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## Do Parents Know Best? Examining the Relationship Between Parenting Profiles, Prevention Efforts, and Peak Drinking in College Students<sup>1</sup>

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### Abstract

The study examined parent profiles among high school athletes transitioning to college and their association with high-risk drinking in a multi-site, randomized trial. Students ( $n = 587$ ) were randomized to a control or combined parent-based and brief motivational intervention condition and completed measures at baseline and at 5- and 10-month follow-ups. Four parent profiles (authoritative, authoritarian, permissive, indifferent) were observed among participants. Findings indicated control participants with authoritarian parenting were at the greatest risk for heavy drinking. Alternately, students exposed to permissive or authoritarian parenting reported lower peak drinking when administered the combined intervention, compared to controls. Findings suggest the combined intervention was efficacious in reducing peak alcohol consumption among high-risk students based on athlete status and parenting profiles.

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High-risk drinking and related consequences among college students continues to be a problem across the nation (Abbey, 2002; Cooper, 2002; Hingson, Heeren, Zakocs, Kopstein,

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& Wechsler, 2002; Hingson, Heeren, Winter, & Wechsler, 2005; Perkins, 2002b; Wechsler, Dowdall, Maenner, Gledhill-Hoyt, & Lee, 1998). Despite a tremendous amount of effort on the part of researchers and college administrators to curb dangerous behavior patterns, many college students continue to engage in high-risk drinking, which results in physical, emotional, legal, academic, or sexual problems (e.g., National Institute on Alcohol Abuse and Alcoholism [NIAAA], 2007; O'Malley & Johnston, 2002; Perkins, 2002a).

Epidemiological studies have shown that young adulthood (18 to 29 years), the age range representing the majority of college students, encompasses the largest proportion of individuals who meet DSM-IV criteria for alcohol-use disorders, relative to other age groups (e.g., Dawson, Grant, Stinson, & Chou, 2004; Johnston, O'Malley, Bachman, & Schulenberg, 2005; Schuckit, Klein, Twitchell, & Springer, 1994). To prevent dangerous drinking episodes, acute alcohol-related consequences, and chronic patterns of alcohol misuse throughout the lifespan, researchers have targeted interventions toward this pivotal developmental window (Larimer & Cronce, 2002, 2007). Considering the positive relationships between heavy alcohol consumption, high blood alcohol concentration (BAC), and the likelihood of experiencing consequences, it is not surprising that an integral component of successful interventions focuses on reducing the amount of alcohol consumed during peak drinking occasions (Dimeff, Baer, Kivlahan, & Marlatt, 1999; Turrisi, Jaccard, Taki, Dunnam, & Grimes, 2001).

Successful alcohol interventions targeting college students have incorporated peers and parents, which are sources of significant social influence on college students' drinking behavior (American College Health Association, 2005; Larimer et al., 2001; Turrisi et al., 2001; Wood, Read, Mitchell, & Brand, 2004). Students' perceptions of the quantity of alcohol consumed by their peers—as well as the types of drinking behaviors of which their peers approve—are positively associated with alcohol consumption rates (e.g., Borsari & Carey, 2001; Perkins, 2002a; Larimer, Turner, Mallett, & Geisner, 2004; Neighbors, Lee, Lewis, Fossos, & Larimer, 2007). While peers are highly influential during this developmental period, parents continue to influence students' drinking decisions via ongoing interactions and parenting styles that have been present throughout individuals' lives (e.g., King & Chassin, 2004; Turrisi, Wiersma, & Hughes, 2000). For example, mother–teen communication has been shown to be a significant factor in relation to teens' drinking beliefs and experiencing alcohol-related consequences in college. Specifically, individuals who have more communication with their mothers about negative aspects of alcohol use hold less positive beliefs about alcohol and experience fewer alcohol-related consequences (Turrisi et al., 2000). Parent–child conflict has been shown to increase risky drinking in high-risk college students (Turner, Larimer, & Sarason, 2000). Other research has shown that despite the fact that most college students live away from home, higher rates of parental monitoring and knowledge about students' alcohol use are significantly related to lower alcohol consumption (Wood et al., 2004).

Given that parenting significantly influences drinking during the college years, Turrisi and colleagues (2001) developed a parent-based intervention (PBI) targeting individuals during the transition to college. Parents received a handbook the summer prior to college matriculation, which provided information about alcohol and ways to enhance communication with their teenage son or daughter. Compared to a control sample, students randomized to the intervention condition reported consuming significantly less alcohol and engaging in significantly fewer high risk drinking occasions during their first year of college.

Recently, a study (Turrisi et al., 2009) examined the combined use of the PBI (Turrisi et al., 2001) with a peer-based intervention (Brief Alcohol Screening and Intervention for College

Students [BASICS]; Dimeff et al., 1999) in a sample of high school athletes transitioning to college since they are a high-risk subsample of college students. The study found that the combined intervention was efficacious in reducing risky drinking and resulted in more favorable drinking outcomes, compared to the use of the PBI or BASICS alone. While the study found support for the combined intervention, the use of the PBI alone did not yield significant reductions in drinking, and the BASICS alone had smaller effects than did the combined condition. This finding suggests that adequate dosage and multiple modes of delivery (e.g., parent and peer) are necessary to reduce drinking among certain high-risk samples.

Another topic that warrants further examination is the relationship between different methods of parenting and BASICS (Dimeff et al., 1999) on intervention efficacy. Parents are the mode of delivery of the PBI; therefore, aspects of the parent–teen relationship (e.g., quality, communication, monitoring, permissiveness about alcohol consumption), as well as components of the PBI (e.g., strategies that parents can use to improve communication with teens; specific behaviors and orientations that parents can adopt to facilitate good communication; techniques for giving and receiving criticism; general strategies for improving relationships) may be related to the efficacy of the intervention. In addition, the delivery components of BASICS involve positive communication messages, nonjudgmental listening, individual responsibility, thoughtful consideration of the advantages and disadvantages of drinking behavior, and boundaries and guidance for reducing risk. These are consistent with components of high-quality parenting that are encouraged in the PBI and, thus, may also be related to the efficacy of the intervention.

Parent communication has previously demonstrated a relationship with drinking consequences among college students (Turrisi et al., 2000), making it plausible to believe parenting style may interact with the delivery and efficacy of the PBI. Furthermore, Wood et al. (2004) noted that parent communication moderates peer influences on drinking; therefore, parenting may be associated with the impact of the combined parent- and peer-based intervention. While research examining parental influences on college drinking behavior is promising, more longitudinal work focusing on moderator variables to advance prevention and intervention work is needed (Chassin & Handley, 2006; Fromme, 2006; Van der Vorst, Engels, Meeus, Dekovic, & Vermulst, 2006). Although research has examined parenting styles (e.g., Patock-Peckham & Morgan-Lopez, 2007; Turrisi et al., 2000) and practices (Wood et al., 2004) and their impact on college student drinking, no studies have examined the impact of different parenting profiles (i.e., combinations of both styles and practices concurrently) on high-risk drinking during college. Parenting profiles represent a combination of parenting styles, such as the overall emotional tone of the parent–child relationship (e.g., demandingness, responsiveness) and parenting practices (i.e., specific behavioral acts of monitoring and setting structure) that interact with one another (Barnes & Farrell, 1992; Darling & Steinberg, 1993; Steinberg & Silk, 2002).

Baumrind (1978) described four types of parenting profiles: (a) authoritative; (b) authoritarian; (c) permissive; and (d) indifferent, based on a combination of styles and practices. *Authoritative* parents are classified as both responsive and demanding. They convey warmth toward their child, provide structure and clear expectations, and encourage autonomy by providing support and encouragement.

By comparison, an *authoritarian* profile is highly demanding and much less emotionally responsive than authoritative parents. Authoritarian parents tend to favor obedience, compliance, and punitive punishments, and do not encourage autonomous behavior. Authoritative and authoritarian parents may both have high rates of monitoring in order to prevent their sons and daughters from engaging in underage drinking. However, the act of

monitoring may have different presentations, depending on the parenting style with which it is paired. For example, either type of parent may learn that the child was at an unsupervised party where alcohol was present, after being told that such attendance was unacceptable. Authoritative parents may enforce repercussions for attending the party and discuss possible outcomes of underage drinking and how to make safe decisions about alcohol use with their teen. On the other hand, authoritarian parents might punish their adolescent for going to the party and attempt to limit future transgressions by exerting more controlling behaviors.

The third parenting type is classified as *permissive* parenting and is defined as very responsive, but not demanding. These parents provide their children with a great deal of freedom and little structure or guidance. Patock-Peckham and Morgan-Lopez (2006) defined these parents as allowing their offspring to make decisions that are typically reserved for adults (e.g., alcohol use).

Finally, *indifferent* parenting is a combination of both low demandingness and responsiveness. These parents may be neglectful and tend to spend little time interacting with their children. Permissive and indifferent parents may have low rates of monitoring, but for different reasons. Permissive parents may feel attending an unsupervised party where alcohol is consumed is acceptable, while indifferent parents simply do not care if their teen attends the party and are most likely to not inquire about the activities in which their child is engaging.

While parenting profiles have been examined in relation to child and teen development (Baumrind, 1991; Steinberg, Lamborn, Dornbusch, & Darling, 1992; Weiss & Schwarz, 1996), little is known about their role in college student drinking patterns. The impact of parenting profiles on high-risk drinking and the efficacy of interventions involving a parental mode of delivery has not been examined systematically. Research has shown that parents have an influence on the drinking patterns of their college-aged children (Fromme, 2006; Patock-Peckham & Morgan-Lopez, 2009; Turrisi et al., 2001; Wood et al., 2004). However, it is unclear how different combinations of parenting styles (e.g., use of positive and negative communication) and practices (e.g., monitoring drinking behavior) are related to high-risk drinking among college students in naturally occurring situations and in the context of an alcohol intervention.

The present study examines parent profiles among college students as defined by Baumrind (1978), studies how these profiles are related to high-risk drinking during the freshman year of college, and extends previous work that has shown the efficacy of a combined parent- and peer-based intervention by examining parent profiles as a moderator of intervention efficacy and high-risk underage alcohol consumption in a high-risk sample (Turrisi et al., 2009). We are primarily interested in the impact of parent profiles on the delivery of intervention materials and, therefore, included only participants who completed all phases of the study versus the intent to treat sample.

## Research Topics

Specifically, three research topics are addressed in the present study. These topics are the parent profiles among college students; the relationship between parent profiles and high-risk drinking in naturally occurring conditions; and the relationship of parent profiles with intervention outcome for the combined intervention, as compared to a control group.

### Parent Profiles Among College Students

We used latent profile analysis (LPA) to test for the actual presence of the four theorized parent profiles (i.e., authoritative, authoritarian, permissive, indifferent), based on

commonly used measures that assess parental monitoring, parental knowledge of drinking behavior, use of negative communication, parental permissibility of alcohol use, and quality of the teen–parent relationship. We hypothesize that all four parenting profiles will emerge. However, authoritative and authoritarian profiles will be more prevalent because of the relationship between those parenting styles and academic success (Steinberg et al., 1992).

### **Parent Profiles and High-Risk Drinking in Naturally Occurring Conditions**

The second set of analyses examines the relationship between parent profiles and participants' high-risk peak alcohol consumption under naturally occurring conditions (e.g., in the absence of an intervention). We choose to focus on peak alcohol consumption as the outcome variable in part because of the relationship between high-risk drinking and related consequences (e.g., Wechsler & Isaac, 1992), and because it is a focal indicator of intervention efficacy. We hypothesize that those who experience authoritative parenting styles will consume less alcohol on peak drinking occasions, as compared to individuals who experience authoritarian, permissive, and indifferent parenting. Our rationale is that authoritative parenting has been shown to be related to better problem-solving skills among teens (Steinberg et al., 1992; Steinberg, 2001), which may translate into resisting social and environmental factors that lead to high-risk drinking.

### **Parent Profiles and Intervention Outcome for Combined Intervention, as Compared to Control Group**

The third set of analyses examines whether the combined intervention works better for certain parent profiles. We focus the analyses on the combined intervention condition because it was shown in our previous research to be the most efficacious approach (Turrisi et al., 2009).

We hypothesize that differences in peak drinking will be observed between the combined and the control conditions for authoritative, authoritarian, and permissive parenting; and no differences will be observed for indifferent parenting. Our rationale is that the former three styles are all reflective of diverse, but engaged parenting styles. The parent handbook provides a tool for engaged parents on how best to communicate to teens to reduce high-risk drinking (e.g., strategies that parents can use to improve communication with teens; specific behaviors and orientations that parents can adopt to facilitate good communication; techniques for giving and receiving criticism; general strategies for improving relationships). Further, we expect BASICS (Dimeff et al., 1999) to counterbalance the problematic communication styles of permissive and authoritarian parents and reinforce the positive communication styles of authoritative parents because of its emphasis on positive communication messages, nonjudgmental listening, individual responsibility, and boundaries and guidance for reducing risk. Finally, indifferent parents, because of their lack of engagement, are less likely to respond to intervention efforts and, thus, are less likely to impact their teen's drinking.

## **Method**

### **Participants and Recruitment**

Participants were recruited as part of a large-scale, ongoing multisite study focusing on a high-risk sample of incoming college students who participated in athletics in high school.<sup>3</sup> Randomly selected incoming freshmen ( $N = 4,000$ ) at both a large, public northeastern university (Site A) and a large, public northwestern university (Site B), were screened

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<sup>3</sup>For a more detailed description of the original efficacy study, see Turrisi et al. (2009).

during the early summer of 2006. Invitation letters explaining the study, procedures, and compensation and containing a URL and Personal Identification number (PIN) for accessing the survey were mailed to all 4,000 potential participants.

Eligible participants met the following criteria: (a) they provided their consent to participate; (b) they completed an online screening assessment; (c) they participated in high school or club team athletics; and (d) they completed a baseline assessment during the summer prior to college matriculation. Of the 4,000 participants we contacted, there were 1,803 who consented to participate in the study and who completed the Web-based screening assessment, yielding a 45% response rate, a number that is consistent with using a Web-based recruitment approach (Larimer et al., 2007). We observed no differences on background characteristics (i.e., gender, ethnicity) between participants and individuals who did not respond to the invitation or those who declined to participate in the study. Of the sample, 79% ( $n = 1,419$ ) met the athletic eligibility study inclusion requirements, of which 1,275 completed the baseline assessment and were randomized to one of four conditions (BASICS only, parent only, combined BASICS + parent, or control).<sup>4</sup>

Of the participants who completed all phases of the intervention and follow-up survey, 45.4% were male ( $n = 300$ ) and 54.6% were female ( $n = 361$ ); 3.3% identified as Hispanic or Latino(a), 83.5% as Caucasian, 6.1% as Asian, 3.2% as multiracial, 1.5% as African American, 0.2% as Native Hawaiian or Other Pacific Islander, 0.2% as American Indian/Alaskan Native, 2.1% as “other,” and 0.2% did not identify race/ethnicity. These proportions are comparable to the populations of the campuses from which the respondents were drawn.

The participants received \$10 for the screening survey, \$25 for the summer baseline survey, and \$35 for the follow-up assessment. Individuals who completed the BASICS intervention were compensated \$10 upon completion of a brief evaluation of the session. Of the 661 participants who completed all phases of the intervention, 89% ( $n = 587$ ) completed the long-term follow-up assessment, which was conducted approximately 10 months post-baseline.<sup>5</sup>

### **Intervention Procedure: Combined Intervention (BASICS and Parent Intervention)**

**Peer-Based Intervention (BASICS)**—Participants randomized to participate in a BASICS session (Dimeff et al., 1999; Marlatt et al., 1998) were scheduled for a one-on-one, 45- to 60-min session with a trained student facilitator. The session included review of computer-generated feedback based on their baseline assessment, presented in a motivational interviewing (MI; Miller & Rollnick, 2002) style. Feedback was based on the BASICS manual (Dimeff et al., 1999) and recent efficacy studies using this approach (Larimer et al., 2001, 2007) and included normative feedback, expectancy challenge, negative consequence, and protective behavioral strategy components. Participants who did not attend the BASICS session were mailed their session materials (Larimer et al., 2007).

Analyses were conducted to determine whether or not differences existed between participants who received the BASICS intervention in person versus those who were mailed the materials. The results indicate no differences in baseline drinking measures, follow-up drinking measures, changes in drinking behavior over time, nor any demographic characteristics at baseline (all  $t$ s < 1.96, all  $p$ s > .05), thus allowing us to combine the two groups.

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<sup>4</sup>For a complete review of the original intervention efficacy findings using the intention to treat sample, see Turrissi et al. (2009).

<sup>5</sup>For more details on the sample, see Turrissi et al. (2009).



**Parent-Based Intervention (PBI)**—Parents of participants randomized to receive the intervention were mailed a handbook (as utilized by Turrisi et al., 2001) during the summer prior to college matriculation. Parents were asked to (a) read the handbook; (b) complete a brief evaluation of the handbook, as well as provide feedback on the actual handbook itself; and (c) discuss the material with their teen prior to college. The 35-page handbook included an overview of college student drinking; strategies and techniques for communicating effectively with teens; tips on discussing ways to help teens develop assertiveness and resist peer pressure; and in-depth information on how alcohol affects the body and teen drinking.

To ensure that parents read the material and discussed it with their teens, they were asked to complete a brief questionnaire including items about their perceptions of the handbook and the discussions they had with their teens. The questionnaire asked parents to rate the handbook based on interest, readability, and usefulness for each section on a 5-point scale ranging from 0 (*not at all*) to 4 (*extremely*). The ratings were uniformly positive, ranging from 3.16 to 3.67. In addition, for 21 of the 26 topics covered on drinking, more than 85% of the parents reported discussing the material with their teens. The mean frequency across topics for the “not at all discussed” option was low ( $M = 11.8\%$ ,  $SD = 10.9$ ). These data are consistent with other studies (Turrisi et al., 2001, 2009) and provide fidelity evidence that parents read the material and engaged in conversations with their teens.

**Control Group Procedures**—Participants in the assessment-only control group completed all assessments in an identical manner to the BASICS, Parent, and Combined Intervention conditions, except that interventions were mailed and offered after all assessments were completed.

## Measures

**High-Risk Alcohol Use**—Peak blood alcohol content (BAC) was calculated using participants’ responses to the maximum number of drinks consumed on an occasion within the past 30 days, and the number of hours they spent drinking on that occasion, from the Quantity/Frequency/Peak (QFP) Questionnaire (Dimeff et al., 1999; Marlatt et al., 1998). BAC was calculated following established guidelines (Dimeff et al., 1999; Matthews & Miller, 1979). A standard drink definition was included in assessing alcohol use (i.e., 12 oz. beer, 10 oz. wine cooler, 4 oz. wine, 1 oz. 100 proof liquor, 1¼ oz. 80 proof liquor).

## Parenting Styles

**Quality of the parent–teen relationship:** This construct consists of seven items that measure three main components of relationship quality: (a) *expertise* (3 items; e.g., “My mother gives me good advice,” “The advice my mother gives me is helpful when we talk about important topics”); (b) *trust* (2 items; “I can trust my mother when we talk,” and “My mother is honest with me”); and (c) *empathy* (2 items; “My mother wants to understand my side of things when we talk,” and “When talking to my mother, she tries to understand my point of view”). These items were measured only on the teen’s mother, except when a mother was not present, in which case the father was used (< 1%). Based on the work of Turrisi (2003), all of these items were measured on a 4-point scale ranging from 1 (*disagree*) to 4 (*agree*; Cronbach’s  $\alpha = .92$ ).

**Parent permissibility of alcohol use:** Students provided information regarding their perceptions of permissibility of their alcohol use by their mother and father. Items were rated on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The items are as follows: “My mother/father thinks it is okay if I drink alcohol on special occasions outside the home (e.g., at a friend’s party);” “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.” The items were measured for both parents separately and then were summed ( $\alpha = .90$ ).

**Parent communications:** Based on a form that was adapted from Turrisi et al. (2000), the students provided information regarding the perceived communication practices of both their mother and their father. Four items were used, which were rated for each parent: “My mother (father) lectures to me, rather than listens to me,” and “My mother (father) turns everything into a debate of ‘me versus you.’” The items were rated on a 5-point scale ranging from 1 (*almost never*) to 5 (*most of the time*). Scores for both parents were summed to achieve a single score. Higher scores represent teen perceptions of greater negative communication practices from their parents ( $\alpha = .62$ ).

### Parenting Practices

**Parental monitoring:** The composite representing parental monitoring consists of two items adapted from Wood et al. (2004), detailing how much effort a student perceives his or her parents are taking to monitor his or her behavior. The items are “How much do your parents try to know what you do with your free time?” and “How much do your parents try to know about your drinking?” The items were measured on a 3-point scale ranging from 1 (*don’t try*) to 3 (*try a lot*;  $\alpha = .60$ ).

**Parental knowledge:** Parental knowledge was indexed by two manifest items that were adapted from Wood et al. (2004), tapping the degree to which an individual perceives his or her parents as actually knowing what he or she is doing outside of the house. The items are “How much do your parents really know about what you do with your free time?” and “How much do your parents really know about your drinking?” The items were measured on a 3-point scale ranging from 1 (*don’t know*) to 3 (*know a lot*;  $\alpha = .60$ ). In our past research, we have observed test–retest reliabilities ranging from .70 to .80, Cronbach’s alphas of .75 or greater, and nonsignificant correlations with measures of social desirability (Abar, Abar, & Turrisi, 2009; Turrisi, 2003; Turrisi et al., 2000).

## Results

### Statistical Plan

The first step in our statistical plan was to use latent profile analysis (LPA) to test for the theorized parent profiles. LPA allows for the explanation of continuous predictor variables by categorical latent variables called *profiles*. In addition to determining latent parent profiles, LPA can estimate the proportion of participants who are likely to fit into each profile, estimate the pattern of indicator variable means within each profile, and assign each participant into a latent profile.

The following participant-reported parenting practices and style indicator variables were used: parental monitoring of participants’ general behavior and drinking; parental knowledge of participants’ general behavior and drinking; use of negative communication by participants’ parents; perceived parental permissibility of alcohol use by participant; and quality of the teen–parent relationship. Thus, the current study created profiles of parenting styles based on participants’ reports on these constructs. Scores on these indicator variables were standardized to aid in profile interpretation. The LPA model used also assumes equal indicator item variances across latent profiles.

In order to determine the best fitting LPA model, the first model we tested fit a one-class solution to the data. Additional classes were then added iteratively. At each step, fit indexes were evaluated to determine if the model fit was better than the preceding model. The fit



indexes used in the current analyses were the Akaike information criteria (AIC) and the Bayesian information criteria (BIC). Decreases in size of these indexes are generally indicative of better model fit (Muthén & Shedden, 1999). Also critical to determining model fit was the practical interpretability of the resulting profiles. All LPA analyses were conducted using MPlus Version 4.4 (Muthén, 2002).

The second phase of the analyses used a one-way ANCOVA for theorized participants' parenting profile (i.e., authoritative, authoritarian, permissive, indifferent) on follow-up peak drinking. We controlled for baseline peak drinking and gender to provide perspectives on participants' high-risk alcohol consumption under naturally occurring conditions (in control participants).

Third, to obtain an omnibus  $F$  value for the interaction effect, we used a 4 (Condition: BASICS, parent, combined, or control)  $\times$  4 (Theorized Parent Profile) ANCOVA. Then, to test our hypotheses examining differences between the combined intervention and control condition on follow-up peak drinking, we conducted Tukey's honestly significant difference (HSD) planned comparisons, controlling for baseline peak drinking and gender.

There were no significant group by campus interactions (Turrisi et al., 2009). Thus, the data were combined across sites.

### Missing Data and Outliers

Missing data on our variables (i.e., peak BAC, parenting practices, parenting styles) were minor within session (< 1%) and low from baseline to follow-up (< 15%). Thus, we simultaneously subjected all of the variables in our analyses simultaneously to a maximum likelihood approach (expectation maximization [EM] in SPSS), which was recommended by Schafer and Graham (2002). Finally, based on the recommendations of Tabachnick and Fidell (2001), extreme outliers on the peak drinking measure, which were extremely low in frequency (e.g., < 1%), were rescored to a unit greater than the largest non-outlying value (e.g., 3.29  $SD$  above the  $M$ ) to achieve acceptable levels of skewness and kurtosis in the univariate distributions (e.g., < 2 and 4, respectively).

### Research Question 1: Examination of Theorized Latent Profiles of Parenting

We examined four LPA models to determine if the theorized parent profiles existed in the current data. For each model, estimation terminated normally using 250 random start values and the best log likelihood value replicated. The results of these models (see Table 1) reveal that the four-class solution was the best fit for the data. As the number of classes was increased from one to four, the fit indexes became smaller with each class addition, which is indicative of better model fit. The entropy value of the four-class model was .83, which suggests that the latent profiles were well separated and that the parenting indicator variables were good predictors of parent profile membership (Celeux & Soromenho, 1996). The probability that participants were assigned to the most likely class was at least .86 for each profile, which suggests that participants were assigned to their most likely profile.

The first profile was labeled *authoritative parents* ( $n = 319$ ), and the posterior probability of being assigned to this profile was .48. *Posterior probability* represents the proportion of the sample that fits each profile. Table 2 shows that participants with this parent profile reported high relationship quality, below average levels of negative communication, high levels of monitoring, high levels of knowledge, and average permissibility.

The second parent profile, with a posterior probability of .27, was labeled *permissive parents* ( $n = 177$ ). Participants with these parents reported above average levels of quality of

relationship, slightly below average levels of negative communication, low parental monitoring, average levels of parental knowledge, and above average permissibility.

The third parent profile was labeled *authoritarian parents* ( $n = 86$ ), with a posterior probability of .14. This profile was characterized by low levels of quality of relationship, high levels of negative communication, high levels of parental monitoring, low levels of knowledge, and low permissibility.

The final profile was labeled *indifferent parents* ( $n = 77$ ), and the posterior probability of being assigned to this profile was .11. Participants in this group reported low relationship quality, above average levels of negative communication, low levels of parental monitoring, low levels of parental knowledge of their behavior and alcohol consumption, and average levels of permissibility of alcohol consumption.

### Research Question 2: Relationship Between Parent Profiles in Naturally Occurring Conditions

The second research question of interest was to examine the relationship between parent profiles and participants' high-risk alcohol consumption under naturally occurring conditions (in control group). The results of a one-way ANCOVA with four levels (i.e., authoritative, authoritarian, permissive, indifferent) on peak follow-up drinking controlling for baseline peak BAC and gender reveal significant differences between the different parent profiles,  $F(3, 208) = 5.37, p < .001$ , partial  $\eta^2 = .072$ . Follow-up Tukey's HSD contrasts indicate that control participants with authoritarian parents reported significantly higher mean peak BACs ( $M = 0.20, SE = .02$ ) when compared to control participants with the other parent profile types: authoritative,  $M = 0.12, SE = .01$ ; permissive,  $M = 0.13, SE = .01$ ; and indifferent,  $M = 0.10, SE = .02$ . These findings suggest that participants with authoritarian parents who do not receive interventions are at the greatest risk for heavy drinking at follow-up in their freshman year.

### Research Question 3: Relationship Between Parent Profiles of Combined and Control Groups on Drinking

We observed a significant 4 (Parenting Profiles)  $\times$  4 (Intervention Condition) interaction ANCOVA, controlling for baseline drinking and gender on follow-up peak drinking,  $F(9, 567) = 2.35, p < .01$ , partial  $\eta^2 = .036$ . Considering that the omnibus interaction effect was significant, we then focused on the third research question of interest, which was to examine differences between the combined condition and the control condition for each of the parent profiles using Tukey's HSD tests (all reported mean differences were at the  $p < .05$  level).

Within the authoritative parenting style, there was a nonsignificant difference when comparing mean peak BAC of control participants ( $M = 0.12, SE = 0.01, n = 108$ ) with combined participants ( $M = 0.09, SE = 0.02, n = 50$ ). A significant difference was observed when comparing mean peak BAC in control participants ( $M = 0.13, SE = 0.01, n = 66$ ) and combined participants ( $M = 0.08, SE = 0.02, n = 31$ ) who reported having parents with permissive parenting styles. For those who reported authoritarian parenting styles, control participants had a significantly higher mean peak BAC ( $M = 0.20, SE = 0.02, n = 32$ ), compared to combined participants ( $M = 0.10, SE = 0.03, n = 14$ ). Within the indifferent parenting style, there was a nonsignificant difference in peak BAC between control ( $M = 0.10, SE = 0.02, n = 32$ ) and combined conditions ( $M = 0.06, SE = 0.03, n = 15$ ). Thus, participants who were exposed to permissive or authoritarian parent profiles drank less when they were administered the combined intervention, compared to the control condition.

## Discussion

Matriculation into college represents a key period in the development and maintenance of alcohol use patterns among adolescents, and previous research has demonstrated the impact of parental factors (i.e., parenting styles, communication) on adolescent drinking (Patock-Peckham & Morgan-Lopez, 2006, 2007; Wood et al., 2004). The present longitudinal study extended previous cross-sectional research by investigating parenting profiles as a moderator of the efficacy of a parent- and peer-based intervention to prevent heavy drinking among students transitioning to college. To our knowledge, this is the first empirical investigation to evaluate the association of both parenting styles and practices with high-risk college student drinking over time.

Consistent with our first hypothesis, all four parent profiles (i.e., authoritative, authoritarian, permissive, indifferent) emerged in the LPA. We expected authoritative and authoritarian profiles to have the largest representation among participants. However, the hypothesis was only partially supported. The largest proportion of the sample was associated with authoritative profiles (48%), while the authoritarian profile was the third highest proportion of the sample (13%). Considering that the current findings indicate that students with authoritarian parent profiles were at the greatest risk to engage in high-risk drinking during their freshman year, it is beneficial that the proportion of students reporting this parenting style was relatively smaller than hypothesized. On the other hand, considered on a macro level of university students nationally, it is a large enough population to warrant attention as these students matriculate to college.

The results of the current study partially support our second hypothesis, which proposed that students with parents who are classified as authoritarian would be more likely to engage in risky drinking behavior over the course of their freshman year, compared to their peers with non-authoritarian parents. These findings suggest that authoritarian parenting styles are a risk factor for problematic drinking during the transition from high school to college. Prior research has demonstrated that more restrictive rule setting exerts less effect on drinking behavior of adolescents as they age (Van der Vorst et al., 2006), and greater parental discipline has been shown to be associated with higher levels of drinking among adolescents at the age just before college entry (Latendresse et al., 2008). The current study extends this research by demonstrating that authoritarian parenting is associated with higher peak consumption during the first year of college.

Investigation of the moderating effects of parental style on the impact of the combined parent-peer intervention on peak drinking yielded noteworthy results. As anticipated, the combined parent and peer intervention was successful in reducing peak alcohol consumption among individuals from authoritarian and permissive parents. It is interesting to note that authoritarian parents tend to impose rules and to be very directive in their approach to parenting. In contrast, permissive parents tend to impose few rules and to communicate in a manner that contains fewer directives.

Despite these somewhat oppositional parenting approaches, the handbook may have added a new dimension for both authoritarian and permissive parents to communicate with their sons and daughters. Because we examined the combined intervention, it cannot be discounted that BASICS contributed to some of these effects as a result of the emphasis on positive communication messages, nonjudgmental listening, individual responsibility, and boundaries and guidance for reducing risk. These communication components may have served to counterbalance the problematic communications styles of permissive and authoritarian parents. For example, participants met with a warm, engaging, nonjudgmental peer counselor who openly discussed their drinking with them.

Also as anticipated, there was no relationship between the indifferent parenting style, the intervention, and peak BAC. Supervisory neglect, as measured by adolescent perception of parental knowledge of adolescents' activities, has been shown to be related to an increased likelihood of the onset of alcohol use disorders (AUDs) in adolescents. Those identified as having an AUD are less likely to benefit from treatment when parental supervision is qualified as being neglectful (Duncan, Thatcher, & Maisto, 2005). Although the findings we predicted in this regard are consistent with the literature regarding indifferent parenting, it is concerning that the intervention did not affect peak BAC for these individuals. More research appears to be necessary to find solutions for reaching individuals from indifferent parenting homes.

Finally, counter to what we expected, the intervention did not seem to have differential effects for participants who came from homes with authoritative parents. Although their peak drinking was lower than authoritarian individuals, both in the controls and the treatment, it still was relatively high, on average ( $M_s = .09$  and  $.12$  for treatment and controls, respectively).

There are a few plausible explanations for our findings. First, our sample was composed of an indicative high-risk subgroup (e.g., athletes). It could be that the protective effects of authoritative parents are enhanced by the added risk factor of being a member of a high-risk subgroup. A second possibility is that authoritative parents are already doing what is recommended in the parent intervention; thus, observing no differences between the treatment and control groups would be expected. Third, there may be other important factors (e.g., gender effects) that may moderate this relationship. Parental behavior has been shown to be positively associated with adolescent drinking when the parent and adolescent are the same gender (Patock-Peckham & Morgan-Lopez, 2006). In the present study, the effect of gender was controlled for in order to reduce the complexity of interpreting the relationship between parenting style and the role of intervention in reducing risky drinking. In light of this, more research is needed to examine what might be needed in terms of improving the quality and quantity of communications in order to examine treatment effects for individuals from authoritative homes.

Together, our findings offer evidence that suggests interventions involving parental participation may benefit from being tailored to address specifically the relationship between parent and child in order to improve efficacy. This may be especially important for students who engaged in lower levels of drinking throughout high school, but who will no longer be under the supervision of their authoritarian parents during college (Hersh & Hussong, 2006) and among those whose parents tend to be more lenient in their approach.

Although careful consideration was taken to reduce limitations to the present study, some limitations should be noted. Our reliance on participants' self-reports is one limitation, as self-report biases are always a concern. However, assurances of confidentiality were conveyed throughout the survey and consent form; individuals were able to respond via a Web-based survey, rather than an in-person interview; and a measure of social desirability was included to evaluate potential response bias. Consistent with previous research (Laforge, Borsari, & Baer, 2005), we found no evidence of self-report bias in our results.

A second limitation is that the measurement of parent behaviors and attitudes were assessed from teens' perspectives, and future research should also collect data directly from parents in order to provide a more reliable measure of parental influences (Wood et al., 2004). In addition, the assessment of communications asked about both mothers and fathers, whereas assessment of styles focused on parents more generally. More recent studies have demonstrated the importance of assessing both parents (e.g., Chassin & Handley, 2006;

Fromme, 2006; Patock-Peckham & Morgan-Lopez, 2009), in contrast to earlier studies that have primarily shown the importance of mothers (e.g., Turrisi et al., 2000). Future research might benefit from assessment of both parents.

Third, alpha scores for some of the parenting constructs were lower (e.g., .60), in part, because they assessed general parenting and then specific parenting. In addition, some of these measures referred to both mothers and fathers simultaneously, who may have different parenting styles or practices. This tends to result in slightly lower alphas, but provides more range and heterogeneity of parenting.

Fourth, some of our planned comparisons had small cell sizes, which can reduce power and result in outliers affecting the stability of parameter estimates. However, we used an approach that mitigated the impact of extreme outliers (e.g., Tabachnick & Fidell, 2001) and balanced concern about type 1 error with sensitivity to power. It should be noted that we observed an extremely low frequency of outliers (i.e., 1%) and, as recommended in the literature, an ANCOVA was conducted on the complete design, which was followed with Tukey's HSD to detect significant differences between group means (Jaccard, Becker, & Wood, 1984). Thus, we have greater confidence that our results are valid and provide insight into the impact of parental profiles on intervention efficacy.

Finally, our method of formulating parenting profiles was to utilize LPA statistical analyses. An alternate approach could have assessed parenting profiles using a measure such as Buri's (1991) scale. Whether the findings would replicate remains an empirical question. However, it is our contention that by using a multi-assessment approach, the present study examined both parental styles and behaviors in a manner that could be argued is more thorough than by a single scale. Further research is needed to determine the comparability of the different approaches.

Despite these limitations, the present study offers insight into the relationship of parenting style and high-risk drinking during the freshman year of college. It appears that the risky drinking behavior of students is associated with parenting profiles when exposed to combined parent and peer interventions. In addition, this study also began to elucidate how parenting practices may moderate the efficacy of an intervention involving a parent-based component. Future studies should aim to examine other important factors (e.g., gender, drinking status) to examine further how parenting profiles may be associated with college student drinking and improve the effectiveness of parent-based interventions that are specifically tailored to address these factors.

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**Table 1**

## Fit Indexes for Latent Parent Profiles

<b>Number of classes</b>	<b>LL</b>	<b>AIC</b>	<b>BIC</b>	<b>Number of parameters</b>
One class	-4081.67	8183.35	8228.26	10
Two classes	-3887.86	7807.72	7879.57	16
Three classes	-3823.00	7690.00	7788.79	22
Four classes	-3787.06	7630.11	7755.86	28

*Note.* LL = log likelihood; AIC = Akaike information criteria; and BIC = Bayesian information criteria.

**Table 2**

Latent Parent Profiles and Means and Variances on the Parent Indicator Z Score Variables

Parent profile	Quality of relationship	Negative communication	Parental monitoring	Parental knowledge	Permissibility
Authoritative ( <i>n</i> = 319; 48%)	0.42*	-0.19*	0.61*	0.40*	0.02
Permissive ( <i>n</i> = 177; 27%)	0.27*	-0.17*	-0.81*	-0.08	0.24*
Authoritarian ( <i>n</i> = 86; 13%)	-0.93*	0.69*	0.43*	-0.53*	-0.45*
Indifferent ( <i>n</i> = 77; 12%)	-1.26*	0.39*	-1.17*	-0.86*	-0.05
Variances	0.28	0.37	0.19	0.52	0.94

*Note.* Item variances were constrained to be equal across groups.

\* Indicates mean is significantly different from 0, *p* < .05.