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## Exploring the role of positive and negative consequences in understanding perceptions and evaluations of individual drinking events

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### Abstract

While research has established that drinking more alcohol is associated with experiencing more positive and negative alcohol-related consequences, less is known about how college students evaluate their drinking experiences. Evaluations of drinking events may vary with factors such as how much one drinks, which consequences one experiences, and the context (i.e., where and with whom) one drinks on a given occasion. This research used daily data (Level 2:  $N=166$  students, 61% female; Level 1:  $N=848$  person drinking days) to explore the relationship between quantity of alcohol consumed and experience of specific domains of positive and negative consequences and to examine how the experience of specific consequences related to overall evaluation of the drinking experience. Drinking on a given day was positively associated with experiencing more negative (social and personal) and more positive (image, fun/social, and relaxation) consequences. With respect to the formation of overall impressions, negative (social and personal) consequences were associated with less favorable evaluations whereas positive (image, fun/social, and relaxation) consequences were associated with more favorable evaluations of the drinking experience. Indirect effects analyses suggested that consequences (negative personal, negative social, positive fun/social, and positive relaxation) significantly mediated the relationship between drinking and overall evaluation at the daily level. These results underscore the importance of considering both positive and negative consequences in understanding students' choices to drink and how they evaluate their experiences.

### Keywords

College students; Alcohol-related consequences; Web-based daily diary; Overall evaluations

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#### Contributors

All authors contributed to and have approved the final manuscript.

#### Conflict of Interest

All authors declare that they have no conflicts of interest.

## 1. Introduction

The present research was designed to investigate positive and negative consequences of alcohol use and to understand how college students may utilize these experiences to reach an overall evaluation of the drinking event utilizing a daily diary design. The way individuals distill their experience of consequences, both good and bad, into overall evaluations of the drinking experience may provide valuable information for developing college student prevention and intervention programs, which largely focus on reducing negative alcohol-related problems on college campuses. Behavioral decision research and theories of behavior suggest that individuals make decisions based on weighing the pros and cons, or potential positive and negative outcomes, of engaging in a certain behavior (see Fischhoff, 2008), consistent with motivational strategies for intervention (Miller & Rollnick, 2002). While the present study does not examine decision making per se, the aim of the present study is to examine how positive and negative consequences may affect the formation of evaluations of the overall drinking occasion and whether these relationships may be dependent on situational context.

### 1.1. College student drinking-related consequences

The social activities of college students often involve heavy alcohol consumption (DuRant et al., 2008; Zamboanga, Rodriguez, & Horton, 2008), which can result in negative consequences for students themselves, their peers, and/or their campuses (Hingson, Heeren, Winter, & Wechsler, 2005; Perkins, 2002; Wechsler et al., 2000). There is a vast amount of literature documenting the negative consequences of college student drinking, which include both personal consequences (e.g., intentional and unintentional injuries and trouble with the police/authorities) and social consequences (e.g., arguments) that can be assessed on a daily basis, as well as more serious and long-term negative consequences such as poor academic performance, suicide, and death (Hingson et al., 2005; Perkins, 2002; Wechsler et al., 2000).

Researchers and practitioners who focus on examining and intervening with high-risk college drinking continually face the paradox of alcohol use: individuals continue to drink alcohol despite the experience of negative consequences. While it has been documented that negative consequences are experienced by many students, these do not occur in isolation. Rather, research has shown that college students expect (e.g., Leigh & Stacy, 2004; Palfai & Wood, 2001; Zamboanga, 2006) and report experiencing a multitude of subjectively positive consequences from drinking (Corbin et al., 2008; Park, 2004; Patrick & Maggs, 2008), including social enhancement and enjoyment, relaxation effects, and image enhancement (Bauman, 1985–1986; Cooper et al., 1995; Cox & Klinger, 1988; Kuntsche et al., 2005). Additionally, positive consequences tend to occur more immediately to the drinking event (e.g., feeling more relaxed), than negative consequences (e.g., having a hangover and missing school the next day). It may be that when college students consider all of the consequences of their drinking behaviors, the positive consequences may outweigh the impact of negative consequences in the overall evaluation of a drinking experience (Leigh & Lee, 2008). This may lead to an overall sense that the drinking occasion was a rewarding experience, thus reinforcing continued engagement in drinking behavior, despite some negative experiences.

Both positive and negative consequences have been incorporated into many efficacious college student brief alcohol interventions, which often incorporate motivational interviewing and cognitive behavioral strategies (for review see Larimer & Cronce, 2002, 2007). In these interventions college students are presented with personalized feedback about negative alcohol-related consequences they have experienced with the hopes of developing discrepancies about their personal alcohol use and the context of their daily life and broader life goals (e.g., Brief Screening and Intervention for College Students, Dimeff et al., 1999; Alcohol Skills Training Program, Kivlahan et al., 1990; Miller, Kilmer, Kim, Weingardt, & Marlatt, 2001). These consequences are presented in a style which seeks to explore and resolve ambivalence and promote change (Miller & Rollnick, 2002). While discussions of consequences are included in these interventions, research has devoted less attention to evaluating positive and negative drinking consequences and how these experiences are aggregated to form overall evaluations about a particular drinking event in real time. Understanding which consequences may be particularly influential in overall evaluations may help to inform and focus future research with personalized feedback.

## 1.2. Evaluations of alcohol-related consequences

The influence of positive and negative alcohol-related consequences on future motivations for drinking (or not drinking) has been the focus of recent study. In a study of college students (Park, 2004), drinking episodes with positive consequences were described as being more extreme and more frequent than episodes with negative consequences. Heavier drinkers reported more positive and negative consequences, but it was the positive consequences that were perceived as more influential in future drinking decisions. Additionally, Patrick and Maggs (2008) found that after controlling for between-person differences in average experienced positive and negative consequences, following weeks when college students experienced more positive consequences than usual they rated positive consequences as more important and planned to drink more the following week.

Other research has focused on evaluation of negative consequences, primarily in the context of severe negative events or consequences, and its association with motivation to change drinking. For example, among college students referred to an alcohol education program due to an alcohol violation or medical treatment, perceiving the incident as more aversive, having less experience with alcohol, and having fewer problems were associated with higher motivation to reduce future drinking (Barnett, Goldstein, Murphy, Colby & Monti, 2006). Similarly, White et al. (2004) found that among college students who had experienced a previous blackout, about half reported being scared or frightened by their last blackout, which was in turn associated with altering toward more careful drinking patterns (White, Singer, Kraus, & Swartzwelder, 2004). However, when examined with general college drinkers, the relationship between negative consequences and drinking is less clear. For example, among general first-year college drinkers, Patrick & Maggs (2008) found that experiencing negative consequences was not associated with perceived importance of avoiding negative consequences in the future.

To begin to untangle the paradox of alcohol use and consequences among general young adult drinkers, the simultaneous examination of specific types of positive and negative

consequences may be helpful in identifying salient and influential consequences in young adult evaluative processing. That is, how do college students simultaneously utilize positive and negative consequences of drinking to form an overall evaluation of the drinking event? Therefore, an important next step is to examine the association between daily alcohol use and associated positive and negative consequences, as well whether alcohol-related consequences mediate the association between alcohol use and overall evaluation of drinking events. Further, the present study moves beyond generally labeled positive and negative consequences to evaluate different domains of consequences, such as fun/ social enhancement and negative social problems. Identifying important domains of consequences could further help researchers develop effective interventions to reduce high-risk college student drinking designed to help students weigh the positive and negative consequences of behavior (Dimeff et al., 1999; Fischhoff, 2008).

### 1.3. Drinking context as a predictor of alcohol use and consequences

The contexts of alcohol use, specifically who students are with and where they drink, has been associated with young adults' level of alcohol use and related consequences (e.g., Demers, Kairouz, Adlaf, Gliksman, Newton-Taylor & Marchand, 2002; Paschall & Saltz, 2007; Wells, Graham, Speechley, & Koval, 2005; Zamboanga & Ham, 2008). College students have been found to consume more alcohol when drinking outside the home (e.g., in bars, discos and off-campus parties) (Demers et al., 2002; Paschall & Saltz, 2007). In regards to negative consequences, Wells et al. (2005) found that drinking in public locations was associated with greater likelihood of fights for women. For males, frequency of drinking and alcohol-related aggression were moderated by usual drinking location (i.e., men who typically drank in public locations were at greatest risk for alcohol-related aggression). While drinking and drinking heavily may be viewed as socially normative (Borsari & Carey, 2003), drinking while alone has been found to be associated with more negative consequences (Christiansen, Vik, & Jarchow, 2002). The present study will explore the relationships between drinking context (i.e., whether students are alone versus with others and whether they are at home versus out) and the experience of drinking consequences and overall evaluations.

### 1.4. The present study

The present study focused on evaluating positive and negative consequences simultaneously to understand the influence these consequences had on overall evaluations of individual drinking events. Utilizing the unique design of daily diaries, between-person (i.e., gender and average drinking) and within-person differences (i.e., number of drinks and drinking context) were used to describe variability in drinking consequences and to explore the relationship between alcohol use and positive and negative consequences. We also examined between- and within-person predictors of overall evaluations, including five salient domains of consequences (i.e., Positive Fun/Social, Positive Image Enhancement, Positive Relaxation, Negative Personal, and Negative Social) to see which were more influential in the formation of overall evaluation of individual drinking events. Finally, we explored whether consequences mediated the relationship between alcohol use and overall evaluations of a drinking occasion.

## 2. Method

### 2.1. Participants and procedure

Participants for the present study were undergraduate psychology students. As part of the undergraduate psychology experience, all introductory students are offered extra credit for participating in research projects. Of students who participated in the screening survey ( $N=804$ ), 51% of students ( $n=412$ ) met screening criteria for the current Diary Study, that is they consumed alcohol in the past month, indicated daily internet access, and provided contact information. The focus of the Diary Study was to examine within-person co-variation in alcohol use, consequences, and evaluations of drinking events. Therefore, students who had consumed no alcohol during the prior month were excluded. Eligible students were recruited by telephone to participate until the recruitment goal of 200 students was reached. The final sample of 200 students averaged 18.9 years ( $SD=1.99$ ), 41% lived on campus, 61% were female, and 64.6% self-identified as white non-Hispanic, 24.5% Asian, and 10.9% other ethnicities. The majority (69%) were freshmen.

Students who agreed to participate in the study were emailed a link with the study website. On the first day of participation, students completed a baseline survey lasting approximately 45 minutes. On each of the next 29 days, students received a daily email with a link to complete a web diary of their mood, alcohol use, consequences, and activities. These daily assessments lasted approximately 5–10 minutes. Participants received up to 3 extra credit hours and \$57 monetary payment as an incentive to continue daily responding, based on a graduated schedule depending on the number of days completed. As an additional incentive for complete data, students who completed all days were entered into a drawing for cash prizes at the end of the study. Three students never began the study (i.e., did not complete baseline). Among the remaining 197, 92% of the targeted days were completed (5620 of 6107 possible). Most students (69%) completed all 31 days (including baseline, 29 daily reports, and 1 post daily report) and 81% completed 29 or more total days. Nineteen students reported not drinking alcohol during the 29 day daily assessment period and 12 participants had missing data on the Level 2 predictors; these students were excluded from the current analyses. Follow-up analyses did not indicate any significant differences between those excluded and those included in the present study on demographics (i.e., gender, race, age and grades) or alcohol use (i.e., drinks per week and quantity on a typical weekend occasion in the last month) assessed at baseline. Thus, the final sample for the present analyses included 166 students. Analyses were also restricted to drinking days ( $n=868$ ) because of a focus on consequences of alcohol use and overall evaluation of the drinking occasion. For participants who reported all Level 2 variables, there were a total of 848 person drinking days to be included in the multilevel analyses.

### 2.2. Measures

**2.2.1. Alcohol use**—Each day, students were asked to answer the question, “How many standard drinks did you have yesterday?” Students were informed that a standard drink was equivalent to 12 oz. of beer (8 oz. of Canadian beer, malt liquor, and ice beers or 10 oz. of microbrew), 10 oz. of wine cooler, 4 oz. of wine, or one cocktail with 1 oz. of 100 proof liquor or 1 ¼oz. of 80 proof liquor.

**2.2.2. Drinking event characteristics**—Two items assessed characteristics of the drinking event. Participants were asked to indicate the type of location they primarily drank in yesterday, if they reported drinking. Nine options were presented including locations such as bar, restaurant, party or social event (non-Greek), fraternity social function, sorority social function, friend’s house, sporting event, home, or other. To evaluate the risk of experiencing consequences when a student is out drinking, items were recoded to represent whether the participant reported the drinking occurring at home (0) or out of their home (1). Participants also indicated with whom they drank including alone, friends, family members, casual acquaintances, partner (boy/girlfriend), and other. Items were recoded to represent whether the participant was alone (0) or with others (1).

**2.2.3. Positive alcohol-related consequences**—Students who reported drinking alcohol the previous day were asked whether they had experienced each of 26 positive consequences as a result of drinking alcohol the previous day. Positive and negative items were presented together in random order. The possible responses to each question were asked and coded dichotomously, no (0) or yes (1). The 26 positive items reflect three domains, Fun/Social enhancement (12 items, e.g., have more fun, feel closer to your friends), Relaxation (7 items, e.g., relax after a stressful situation, relieve tension), and Image enhancement (7 items, e.g., help to maintain your reputation, seem more exciting to others) of consequences (Maggs, Vesterdal, & Galambos, submitted for publication). Three scores were created reflecting each positive consequence domain indicating whether on a particular drinking occasion the participant reported experiencing any Positive Fun/Social enhancement, Positive Relaxation, and Positive Image enhancement (0=no, 1=yes) on each drinking occasion.

**2.2.4. Negative alcohol-related consequences**—These were assessed with the 23-item Rutgers Alcohol Problem Index (RAPI; White & Labouvie, 1989), adapted for the previous day timeframe. If the participant reported drinking on the prior day, the RAPI was administered to assess whether each consequence occurred on the associated drinking day (0=did not occur, 1=occurred). Prior research has shown that the RAPI consists of three factors including Social consequences, Personal consequences, and Abuse/Dependence symptoms (Martens, Neighbors, Dams-O’Connor, Lee, & Larimer, 2007). For the present analyses, Social (4 items, e.g., “got into fights, acted bad, did mean things,” “caused shame or embarrassment to someone”) and Personal (6 items, e.g., “not able to do your homework or study for a test,” “passed out or fainted suddenly”) consequences were utilized due to the relevance of each of the items for event level evaluations of drinking. Abuse/Dependence symptoms were not utilized in these analyses because these items assessed longer term problems with alcohol (e.g., “felt that you needed more alcohol than you used to in order to get the same effect”). Similar to positive consequences, one score was created for whether participants reported any Negative Social consequences and another score indicated whether participants reported any Personal consequences on each drinking occasion (0=no, 1=yes).

**2.2.5. Rating of overall drinking experience**—This was assessed with a single item developed for the current study. Specifically, students were asked to, “Think about the entire drinking experience you had yesterday. Taking into account all the good and bad things that

were associated with yesterday's drinking experience, how would you rate the overall drinking experience?" Response format was: -2=Bad, -1=Slightly Bad, 0=Neutral, 1=Slightly Good, and 2=Good.

### 3. Results

#### 3.1. Plan of analysis

Multi-level models estimated between- and within-person variation using hierarchical linear modeling software (HLM; Raudenbush & Bryk, 2002). Twenty-nine days of each Level 1 predictor (e.g., daily total drinks) and 29 days of each outcome (e.g., experienced consequences of alcohol use) were nested within individuals. HLM allows modeling of both between-person variance in the outcomes (e.g., by gender) and within-person variance in the outcomes (e.g., by daily measures of drinking). In other words, the model tests both whether individuals differ from one another on average and from themselves from day to day (Singer & Willett, 2003).

Two types of models were computed. First, a series of logistic multilevel models predicted whether five types of positive and negative consequences were experienced on a given drinking day. Between-person (Level 2) predictors were gender and person mean drinks across days, and within-person (Level 1) predictors were daily total drinks and whether individuals drank with others (versus alone) and whether they drank out (versus at home). Second, a single linear multi-level model predicted the overall evaluation of a drinking occasion. Between-person (Level 2) predictors were gender, person mean drinks, and person means of the five alcohol-related consequences across days. Within-person (Level 1) predictors were daily measures including total drinks, experience of each of the five domains of alcohol-related consequences, drinking with others, and drinking out. All Level 2 variables were grand-mean centered such that coefficients represent how individuals differ from the population average. All Level 1 variables were person-mean centered such that coefficients reflect day-to-day variation (i.e., whether a particular day is higher or lower than an average day for that person; Kreft, de Leeuw, & Aiken, 1995).

#### 3.2. Description of the variables

Means, standard deviations, and ranges are shown for the Level 1 variables in Table 1. Analyses were restricted to drinking days ( $n=868$ , 18.2% of all days). On average across days, students consumed 5.21 drinks per day. Positive drinking consequences were reported more frequently (Positive Fun  $n=788$  days, 90.8% of drinking days; Positive Image  $n=463$  days, 53.3% of drinking days; Positive Relaxation  $n=653$  days, 75.2% of drinking days) than negative drinking consequences (Negative Social  $n=100$  days, 11.5% of drinking days; Negative Personal  $n=210$  days, 24.2% of drinking days). Of all drinking days, participants met criteria for binge drinking (4+ for women, 5+ for men) on 58.1% of days (61.9% of all male drinking days, 55.6% of female drinking days).

Intraclass correlations (ICCs; see Ridout, Demétrio, & Firth, 1999) indicated that a substantial proportion of variation was within-people for all outcomes (ICCs: positive

fun=38.7, positive image=61.3, positive relax=42.7, negative social=29.3, negative personal=31.5, overall evaluation=40.7).

### 3.3. Daily experienced drinking consequences

First, whether or not individuals experienced each of five types of alcohol-related consequences was predicted (see equations in Table 2). Between-person variables (Level 2: gender [ $\gamma_{01}$ ] and person mean drinks [ $\gamma_{02}$ ]) were not significant predictors of experiencing any positive or negative alcohol-related consequences, with one exception. A greater mean of drinking across days was associated with greater odds of reporting Positive Fun/Social consequences. Within-person fluctuations, or day-to-day variation, in experienced consequences were predicted by daily drinking, drinking with other people (versus alone), and drinking out (versus at home) as Level 1 predictors. On average, on days when people consumed a greater number of drinks ( $\beta_1$ ), they were also more likely to experience more of all five alcohol-related consequences (Negative Social, Negative Personal, Positive Fun/Social, Positive Image, and Positive Relaxation). Adjusted odds ratios (i.e., controlling for other variables in the model) indicated that consuming one more drink was associated with between 14% greater odds (Positive Relaxation) and 36% greater odds (Positive Fun/Social) of experiencing a consequence. Drinking with others ( $\beta_2$ ) predicted greater odds of experiencing Positive Fun/Social consequences and lower odds of experiencing Positive Relaxation consequences, but was not associated with Negative Social, Negative Personal, or Positive Image. Drinking out ( $\beta_3$ ) was significantly associated with greater odds of reporting Positive Image consequences, but not with any other types of consequences.

### 3.4. Daily evaluation of overall drinking experience

For all drinking days, students were asked to give an overall rating of their drinking experience (see Table 3). Between-person predictors of this rating indicated that women rated their drinking experiences more positively than did men ( $\gamma_{01}$ ) and students who drank more across days tended to rate their drinking experiences as more positive than students who drank less ( $\gamma_{02}$ ). Students who experienced fewer Negative Personal ( $\gamma_{03}$ ) and fewer Negative Social ( $\gamma_{04}$ ) drinking consequences on average across days tended to evaluate their drinking experiences as more positive than students who experienced more negative drinking consequences. In addition, students who reported more Positive Image consequences across days ( $\gamma_{06}$ ) rated their drinking experiences more positively overall. Person means of Positive Fun/Social ( $\gamma_{05}$ ) and Positive Relaxation ( $\gamma_{07}$ ) consequences were not associated with overall evaluation, on average.

Overall evaluations were also predicted with daily within-person (Level 1) variables. Within-person, consuming more drinks on a given day predicted a more positive overall experience of the drinking occasion ( $\beta_1$ ). Experiencing more Negative Personal ( $\beta_2$ ) and Negative Social ( $\beta_3$ ) consequences on a given day was related to more negative evaluations of those daily drinking occasions. Daily experiencing Positive Fun/Social ( $\beta_4$ ), Positive Image ( $\beta_5$ ), and Positive Relaxation ( $\beta_6$ ) consequences was associated with more positive evaluations of those drinking days. Drinking with Others ( $\beta_7$ ) and Drinking Out ( $\beta_8$ ) were not significantly associated with variation in evaluation of the drinking occasion. We examined differences in the magnitude of parameter estimates using *Z*-tests (Rosenthal & Rosnow, 1991).



Comparisons of coefficients revealed that Negative Social consequences had the strongest unique association with overall evaluations and was a significantly stronger predictor than all other consequences,  $Zs = 2.93$ ,  $ps < 0.01$ , with the exception of Positive Fun/Social consequences,  $Z = 1.90$ ,  $p = 0.06$ .

### 3.5. Indirect effects

The indirect relationship of daily total drinking to daily overall evaluation of the drinking occasion through the experience of positive and negative consequences was tested from the coefficients reported in Tables 2 and 3 using the Goodman Test (1960). Significant daily indirect effects were found for Negative Personal (Goodman Test coefficient =  $-2.09$ ,  $p < 0.05$ ), Negative Social (Goodman Test coefficient =  $-3.06$ ,  $p < 0.01$ ), Positive Fun/Social (coefficient =  $3.23$ ,  $p < 0.01$ ), and Positive Relaxation (coefficient =  $2.25$ ,  $p < 0.05$ ) consequences. The indirect effect of Positive Image was trend level of significance (coefficient =  $1.93$ ,  $p = 0.053$ ). In other words, the effect of total number of drinks consumed on a given day (controlling for person mean drinking) on overall evaluation of the drinking occasion was mediated by experiencing negative and positive alcohol consequences.

## 4. Discussion

The purpose of the study was to further understand the factors associated with the experience of positive and negative consequences, as well as how these factors are utilized to inform an individual's overall evaluation of a drinking event. Understanding the relative explanatory power of experienced positive and negative consequences and how they are combined into a single dimension to evaluate a drinking event will provide information for intervention programs specifically designed to help students re-evaluate the balance of positive and negative consequences of their alcohol use. The present study aimed to understand how college students distill their perceptions of consequences, both good and bad, into overall evaluations of the drinking experience using a daily repeated-measures design.

The present research demonstrated that drinking was associated with increased likelihood of all five alcohol-related consequences domains (Negative Social, Negative Personal, Positive Fun/Social, Positive Image, and Positive Relaxation) on those drinking days. Participants with higher average drinking reported increased likelihood of having more Positive Fun/Social consequences, on average. Extending prior research (Paschall & Saltz, 2007; Zamboanga & Ham, 2008), contextual factors were also associated with the experience of alcohol-related consequences. Most college drinking occurs in social settings and research has demonstrated many college students drink for socially motivated reasons (Kuntsche et al., 2005). Thus, it is not surprising that drinking with others was associated with increased likelihood of reporting Positive Fun/Social consequences and associated with decreased likelihood of reporting Positive Relaxation consequences. Drinking outside of the home was the only unique significant predictor associated with Positive Image enhancement, accounting for other positive and negative consequences in the model. Future research should examine whether positive image consequences are especially likely to occur or be sought after in specific out-of-home contexts (e.g., bars or fraternity/sorority parties).

Moreover, it may be that positive image consequences vary depending on one's relationship with his/her drinking partners, such that one's image or status is presumably already set with close friends but may need to be established with lesser known individuals.

Between-person results for overall evaluations indicated that women and students who drank more on average across days tended to rate their overall drinking experience as more positive, consistent with previous research (Park, 2004). Additionally, students who experienced fewer negative consequences and greater Positive Image consequences across days tended to evaluate their overall drinking experiences as generally more positive than students who experienced more negative drinking consequences, on average. On a daily level, fewer negative and more positive consequences across all domains were associated with overall drinking evaluations, such that having negative physical or social consequences was associated with more negative evaluations and having positive fun/social, relaxation, or image enhancement consequences was associated with more positive overall evaluations of the drinking experience. The relative strength of prediction suggested that negative social consequences were uniquely and strongly associated with overall evaluation, suggesting that when a negative social consequence (e.g., getting into a fight) occurs, it may be one of the most important or salient factors influencing how a student evaluates the overall drinking event, even accounting for other consequences experienced. Given the salience of peer relationships during college and the importance of these consequences in students' overall perceptions of the positivity or negativity of drinking events, both positive and negative social consequences should be investigated more thoroughly in future research. Finally, both positive and negative consequences were related to overall evaluations (in opposite directions, as would be expected) and mediated the relationship between drinking on a given day and the overall evaluation of the drinking occasion, suggesting that student's overall evaluations are not based so much on how much they drink, but by what they experience.

#### 4.1. Clinical implications

The present study highlights the importance of integrating the positive and negative alcohol-related consequences college students may be experiencing into brief motivational interventions. Weighing the pros and cons of drinking using decisional balance strategies have been inconsistent in efficacy with some finding positive effects (LaBrie et al., 2006, 2007) while others have not found support (Carey et al., 2006; Collins & Carey, 2005). While serious negative physical consequences (e.g., alcohol poisoning) appear to be influential in motivating changes or thoughts about changing drinking patterns, particularly when evaluated as aversive or scary (Barnett et al., 2006; White et al., 2004), these extreme consequences do not occur very frequently. The personal consequences that are typically experienced among college students, such as those assessed in this study (e.g., not able to study for a test, neglected responsibilities), may not be as influential in how college students evaluate an overall drinking experience, when other positive and negative consequences are also taken into consideration. Thus, when asked to weigh the pros and cons of drinking, college students may list both positive and negative consequences, however the serious negative consequences might not be frequently experienced and the more typical negative consequences are not as influential, making it harder to build a discrepancy for reducing use (Carey et al., 2006).

Results from the present study suggest that it may be worthwhile to focus on positive social (e.g., getting to know more people and being more sociable) and negative social (e.g., fights and embarrassment) consequences, particularly for general college student drinkers who may not be experiencing severe negative consequences. While the occurrence of negative personal consequences was negatively related to overall evaluations, it was also the negative social consequences that uniquely predicted evaluations beyond other consequences. Many college students are motivated to drink for social reasons, thus when a negative social event occurs as a result of drinking, it may be particularly salient because they will encounter these consequences in public. Focusing on the pros and cons of drinking in the social arena may help to develop discrepancies in one area particularly important for college students.

#### 4.2. Limitations and future directions

The present research it is not without limitations. The sample included only students in introductory psychology classes at one institution and was a rather homogenous group in regards to ethnicity and class standing, thus, results may not generalize to other college students. Prior research has found that first-year students (as compared to upperclassmen) consumed more alcohol and their drinking behavior was more strongly influenced by normative influences (Turrisi, Padilla, & Wiersma, 2000). Future research should examine whether the relationships found in this paper, particularly the findings with positive fun/social consequences and negative social consequences, are representative for older and more diverse students. While all measures were self-report, prior research suggests self-report is preferable in comparison to other methods of assessing alcohol use (Laforge, Borsari, & Baer, 2005). To increase reliability and validity of self-report measures, we assured all students of the confidentiality of their responses and provided information about standard drink content to help anchor responses (Babor, Stephens, & Marlatt, 1987; Marlatt et al., 1998). Moreover, the use of the daily diaries reduces concerns regarding retrospective recall (Bolger, Davis, & Rafaeli, 2003). The measurement of negative consequences focused mainly on typical negative consequences college students may experience, but did not evaluate more severe potentially life-altering consequences (e.g., alcohol poisoning, getting in a car accident and getting in trouble with the law) which would have influenced overall evaluations of a drinking occasion. Future research could examine the differences between less severe and more severe consequences and the relationship between drinking and overall evaluations.

The present study assessed only short-term positive and negative consequences (i.e., those occurring within the last day resulting from drinking). It must be noted that many of the rewards of drinking are immediate, where as many other negative consequences are delayed or experienced after cumulative experiences (e.g., school problems, relationship difficulties, health effects) and not assessed in the present study. These cumulative negative consequences are not likely to be associated with an individual drinking occasion, as measured in the present study, but to a longer history of high-risk or heavier drinking and evaluations of those events. Additionally, severe negative consequences (e.g., accidents or DWI) are likely to be infrequent and may not be captured in short reporting times, such as 29 days. Future research would benefit from innovative methodologies combining daily data with retrospective reports of past positive, negative, and cumulative consequences, providing

a more comprehensive understanding of how students formulate their evaluations of any given drinking occasion and more likely to be representative of the type of information that is taken into account when making decisions about whether and how much to drink on subsequent occasions.

While research has evaluated the influence of positive and negative consequences on future drinking intentions (Park, 2004), it has yet to evaluate how positive and negative consequences influence future drinking behavior with longitudinal designs. For example, Park (2004) found that students report planning to drink less or more carefully after having experienced negative consequences but that they are encouraged to drink more after having experienced positive consequences. Future research is needed to determine how positive and negative consequences influence evaluations of drinking over time and how these evaluations relate to changes or stability in future drinking behavior.

## 5. Conclusions

The present study demonstrated that alcohol consumption was positively associated with the daily experience of both negative and positive consequences, and that these consequences mediated the relationship between alcohol consumption and the formation of overall drinking impressions. Findings indicate that preventive intervention efforts should consider elaborating on positive and negative social consequences, which are most predictive of evaluations of drinking events.

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**Table 1**

Level 1 descriptive statistics.

	Mean	SD	Range
Drinks per day	5.21	4.01	1–25
<i>Negative consequences</i>			
Personal	0.24	0.43	0–1
Social	0.11	0.32	0–1
<i>Positive consequences</i>			
Fun/social	0.91	0.29	0–1
Image	0.53	0.50	0–1
Relaxation	0.75	0.43	0–1
<i>Context</i>			
With others	0.97	0.17	0–1
Out	0.82	0.39	0–1
Overall evaluation	3.22	1.01	0–4

Note.  $N=166$  students on  $N=848$  drinking days.

Logistic multilevel models predicting daily positive and negative drinking consequences experienced.

Table 2

Consequences	Neg person		Neg soc		Pos fun		Pos image		Pos relax	
	OR	[CI]	OR	[CI]	OR	[CI]	OR	[CI]	OR	[CI]
<i>Average consequence over days</i>										
Intercept, $\beta_0$	0.22	[0.05, 0.94]*	0.13	[0.02, 0.71]*	1.50	[0.33, 6.78]	0.25	[0.05, 1.43]	20.94	[3.31, 132.6]**
Female gender, $\gamma_{01}$	1.19	[0.68, 2.06]	1.23	[0.63, 2.38]	1.06	[0.46, 2.44]	2.03	[0.94, 4.39]	1.19	[0.65, 2.18]
Mean drinks, $\gamma_{02}$	1.15	[0.93, 1.42]	1.04	[0.80, 1.34]	1.82	[1.20, 2.76]**	1.39	[0.94, 2.05]	1.08	[0.84, 1.38]
Daily drinks, $\beta_1$	1.22	[1.13, 1.31]***	1.17	[1.07, 1.28]**	1.36	[1.18, 1.57]***	1.19	[1.10, 1.29]**	1.14	[1.04, 1.25]**
Drinking with others, $\beta_2$	1.02	[0.28, 3.63]	0.66	[0.11, 3.82]	8.61	[1.95, 38.0]**	1.69	[0.30, 9.46]	0.13	[0.02, 0.77]*
Drinking out, $\beta_3$	0.97	[0.56, 1.68]	1.06	[0.56, 1.99]	1.36	[0.71, 2.59]	2.01	[1.09, 3.70]*	1.15	[0.67, 1.98]

Note. N=848 drinking days.

\*  $p < 0.05$ ,

\*\*  $p < 0.01$ ,

\*\*\*  $p < 0.001$ .

Level 1: Probability ( $Y=1|B$ )= $P$ .

Log [ $P(1-P)$ ]= $\beta_0 + \beta_1$  (Daily Drinks)+  $\beta_2$  (Drinking with Others)+  $\beta_3$  (Drinking Out).

Level 2:  $\beta_0 = \gamma_{00} + \gamma_{01}$  (Gender)+  $\gamma_{02}$  (Person Mean Drinks)+  $U_0$ .

$\beta_1 = \gamma_{10}$ ,  $\beta_2 = \gamma_{20}$ ,  $\beta_3 = \gamma_{30}$ ,  $\beta_4 = \gamma_{40}$ ,  $\beta_5 = \gamma_{50}$ .



**Table 3**

Linear multilevel model predicting overall impression of the drinking event.

	<u>Overall evaluation</u>
	B (SE)
Average over days intercept, $\beta_0$	2.94 (0.18) ***
Female gender, $\gamma_{01}$	0.28 (0.12) *
Person mean drinks, $\gamma_{02}$	0.17 (0.08) *
Mean negative personal consequences, $\gamma_{04}$	-3.07 (0.88) **
Mean negative social consequences, $\gamma_{03}$	-6.61 (1.15) ***
Mean positive fun/social consequences, $\gamma_{05}$	-1.00 (1.44)
Mean positive image consequences, $\gamma_{06}$	1.78 (0.55) **
Mean positive relaxation consequences, $\gamma_{07}$	0.79 (0.93)
Daily total drinks, $\beta_1$	0.03 (0.01) *
Daily negative personal consequences, $\beta_2$	-0.20 (0.09) *
Daily negative social consequences, $\beta_3$	-1.09 (0.15) ***
Daily positive fun/social consequences, $\beta_4$	0.66 (0.14) ***
Daily positive image consequences, $\beta_5$	0.22 (0.11) *
Daily positive relaxation consequences, $\beta_6$	0.31 (0.09) **
Drinking with others, $\beta_7$	0.07 (0.19)
Drinking out, $\beta_8$	0.06 (0.08)

Note.  $N=845$  drinking days.\*  
 $p < 0.05$ ,\*\*  
 $p < 0.01$ ,\*\*\*  
 $p < 0.001$ .Level 1:  $Y = \beta_0 + \beta_1$  (Daily Drinks) +  $\beta_2$  (Neg Pers Cons) +  $\beta_3$  (Neg Soc Cons) +  $\beta_4$  (Pos Fun Cons) +  $\beta_5$  (Pos Im Cons) +  $\beta_6$  (Pos Relax Cons) +  $\beta_7$  (Drinking with Others) +  $\beta_8$  (Drinking Out) +  $r_{jt}$ Level 2:  $\beta_0 = \gamma_{00} + \gamma_{01}$  (Gender) +  $\gamma_{02}$  (Person Mean Drinks) +  $\gamma_{03}$  (Person Mean Neg Pers) +  $\gamma_{04}$  (Person Mean Neg Soc) +  $\gamma_{05}$  (Person Mean Pos Fun) +  $\gamma_{06}$  (Person Mean Pos Image) +  $\gamma_{07}$  (Person Mean Pos Relax) +  $U_0$ . $\beta_1 = \gamma_{10}$ ,  $\beta_2 = \gamma_{20}$ ,  $\beta_3 = \gamma_{30}$ ,  $\beta_4 = \gamma_{40}$ ,  $\beta_5 = \gamma_{50}$ ,  $\beta_6 = \gamma_{60}$ ,  $\beta_7 = \gamma_{70}$ .