had a significant unique effect on membership in the high-risk subgroup (see Table 3b) but only for the negative father profile (odds ratio = 5.62). These findings substantiate that pre-college drinking alone does not fully account for membership in the high-risk subgroup at the 15-month follow-up and that parenting remains an important independent predictor.

Discussion

The current study examined pre-college parenting predictors of student membership in a high-risk subset experiencing excessive alcohol-related consequences. Approximately 16% of the sample in the study met criteria for inclusion in the high-risk consequences subset. The high-risk subset experienced more than half of the repeated consequences and more than 40% of the unique consequences endorsed by the entire sample.

Four unique parenting profiles were identified. The largest of the profiles to emerge was the positive pro-alcohol profile. These students reported that they had positive relationships with both parents but that their mothers and fathers exhibited relatively pro-alcohol attitudes and modeling. In contrast, students in the second largest profile (positive anti-alcohol profile) reported that their mothers and fathers conveyed more disapproval of alcohol use and drank less, while maintaining similarly positive relationships. The remaining two

TABLE 3B. Odds ratios and 95% confidence intervals [in brackets], after drinking at baseline was controlled for

Variable	Positive pro-alcohol, (n = 97)	Positive anti-alcohol, (n = 107)	Negative mother, (n = 58)	Negative father, (n = 22)	Drinking at baseline	$\chi^2(df)$
High-risk consequence subset	2.18 [0.83, 5.74]	1 (ref.)	1.34 [0.42, 4.28]	5.62** [1.67, 18.94]	1.14** [1.07, 1.21]	34.02 (4)

Note: Ref. = reference.

**Denotes an odds ratio significantly different from 1 ($p < .01$).

profiles were characterized by distinctly negative relationships with one of their parents (negative mother and negative father profiles).

Students in the negative father profile were at the greatest odds of being in the high-risk consequences subset. This finding is consistent with recent work showing that paternal influences may be especially important with respect to predicting problems with alcohol (Patock-Peckham and Morgan-Lopez, 2007). Contrary to previous assumptions that mothers are the more influential parent (Madon et al., 2008; Turrisi et al., 2000), it appears that paternal influences are at least equally important in terms of their association with membership in the high-risk consequences group. Furthermore, the association between the negative father profile and membership in the high-risk consequences subgroup remained even after students' baseline drinking was controlled for, suggesting that this relationship is robust and is not entirely explained by students' pre-college drinking.

The second parental profile that was associated with high-risk group membership was the positive pro-alcohol profile. Although the findings were not robust when pre-college drinking was controlled for, they are consistent with previous work demonstrating the importance of parental approval of alcohol use and modeling of alcohol use even in the context of largely positive parent–student relationships (Abar et al., 2009; White et al., 2000). In addition, this was the only profile positively related to pre-college drinking, such that students in this profile drank significantly more than students in the other profiles. Given that pre-college drinking accounted for the association between the positive pro-alcohol profile and membership in the high-risk group, future work could explore variables such as alcohol expectancies and pre-college drinking tendencies as potential mediators of this association.

Contrary to previous work showing that mother- and father-specific influences on risky alcohol-related behavior might operate differently according to student gender (Patock-Peckham et al., 2011; Turner et al., 2000), we did not find a significant association between parental profiles. However, it is possible that the small sample sizes in the negative-mother and negative-father profiles did not afford sufficient power to test this interaction. This possibility could be explored further with larger samples.

The current study did not explore mediators in the link between parental influences and membership in the high-risk subset, but previous work suggests possible mechanisms including personality factors (King et al., 2011), depressive symptoms (Patock-Peckham and Morgan-Lopez, 2007), reasons for drinking (Patock-Peckham and Morgan-Lopez, 2009b), and selection of friends (Abar and Turrisi, 2008). These potential explanatory mechanisms may be especially relevant for the negative father profile, because the association between membership in this profile and membership in the high-risk subgroup was not fully accounted for by pre-

college drinking. Given that the most salient characteristic of this profile was the high level of family conflict and that the mean for maternal conflict also was relatively high in this profile, it is possible that overall family conflict is higher in families fitting this profile. Higher levels of family conflict could be related to other immediate predictors of alcohol consequences, such as choice of friends (Abar and Turrisi, 2008), motives for drinking (O'Connor and Colder, 2005), and negative peer influences (Wood et al., 2004). Future work should explore possible mediators that account for the association between parental profile and membership in the high-risk subset.

Implications

The results of the present study have important implications for the pre-college identification of students at the greatest risk for excessive alcohol consequences. Given the disproportionate number of alcohol-related consequences experienced by this high-risk group of students, early intervention efforts directed at this group have the potential to substantially reduce alcohol consequences when students arrive on campus. In addition to a call for early intervention efforts, the results of the present study underscore the importance of both general and alcohol-specific parenting during the transition period between high school and college. For example, although some reports show that the impact of parenting may recede (Windle, 2000), numerous others suggest the continued importance of parental behaviors predicting drinking and consequences (Abar and Turrisi, 2008; Patock-Peckham and Morgan-Lopez, 2007; Sessa, 2005; Turner et al., 2000; Turrisi and Ray, 2010; Wood et al., 2001, 2004). The majority of these studies either report direct effects of parenting on student drinking outcomes or show that effective parenting mitigates the risky effect of peer and environmental influences. Our own research (Mallett et al., 2011b; Turrisi et al., 2001, 2009, 2010) and that of collaborators (Ichiyama et al., 2009; Testa et al., 2010) also have documented the benefits of interventions specifically targeting parenting behaviors—such as parental approval of alcohol consumption, parental drinking, and parent communications about drinking—as mechanisms of change for student drinking and consequences during the transition to college.

Finally, recent intervention studies have shown that parents can change the drinking behaviors of their college-bound children even if the children have already established heavy drinking habits in high school (Cleveland et al., 2011; Mallett et al., 2010). Based on the findings of these studies, it is reasonable to expect that messages encouraging parents to modify their own behaviors will be effective and in turn will have a positive influence on their college-aged children, even at this late stage of development. Such efforts need to include messages that counter parental misperceptions that, as long as they maintain a close, positive relationship with

their college students, their alcohol-specific behavior is less important.

Limitations and future directions

Despite these contributions, the present study is not without limitations. First, all of the parental data were student-reported. Therefore, the measures may not be accurate with respect to their parents' actual behavior. However, given that students' reports of their parents' behavior have consistently been found to be associated with drinking outcomes (e.g., Patock-Peckham et al., 2011; Wood et al., 2004), it is likely that students' perceptions of their parents' behavior are at least as influential as parents' self-reported behavior would be, even if the perceptions are not completely accurate. Future efforts could expand on this work by determining whether parent-reported data yield similar results.

A second limitation of the study was that only a restricted number of parental variables could be included because of the constraints of the LPA procedure. A strength of Abar's (2011) LPA is that it included more indicators, albeit most were measured at the general parent level. It is possible that additional parenting variables that were not included in the present analyses (e.g., more nuanced measures of modeling) are equally important. However, variables were selected based on the existing literature and should be representative of the most relevant measures of parental influences.

Finally, the current analyses did not account for family structure or living arrangements. Although the sample was relatively homogeneous (87% lived with both biological parents before college), it is possible that students had more than one influential mother or father figure (e.g., a stepmother or stepfather) whose influence was not captured. Future work should explore how such differences affect the nature of parental influences on college student drinking. Finally, peers, environment, and genetics (Chassin et al., 1996) are likely to be related to high-risk group membership and should be examined.

Conclusion

The findings reveal that mothers' and fathers' pro-alcohol behaviors, even in the context of other positive parenting, are associated with students' inclusion in the high-risk subset. Our conclusions can be used to strengthen interventions to reduce college student alcohol consequences and to inform future work examining mother- and father-specific influences.

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