ALCOHOLISM CLINICAL & EXPERIMENTAL RESEARCH

Singaporean College Students Overpour Drinks Similar to Western Populations: Influence of Peer Presence in a Simulated Alcohol-Pouring Task

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Background: College drinking is a global health concern. However, most studies originate from countries with high alcohol consumption. In the United States, college students overpour a standard alcoholic drink, yet it is unclear if this remains true in countries with low alcohol consumption. Additionally, in college, peer influence is the greatest predictor of drinking behavior, yet it is unknown if social norms affect how students pour drinks. This study examined how male college students, in a country with low alcohol consumption, define standard drinks, and if the presence of an unfamiliar peer affects how students pour during a simulated alcohol-pouring task.

Methods: Male undergraduate students (n = 105) underwent baseline assessments of impulsivity, self-monitoring, religiosity, and drinking characteristics. Participants poured fluid into empty cups of different sizes to equal a standard serving of beer or shot of liquor. There were 2 groups based on gender of experimenter. Within each group, participants were randomly assigned to *Alone* or *Dyad* condition. In the *Alone* condition, students were instructed to pour only for themselves. In the *Dyad* condition, students were instructed to pour for themselves and the experimenter. The volumes poured by the students were compared with standards used in Singapore and the United States.

Results: Collapsed across container size, students overpoured shots by 50% and beer by 100% when compared to the standard drink definition in Singapore. When using a more liberal definition, students overpoured beer by 25%, but did not overpour shots. In the presence of an unfamiliar peer, overpouring decreased by 10% for beer.

Conclusions: The current data show that college students, in a country with low alcohol consumption, overestimate standard alcoholic drinks similar to their Western counterparts and use social norms to determine how much to pour for a drink when confronted with an unfamiliar peer. Efforts toward creating internationally recognized standard drink definitions should be considered.

Key Words: College, Drinking, Standard Drink, Peer, Social Norms.

GLOBAL ALCOHOL ABUSE rates among young people are rapidly rising, with 9% of all deaths between ages 15 and 29 resulting from alcohol-related causes (World Health Organization, 2011). Despite regional variations in alcohol consumption across the world, over three-fourths of countries surveyed report an increasing trend in drinking among 18- to 25-year-olds (World Health Organization, 2008). Most importantly, the risk of developing alcohol use disorders is highest during this age range, a period known as "emerging adulthood" (Arnett, 2000; Grant et al., 2003). In the United States, the transition from adolescence to adulthood is associated with greater difficulties with alcohol use (Schulenberg et al., 1996), and binge-drinking patterns during this time can lead to increased prevalence of alcohol use disorders and associated problems (Dawson et al., 2005; Slutske, 2005). Within this vulnerable population, binge drinking is particularly evident in collegiate environments, where students consume more drinks and drink more frequently than their noncollege peers (for review, see Carter et al., 2010).

Current data investigating consumption patterns of college students primarily originate from Western countries, such as the United States. Most Asian countries report modest overall alcohol consumption but are also experiencing rapid economic development. In fact, some areas of Southeast Asia display lower overall consumption but *more risky* drinking patterns than the United States or parts of Europe (World Health Organization, 2011). Indeed, the prevalence of alcohol consumption in Singapore is rising and the frequency of binge drinking doubled from 5 to 10% between 1998 and 2004 (Lim et al., 2007). Similar to descriptive drinking statistics in the West, binge drinking was the most common pattern of alcohol use in 2010 and more frequent

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among males (15.6%) than females (3.7%), with the highest proportion of binge drinkers between the ages of 18 and 29 (Ministry of Health, 2010). While the levels of alcohol use remain modest compared with Western countries, these data may not truly represent the drinking culture in Singapore. Specifically, a large portion of the population in countries within Southeast Asia abstains from alcohol. Thus, the amount of alcohol consumed by those who do drink might reach higher levels than are reported in national statistics due to societal pressures to mask alcohol consumption. Singapore is a diverse country in Southeast Asia and has undergone significant economic growth in recent years. Consequently, Singapore is a unique location to examine college drinking patterns in a developing country with strong Western influences. Given the evolving importance of Asian countries in the world market, there is a need for more accurate measurements of drinking trends in Singapore occurring during emerging adulthood.

Previously, patterns of college drinking have been investigated using self-report survey data. However, varying alcohol content in different drink types, glass sizes, and subjects' experience with alcohol influence the accuracy of these reports, leading to misrepresentation of actual alcohol use (Lemmens, 1994). In general, subjects overpour standard drinks producing an underestimation of self-reported alcohol consumption (Devos-Comby and Lange, 2008; Kaskutas and Graves, 2000; Wilkinson et al., 2011). For example, White and colleagues (2003) showed that college students in the United States overestimate a standard drink by 25% or more during a simulated alcohol-pouring task. In a follow-up study, students increased their original self-reported alcohol consumption by 12% overall after feedback was provided on standard drink sizes and performance during a simulated alcohol-pouring task (White et al., 2005). In addition to overestimations in pouring, college students also tend to lack knowledge of alcohol guidelines, which can contribute to increases in total alcohol consumption per drinking event (Hasking et al., 2005; de Visser and Birch, 2012). Taken together, these findings suggest that it is difficult to assess college drinking on a global scale because standard drink definitions and knowledge of alcohol guidelines vary between countries (Kerr and Stockwell, 2012). Most studies published evaluating overestimation of standard drink volume originate from countries with high overall alcohol consumption, such as Australia, the United Kingdom, and the United States (Gill and Donaghy, 2004; Stockwell et al., 1991; White et al., 2003; Wilkinson et al., 2011). It remains unclear if the overpouring phenomenon is present only within permissive drinking cultures. Overall alcohol consumption remains low in Singapore, which provides an ideal environment to test whether college students overestimate standard alcoholic drinks regardless of societal drinking culture.

The greatest predictor of the level of alcohol consumption in college student is peer influence (Borsari and Carey, 2001; Neighbors et al., 2007; Perkins, 2002). Social norms strongly correlate with drinking behaviors, particularly in college as evidenced by the drinking habits of college students being highly influenced by the perception of peer drinking as compared to noncollege peers (Quinn and Fromme, 2011). Descriptive norms, or perceived drinking behavior, demonstrate a positive association between perceived drinking of others and one's own drinking whether the peer group is familiar or not (Borsari and Carey, 2003). In contrast, injunctive norms, or the perceived approval of drinking, primarily influence drinking behavior when the peer group is proximal (i.e., friends, family; Halim et al., 2012; Neighbors et al., 2008). Using self-report surveys, perceived injunctive norms of distal peer groups (i.e., typical college students) often have no relationship with a student's own drinking habits. However, these social norms may have greater influence on drinking behavior within a physical context.

While perceived approval of drinking from unfamiliar peers may not affect drinking attitudes reflected in surveys, young adults often imitate drinking behavior in the physical presence of a peer regardless of proximity of relationship (Bot et al., 2005; Larsen et al., 2009, 2012). These studies investigate the relationship between social norms and peer presence on how subjects drink, but not how they pour alcoholic drinks, an important component of self-report drinking rates. In particular, it is unknown how college students use social norms to determine acceptable drinking practices when pouring for their peers. Most college students drink among peers; however, the physical presence of unfamiliar peers on self-poured drinking behavior has not been examined.

The current study investigated whether Singaporean male college students overpour standard drink definitions in a simulated alcohol-pouring task. We also investigated how peer interaction affects estimation of alcohol volumes among college students. We suspected that the volume poured in excess of a standard drink size observed in Western populations could be, in part, due to lowered sense of discretion in self-pouring conditions. It was hypothesized that the presence of an unfamiliar peer would trigger social norms and inhibit overpour behavior.

MATERIALS AND METHODS

Participants

Data were collected from 105 male undergraduate students at a large public university in Singapore. Participants were recruited from a research participation pool composed of students in a psychology class or by advertisements posted on campus. Participants were assured that names or any other identifiable information would not be recorded during the session. Each participant was paid S$10 or awarded equivalent course credit for completing the study. The participants were all between 18 and 26 years of age (mean = 22.26, SD = 1.798). This age range is representative of typical male college students in Singapore. All male Singaporean citizens are required to enlist for 24 months of compulsory military service. In few cases, male students may request a delay in start of service due to college enrollment, which accounts for the small portion of our sample younger than 20 years old. The experimenters, 1 male and 1 female, were defined as peers based on undergraduate status at the same university and age within the range of the

participants. Both experimenters were unknown to students in the study. The study was approved by the Institutional Review Board of Nanyang Technological University.

Procedures

There were 4 components to the study: a survey, the alcohol timeline calendar, and 2 free-pour tasks. The components were completed sequentially, and free-pour tasks counterbalanced across subjects. Participants were not given a time limit, although the entire experiment generally required 20 to 30 minutes to complete. At the completion of the experiment, students were debriefed on the background of the study, but were not provided any further alcohol education.

Survey. Participants first completed a survey to collect basic demographic background and information on drinking habits. Participants completed the 10-item Alcohol Use Disorders Identification Test (AUDIT) to identify possible harmful drinking habits (Babor et al., 2001). An 18-item self-monitoring scale was used to assess reactions to different situations directed at self-control, social stage presence, and other-directed self-presentation (Snyder and Gangestad, 1986). Participants were asked to answer 5 questions regarding religiosity (Dollinger, 2001) and complete the 15-item Barratt Impulsiveness Scale (BIS-15) to measure impulsive personality traits (Patton et al., 1995; Spinella, 2007).

Alcohol Timeline Calendar. Participants were given a calendar to document their drinking habits over the preceding 14 days. As frequently used (Sobell et al., 1996), subjects were asked to indicate the number of standard drinks and type they consumed on each day as well as the general location the drinks were consumed.

Free-Pour Tasks. Procedures for the free-pour tasks were adapted from White and colleagues (2003). Briefly, the beer free-pour task consisted of 3 beer pitchers filled with 1,000 ml water each, tinted yellow to resemble beer. Plastic cups of 16, 22, and 32 oz were used. The shot free-pour task consisted of an Absolut® Vodka liquor bottle filled with 1,000 ml water, tinted dark brown to resemble spirits. A standard 1.5 oz shot glass, 3, and 7 oz plastic cups were used. All fluids poured by participants were measured using 250- and 500-ml graduated cylinders.

Sequence of Free-Pour Tasks. The order of the free-pour tasks was counterbalanced across participants. There were 2 groups based on gender of experimenter. Within each group, participants were randomly assigned to 1 of 2 conditions, *Alone* or *Dyad*. In the *Alone* condition, the participant was instructed to pour the amount of liquid that would constitute 1 standard drink into the cup placed in front of them. For example, in the beer free-pour task, the participant was told *"I would like you to pour the amount of beer that you consider as a standard size beer into this cup in front of you."* In the *Dyad* condition, 2 cups of the same size were placed in front of the participant who was instructed to pour the amount of liquid that would constitute 1 standard drink into each of the cups. The participants were told that 1 cup was for him and the other cup for the experimenter. For example, in the beer free-pour task, the participant was told *"There are two cups in front of you, one cup is for you and the other is for me. I would like you to pour the amount of beer that you consider as a standard size beer into each of the two cups."* The different sized cups were presented one at a time and the order was counterbalanced across participants.

Statistical Analyses

Descriptive statistics were first calculated on self-reported drinking data from 65 subjects (alcohol timeline data available) in the 2 weeks prior to the experiment (Table 1). To determine whether cup size influenced the amount of fluid participants poured for themselves, 1-way repeated-measures analyses of variance (ANOVAs) were used for each free-pour task. To investigate whether students poured more for themselves than a standard drink, 1-sample Student's *t*-tests were performed for each container in each of the free-pour tasks to compare the amount of fluid poured by students to the volume in the standard drink definition as stated by the Singapore Health Promotion Board (HPB; 220 ml beer and 30 ml liquor in a shot) and a more liberal definition from the National Institute on Alcohol Abuse and Alcoholism (NIAAA; 12 oz beer and 1.5 oz liquor in a shot). Independent sample Student's *t*-tests were used to determine whether peer gender influenced the amount of fluid students poured for themselves in the *Alone* (only pour for yourself) condition for each free-pour task. Two-way ANOVAs were conducted for each free-pour task to assess whether students' knowledge that they would either pour only for themselves (*Alone* condition) or pour for themselves and a peer (*Dyad* condition) influenced the volume they poured, and whether peer gender influenced the relationship. To determine whether participants poured differently for themselves and their peer when asked to pour for both (*Dyad* condition), 2-way mixed-design ANOVAs were used in each pour task. Finally, Pearson's correlations were calculated to identify any relationships between religiosity, impulsivity, self-monitoring, and AUDIT scores with volume students poured for themselves in each free-pour task.

All analyses were performed using SPSS Statistics (version 20; IBM, Armonk, NY) with an alpha level of 0.05 for significance. Bonferroni corrections were used for all post hoc analyses. Graphical representations of data (mean ± SEM) were created using Prism 6 (GraphPad Software Inc., La Jolla, CA).

RESULTS

Container Size Influences Volume

In agreement with previous literature (White et al., 2003), the volume poured by students for themselves increased with size of container for beer, $F(2, 208) = 145.6$, $p < 0.0005$, and shots, $F(2, 208) = 60.70$, $p < 0.0005$ (Table 2). A significant linear trend was observed for beer, $F(1, 104) = 185.6$, $p < 0.0005$, and shots, $F(1, 104) = 73.18$, $p < 0.0005$.

Table 1. Self-Reported Drinking Characteristics During 2 Weeks Before Experiment

Variable	Average (SD)
Total number of drinks consumed per student	8.18 (10.0)
% Self-poured	61.7 (38.9)
Type of drink	
% Beer of total	43.5 (34.2)
% Shots of total	18.0 (24.5)
% Mixed drinks of total	38.5 (34.0)
Location of drinking	
% Events at home	24.69
% Events at friend's house	21.60
% Events at pub/club	32.72
% Events at restaurant/food court	5.56
% Events at university	5.56
% Events at other location	9.88
AUDIT score	4.89 (3.82)

AUDIT, Alcohol Use Disorders Identification Test; SD, standard deviation.

Table 2. Average Free-Pour Volume by Container Size

Drink type	Students pouring for themselves (n = 105)	
	Container size, fl oz	Average volume poured, fl oz (SD)
Beer	16	12.4 (2.78)
	22	14.7 (3.63)
	32	18.3 (5.64)
Shot	1.5	1.06 (0.31)
	3	1.50 (0.58)
	7	1.94 (1.14)

fl oz, fluid ounce; SD, standard deviation.

Beer Free-Pour Task

When subjects were instructed to pour a beer for themselves, participants poured more fluid than in a standard beer (220 ml) as defined by the Singapore HPB regardless of container size, 16 oz: $t(104) = 18.21$, $p < 0.0005$; 22 oz: $t(104) = 20.42$, $p < 0.0005$; and 32 oz: $t(104) = 19.79$, $p < 0.0005$. In support of this, if fluid poured was averaged across container size, it was again determined that subjects overpoured fluid amounts, $t(104) = 21.70$, $p < 0.0005$ (Fig. 1). Using a more liberal definition of a standard drink, as defined by NIAAA (12 oz) and used in White and colleagues (2005), students still poured more fluid collapsed across container size, $t(104) = 8.713$, $p < 0.0005$. When analyzed separately, only the volumes poured into the 22 oz, $t(104) = 7.527$, $p < 0.0005$, and 32 oz, $t(104) = 11.50$, $p < 0.0005$, cups were significantly larger than the NIAAA standard definition (Fig. 1). Surprisingly, collapsed across container size, peer gender did not influence volume when students poured for themselves in the *Alone* (only pour for yourself) condition (data not shown). If the participant was instructed that they would pour for themselves and someone else, students poured significantly less beer for themselves (14.4 oz) in the *Dyad* condition (pour for yourself and peer) compared with pouring for themselves (15.8 oz) in the *Alone* (only pour for yourself) condition (main effect condition), $F(1, 101) = 4.803$, $p = 0.03$, $\eta^2 = 0.045$ (Fig. 3). As before, peer gender did not influence the volume students poured for themselves within these conditions. In the *Dyad* condition (pour for yourself and the peer), students did not pour differently between themselves and their peer (data not shown). Despite pouring less volume in the presence of a peer than they did in the *Alone* condition, students still poured significantly more beer than the Singapore HPB and the NIAAA standard drink definitions, $t(55) = 13.62$, $p < 0.0005$; $t(55) = 4.683$, $p < 0.0005$. Interestingly, the interaction of peer gender and pour condition (self or peer) trended toward significance (peer gender × pour), $F(1, 54) = 3.304$, $p = 0.075$, η^2=0.058.

To further investigate the effect of the peer experimenter, we used religiosity score as an indirect measure of personal injunctive norms (Johnson et al., 2008; Vaughan et al., 2011). Students were grouped by total religiosity score, low (5 to 14) or high (15 to 25). Students identifying as more religious poured significantly less beer when pouring for themselves both alone and in the presence of an unfamiliar peer (main effect religiosity), $F(1, 101) = 5.675$, $p = 0.019$, $\eta^2 = 0.053$, and the decrease in volume poured in the presence of a peer was greater in more religious students compared with less religious students, $t(54) = 2.049$, $p = 0.045$.

Shot Free-Pour Task

When subjects were instructed to pour a shot for themselves, participants poured more fluid than in a standard shot (30 ml) as defined by the Singapore HPB regardless of container size, 1.5 oz: $t(104) = 2.038$, $p = 0.044$, 3 oz: $t(104) = 8.881$, $p < 0.0005$, and 7 oz: $t(104) = 8.436$, $p < 0.0005$. Averaged across container size, subjects overpoured fluid amounts overall, $t(104) = 8.620$, $p < 0.0005$ (Fig. 2). Using a more liberal definition of a standard drink, as defined by NIAAA (1.5 oz) and used in White and colleagues (2005), students only over poured into the 7 oz container, $t(104) = 3.955$, $p < 0.0005$, and in fact, poured significantly less into the 1.5 oz container compared with this

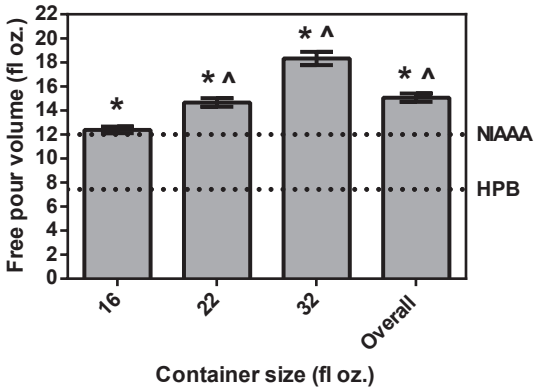

Fig. 1. Self-pour volumes by container size for beer compared with standard drink definition. HPB, Singapore Health Promotion Board. NIAAA, National Institute on Alcohol Abuse and Alcoholism. *$p < 0.05$ relative to HPB, ^$p < 0.05$ relative to NIAAA.

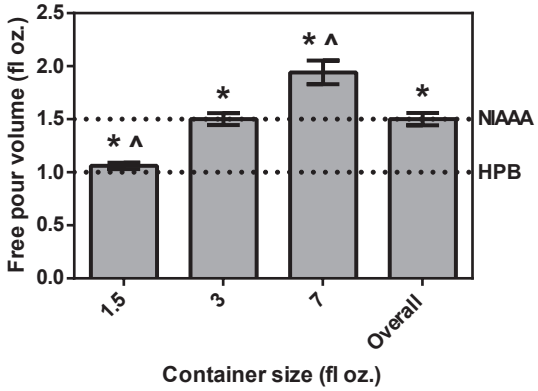

Fig. 2. Self-pour volumes by container size for shots compared with standard drink definition. HPB, Singapore Health Promotion Board. NIAAA, National Institute on Alcohol Abuse and Alcoholism. *$p < 0.05$ relative to HPB, ^$p < 0.05$ relative to NIAAA.

Fig. 3. Self-pour volumes between *Alone* (pour for yourself) and *Dyad* (pour for yourself and peer) conditions. *$p < 0.05$.

definition, $t(106) = -14.73$, $p < 0.0005$ (Fig. 2). The capacity of a 1.5 oz standard shot glass is suspected to limit students' potential overpours, as suggested in previous findings (White et al., 2003). Similar to the beer condition, when students poured for themselves in the *Alone* condition (only pour for yourself), gender of the peer present did not influence average volume poured across container sizes (data not shown). Between *Alone* (only pour for yourself) and *Dyad* (pour for yourself and the peer) conditions, students did not pour differently for themselves and the gender of peer also did not influence volume (Fig. 3). When subjects were instructed to pour for themselves and their peer, there were no differences between these pours (data not shown). However, there was a significant interaction effect between peer gender and pour condition (self or peer; peer gender × pour), $F(1, 54) = 5.995$, $p = 0.018$, $\eta^2 = 0.100$. Pairwise comparisons revealed students poured significantly more volume for themselves compared with the volume poured for their peer in the presence of a female peer, $t(35) = 2.340$, $p = 0.025$, and slightly less for themselves compared with the volume poured for their peer in the presence of a male peer, $t(19) = -2.026$, $p = 0.057$. Further analyses were executed to investigate the role of religiosity among our sample. Interestingly, students that identified as more religious poured significantly less volume for a shot when pouring for themselves alone or in the presence of a peer (main effect religiosity), $F(1, 101) = 4.423$, $p = 0.038$, $\eta^2 = 0.042$.

Personality Characteristics Correlated with Pour Volume

As shown in Table 3, a negative correlation was observed between religiosity scores and pour volumes of beer. This correlation indicated that the more religious students felt, the less beer they poured for themselves ($r = -0.251$, $p = 0.01$). A negative correlation was also observed between religiosity scores and shot pour volumes (Table 3). While not statistically significant, in general, the more religious students felt, the less volume they poured in a shot for themselves ($r = -0.186$, $p = 0.057$). Self-monitoring scores were negatively correlated with shot volumes, meaning students who identified as higher self-monitors poured less volume for themselves in a shot ($r = -0.197$, $p = 0.044$; Table 3). A positive correlation between the BIS-15 attention impulsivity subscale score and shot volumes was observed, indicating that the more students identified as inattentive or unable to concentrate, the more volume they poured for themselves in a shot ($r = 0.191$, $p = 0.05$; Table 3). Within the Timeline Followback calendar data from 65 subjects, AUDIT score was positively correlated with number of beers ($r = 0.525$, $p < 0.0005$) and shots ($r = 0.329$, $p = 0.007$) consumed during the 2 weeks prior to the experiment. AUDIT score was positively correlated with overall number of drinks ($r = 0.573$, $p < 0.0005$; data not shown).

DISCUSSION

In an effort to determine whether the overpour phenomenon observed in Western college students exists in the global population, we used simulated alcohol-free-pour tasks with students pouring alone or in the presence of an unfamiliar peer. The principal findings of this study are that Singaporean college students overestimate how much volume to pour for a standard drink of beer or shot of liquor and that the presence of an unfamiliar peer significantly decreased the volume students poured for themselves for a standard beer.

Students significantly overestimated volume in all container sizes for beer and shots according to the Singapore HPB standard drink definitions. When using a more liberal definition from NIAAA, results were pronounced only in the larger container sizes. Students significantly overpoured into

Table 3. Bivariate Correlations Among Survey Measures and Free-Pour Volume

	1	2	3	4	5	6	7	8	9
1. AUDIT score	–								
2. BIS-15: Nonplanning	−0.059	–							
3. BIS-15: Motor	0.069	0.160	–						
4. BIS-15: Attentional	0.156	0.135	0.409**	–					
5. BIS-15: Total	0.181	0.192*	0.670**	0.688**	–				
6. Religiosity	−0.135	−0.116	−0.196*	−0.065	−0.185	–			
7. Self-monitoring	0.190	0.011	0.014	−0.071	−0.130	0.102	–		
8. Average free-pour beer (fl oz)	0.086	−0.080	0.027	0.129	0.048	−0.251**	0.012	–	
9. Average free-pour shot (fl oz)	−0.087	−0.015	0.004	0.191*	0.040	−0.186	−0.197*	0.400**	–

AUDIT, Alcohol Use Disorders Identification Test; BIS-15, 15-item Barratt Impulsiveness Scale; fl oz, fluid ounce.
**$p < 0.01$, *$p < 0.05$.

the 22 and 32 oz beer containers, and only the 7 oz shot container. In fact, when compared to the NIAAA definition, students poured significantly less into the 1.5 oz shot glass. This result was not surprising based on the volume limitation of the shot glass and confirms previous findings (White et al., 2003). In agreement with previous findings (Kerr et al., 2009; de Visser and Birch, 2012; White et al., 2003, 2005), students poured larger volumes as container size increased for beer and shots. Students primarily overpour drinks due to lack of knowledge of standard drink volumes and guidelines, not volume perceptions (White et al., 2005). While not required in this study, future work should assess students' knowledge of drink standards prior to free-pour tasks. Nonetheless, overall findings suggest that Singaporean college students overestimate standard drink sizes just as college students do in countries with higher overall alcohol consumption.

In the presence of an unfamiliar peer, students poured significantly less volume for themselves than when alone for the beer task, an average decrease of over 10%, or about 50 ml. Our results are the first to show how an unfamiliar peer influences self-pouring behavior. We believe the presence of an unfamiliar peer may trigger social norms, decreasing the amount students overpour for a standard drink. While perceived approval of close peers (i.e., friends and family) is positively associated with drinking, perceived approval of unfamiliar, or typical students, has been shown to have no significant relationship with drinking (Halim et al., 2012; Neighbors et al., 2008). However, these studies did not examine perceived approval in the *physical presence* of an unfamiliar peer. A recent study shows that confidence plays a role in the influence perceived injunctive norms have on college students' drinking behavior (Neighbors et al., 2011). We speculate that in the presence of an unfamiliar peer, students are uncertain of the peer's approval of drinking and thus limit the amount they pour for a standard beer. Furthermore, a single unfamiliar peer may have an inhibitory effect not observed when examining the general perceived approval among a group of students. In other words, the perceived approval of a typical student in a limited environment, such as a room with no other peers, may influence drinking behavior differently than within a group setting. The current study did not survey descriptive or injunctive norms prior to the free-pour tasks. In the future, it would be worthwhile to compare perceived drinking and perceived approval of drinking prior to the free-pour tasks, and then examine whether the poured volume in the presence of a peer reflects surveyed social norms. Additionally, the inclusion of a familiar peer condition would be valuable to further investigate how injunctive norms influence pouring based on proximity of peer group. These data may have implications in further determining the degree and types of peer influences on drinking behavior in college students.

If social norms are responsible for inhibiting students' overpour behavior, it is possible that participants with stronger personal injunctive norms are affected to a greater degree by the presence of an unfamiliar peer. Religious involvement in students is associated with negative attitudes and disapproval of alcohol use (Johnson et al., 2008), and injunctive norms partially mediate the relationship between religiosity and alcohol consumption in college (Chawla et al., 2007; Vaughan et al., 2011). Therefore, we used religiosity to indirectly measure personal injunctive norms. Students identifying as more religious poured significantly less beer overall, and the presence of the unfamiliar peer decreased pour volumes to a greater degree compared with less religious students. These results suggest the effect of an unfamiliar peer may be due to social norms specific to alcohol. However, to confirm social norms are influencing the decrease in overpour rather than volume perception, a control fluid such as water or soda should be considered for future studies. Despite not directly measuring social norms, findings support that injunctive norms likely have a role in the decrease in volume poured when students are in the presence of an unfamiliar peer. The influence of an unfamiliar peer on pour volume had a specific effect on beer, but not shots. This differential effect could be due to 2 reasons. First, college students have more experience with beer than other types of alcohol. In our sample, beer constituted almost half (43.5%) of drinks consumed during the previous 2 weeks. Furthermore, according to the Ministry of Health, beer is the most consumed alcoholic beverage in Singapore (Ministry of Health, 2010). However, there were no correlations observed in our sample between students' alcohol use in the preceding 2 weeks and volumes poured in the tasks. Students consumed an average of 8 total drinks in the past 2 weeks before the experiment, whereas college students in the United States consumed more than 4 times that amount in a previous study (White et al., 2003). Our results reflect drinking habits of a country with overall low alcohol consumption, which may influence expectations of alcohol experience on accuracy. Second, subjects are more familiar with drink sizes of beer compared with other alcoholic drinks, presumably due to supply in fixed containers, such as bottles or cans (Devos-Comby and Lange, 2008; Kerr and Stockwell, 2012). In support of this, White and colleagues (2005) found that beer was the only beverage college students in the United States were able to correctly define a standard drink definition. If students are more familiar with beer sizes than other alcoholic beverages, they may be able to better judge differences in volume. Consequently, if the presence of an unfamiliar peer triggers social norms, this effect is likely to be observed if students can more accurately determine the volume poured for the task.

Students pour more fluid as container volume increases, and therefore, it is possible the peer effect was observed in the beer task due to larger cup sizes. Volume perception may alter with size and shape of container; however, students poured into the same container whether they poured only for themselves or in the presence of a peer. If misperceptions of volume exist, the misperception can be assumed to be similar between subjects. However, when using the same container, the presence of a peer decreased the volume students

overpoured; therefore, it is likely that another factor besides volume misperception is influencing the results.

There were no main differences in volume between how students poured for themselves and for the peer when in the presence of a peer; however, there was an interaction effect between pour condition (self or peer) and peer gender. Interestingly, students poured significantly more for themselves in the presence of a female peer for shots. We observed the same trend when students poured beer, although the relationship was not statistically significant. This pattern of results may be due to gender differences in descriptive and injunctive norms. Male college students tend to drink more and believe their peers drink more compared with female college students (Read et al., 2004). Feminine qualities are often associated with less perceived approval of drinking by others (Prince and Carey, 2010). In addition, many male college students believe the ability to drink more alcohol is a masculine behavior (Peralta, 2007). Therefore, subjects may believe pouring more for themselves reflects positively in the presence of a female peer.

Religiosity scores were negatively correlated with pour volumes of beer. Consistent with prior research, this finding supports that religiosity is a protective factor against college drinking (Burke et al., 2012; Patock-Peckham et al., 1998; Wells, 2010). Unlike many Western countries, Singapore is a multireligion country where culturally diverse groups are largely represented. Future studies should investigate religious identity and how the strength of religious affinity influences college drinking. Self-monitoring scores were negatively correlated with shot volumes, and the presence of an unfamiliar peer during the study may contribute to this result. High self-monitors use situational cues and interpersonal information to influence their decisions (Snyder, 1974). Without feedback provided from the peer or environment, high self-monitoring students may inhibit the volume they pour due to social norms. However, this finding was exclusive to shots, and therefore, warrants further research to accurately determine how self-monitoring influences pouring behavior. We also observed a positive correlation between the BIS-15 attentional impulsiveness and poured shot volumes. The positive relationship between impulsivity and alcohol use in emerging adulthood is well-documented (MacKillop et al., 2007; Sher and Littlefield, 2008; Shin et al., 2012). This association may be due to the physical limitation of a shot glass requiring a greater attentional focus; however, these results must be carefully interpreted due to specificity of results with respect to the attentional impulsiveness subscale.

Limitations exist within the current study. The present study investigated peer influence between groups of students instructed to pour for themselves and those instructed to pour for themselves and a peer. Therefore, this limits direct comparisons of self-pours between solitary and with-peer conditions. Further studies should use a within-subject study design. In addition, this study examined male students only. Alcohol consumption differs between male and female college students; therefore, the present results should be interpreted cautiously for females. A limitation in this study is the lack of measurement on the degree students identified the experimenters as peers. Survey measures should be considered for future studies to strengthen interpretations. Investigations on pouring behavior among peers in a lab bar setting, rather than procedural instructions, would further increase external validity of these findings. Finally, 2 experimenters were used as unfamiliar peers in this study. Without a representative design using multiple peers, results may reflect a specific peer or experimental effect and thus may not be generalizable to the college population.

Alcohol use in emerging adulthood is a global health concern, and within this population, college students consume more alcohol than their noncollege peers. However, most of what we know about college drinking is based on self-report survey data from countries with high alcohol consumption. This study shows that college students significantly overpour the volume required for a standard alcoholic drink, even within a country with low overall alcohol use. The current data suggest that the overpour phenomenon is universally seen among college students. These findings support the use of multiple measures to determine self-reported alcohol consumption and demonstrate a need for better education on standard drink sizes. Efforts toward internationally recognized standard drink definitions should be considered.

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