

## POLICY AND PREVENTION

### Normative Misperceptions about Alcohol Use in a General Population Sample of Problem Drinkers from a Large Metropolitan City

John A. Cunningham<sup>1,2,\*</sup>, Clayton Neighbors<sup>3,4</sup>, T. Cameron Wild<sup>5</sup> and Keith Humphreys<sup>6,7</sup>

<sup>1</sup>Centre for Addiction and Mental Health, 33 Russell Street, Toronto, Ontario, Canada M5S 2S1, <sup>2</sup>University of Toronto, Toronto, Canada, <sup>3</sup>University of Houston, Houston, TX, USA, <sup>4</sup>University of Washington, Washington, DC, USA, <sup>5</sup>University of Alberta, Alberta, Canada, <sup>6</sup>Center for Health Care Evaluation, Department of Veterans Affairs, Washington, DC, USA and <sup>7</sup>Stanford University Medical Centers, Menlo Park, CA, USA

\*Corresponding author: E-mail: john\_cunningham@camh.net

(Received 1 April 2011; in revised form 15 June 2011; accepted 7 July 2011)

**Abstract** — **Aims:** Heavy drinkers tend to overestimate how much others drink (normative fallacy), at least in college samples. Little research has been conducted to evaluate whether normative misperceptions about drinking extend beyond the college population. The present study explored normative misperceptions in an adult general population sample of drinkers. **Methods:** As part of a larger study, in Toronto, Canada, a random digit dialling telephone survey was conducted with 14,009 participants who drank alcohol at least once per month. Respondents with Alcohol Use Disorders Identification Test of eight or more ( $n = 2757$ ) were asked to estimate what percent of Canadians of their same sex: (a) drank more than they do; (b) were abstinent and (c) drank seven or more drinks per week. Respondents' estimates of these population drinking norms were then compared with the actual levels of alcohol consumption in the Canadian population. **Results:** A substantial level of normative misperception was observed for estimates of levels of drinking in the general population. Estimates of the proportion of Canadians who were abstinent were fairly accurate. There was some evidence of a positive relationship between the respondents' own drinking severity and the extent of normative misperceptions. Little evidence was found of a relationship between degree of normative misperceptions and age. **Conclusion:** Normative misperceptions have been successfully targeted in social norms media campaigns as well as in personalized feedback interventions for problem drinkers. The present research solidifies the empirical bases for extending these interventions more widely into the general population.

People hold beliefs about how much other people drink (Wild, 2002). Sometimes these beliefs are not accurate. Specifically, heavy drinkers have been found to overestimate how much others drink, compared with people who drink moderately (Baer *et al.*, 1991; Kypri and Langley, 2003). This 'normative fallacy' is thought to occur because the heavy drinkers' primary source of comparison, their close friends and social network may contain a disproportionate number of heavy drinkers (i.e. heavy drinkers tend to interact with other heavy drinkers). It is also possible that heavier drinkers assume others drink more as a means of justifying their own behaviour (Neighbors *et al.*, 2006). So, when heavy drinkers are asked how much others of the same sex in the general population drink, they tend to overestimate the levels of alcohol consumption.

Beyond being an interesting finding, why does this matter? Levels of alcohol consumption are under a certain degree of social control (Kanfer, 1986; Becker and Rosenstock, 1987). This control may be moderated by the person's beliefs about how much others drink (Wild, 2002). If the heavy drinker thinks that others drink more than they actually do, then the extent to which these social comparisons can act as a pressure to reduce drinking may be diminished.

Correcting normative misperceptions is one of the core components of some brief interventions for problem drinkers (Neal and Carey, 2004; Riper *et al.*, 2009). Such brief interventions have been shown to reduce the amount problem drinkers consume, at least in the short term. The hypothesized mediator of these reductions in alcohol consumption is the correction of normative misperceptions. Indeed, some studies have found that reductions in alcohol consumption

were preceded by a shift towards more accurate perceptions about how much other people drink (Neal and Carey, 2004; Neighbors *et al.*, 2004, 2006; Dumas *et al.*, 2009).

One limitation of the existing research in this area is that it has largely been conducted with convenience samples of American college students (Riper *et al.*, 2009). Do these misperceptions occur in the general adult population as well? A recent study by Bertholet *et al.* (2011) found normative misperceptions in a random sample from a census of 20-year-old Swiss men. Previous research with smokers has also found that normative misperceptions are greater with younger adults when compared with those over 25 (Cunningham and Selby, 2007). Is there a similar association between age and degree of normative misperception among drinkers? The following hypotheses guided the research: (a) normative misperceptions about drinking will be observed in a general population sample of drinkers; (b) the extent to which normative misperception occurs will increase as severity of the participants' drinking increases and (b) normative misperceptions will decrease as participants get older.

## METHODS

Data for these analyses comes from a general population telephone survey of adults ( $n = 14,009$ , 19 years and over) in the greater Toronto metropolitan area (interviews conducted by the Institute for Social Research, York University). The survey was conducted to recruit participants for a randomized controlled trial to evaluate the impact of a pamphlet-based normative feedback intervention (Cunningham *et al.*, 2008). The survey employed random digit dialling to select

households. Participants were then selected from all adult residents in the household who drink alcohol at least once per month by surveying the potential participant with the most recent birthday. A total of 101,122 households were contacted, of which 29,790 gave an immediate refusal to participate, and 42,077 claimed that no adult in the household drank once per month or more. Of the remaining 29,255 households, 14,009 had an adult who agreed to participate.

The survey collected information on the respondents' current drinking, including the number of drinks consumed on each day of the past week. Severity of alcohol problems was assessed using the Alcohol Use Disorders Identification Test (AUDIT, Babor *et al.*, 1989; Saunders and Conigrave, 1990). Respondents with a score of 8 or more on the AUDIT were asked about their perceptions regarding the typical alcohol consumption of Canadians of the same sex: (a) what percent do you think drink more than you in a typical week; (b) what percent do you think do not drink any alcohol at all and (c) what percent do you think have seven or more drinks in a typical week? To explore the relation between perceptions of how much others consume and the actual amount others consume, population norms were generated using data from the 2008 Canadian Alcohol and Drug Use Monitoring Survey (CADUMS, Health Canada, 2009).

## RESULTS

Of the 14,009 respondents, 2757 had AUDIT scores of 8 or more. Table 1 shows the demographic and drinking characteristics of these respondents, compared with the 11,252 participants who were screened out of the full survey because their AUDIT scores were <8.

Table 2 presents the normative perceptions of the problem drinking sample ( $n = 2757$ ). When asked what percent of Canadians of the same sex drank more than they do in a typical week, the average answer was 39.1%. This perception about others' drinking was approximately three times higher than the actual proportion of Canadians who drank more than the respondents (13.3%; CADUMS population data grouped by age and sex). Similarly, the perception of the proportion of Canadians who drank seven or more drinks per week was 47.0%, more than double the actual percent of Canadians who drank seven or more drinks per week (17.7%; population data grouped by sex). Finally, respondents underestimated the proportion of Canadians of the same sex who were abstinent. Participants' average estimates were 17.7% vs. the actual abstinence rate of 21.1% (population data grouped by sex).

Table 1. Demographic characteristics by severity of drinking problems

Variable	AUDIT < 8 ( $n = 11,252$ )	AUDIT $\geq 8$ ( $n = 2757$ )
Mean (SD) age	50.6 (15.2)	41.9 (15.1)
% male	45.6	68.4
% some post-secondary education	81.6	73.8
% married/common law	66.4	52.0
% full or part time employed	70.8	74.0
Mean (SD) AUDIT	4.2 (1.5)	11.7 (4.6)
Mean (SD) number of drinks in past week	4.0 (4.1)	13.4 (12.9)

All differences significant at  $P < 0.001$ .

Table 2. Normative misperceptions regarding others drinking

Variable	$n = 2757$
Average (%) of perceived same sex who drink more	39.1
% perceived minus actual drink more <sup>a</sup>	25.8
Average (%) of perceived same sex abstinent	17.7
% perceived minus actual abstinent <sup>b</sup>	-3.4
Average (%) of perceived same sex that have 7+ drinks per week	47.0
% perceived minus actual that have 7+ drinks per week <sup>c</sup>	29.3

<sup>a</sup>The respondents' estimate of the percent of Canadians of the same sex who drink more than they do minus the percent who actually drink more (population data grouped by age and sex).

<sup>b</sup>The respondents' estimate of the percent of Canadians of the same sex who are abstinent minus the percent who are actually abstinent (population data grouped by sex).

<sup>c</sup>The respondents' estimate of the percent of Canadians of the same sex who drink seven or more drinks per week minus the percent who actually drink seven or more drinks per week (population data grouped by sex).

Normative perceptions were correlated with respondents' age as well as the number of drinks they had in the last week and their AUDIT scores (see Table 3). Because of the multiple correlations conducted, a Bonferroni correction was applied (0.05/18 tests resulting in a significance level of  $P < 0.0028$ ). Although some of these Pearson correlations were significant, the degree of correlation was usually quite small, indicating only a limited relationship (or at least a limited linear relationship). Specifically, there was only limited support for the hypothesis that the level of normative misperception would reduce as respondents got older with the highest Pearson correlation,  $r = -0.07$  for the relationship between perceptions of the proportion of Canadians who drank more than the respondent and the respondents' age. Both amount of alcohol consumed in the last week and AUDIT scores were more consistently related to normative perceptions about levels of alcohol consumption. Participants who drank more were more likely to perceive that more Canadians of the same sex drank seven or more drinks per week compared with participants who drank less. Finally, it should be noted that there was a significant ( $P < 0.001$ ) negative correlation between participants' amount of alcohol consumption and perceptions of the proportion of Canadians who drank more than they did. Not surprisingly, those respondents who drank more perceived that fewer Canadians drank more than they did when compared with respondents who drank less.

## DISCUSSION

There were substantial normative misperceptions in this general population sample of problem drinkers. Participants overestimated the proportion of Canadians who drank more than they do and who drank more than seven drinks per week by more than double the actual proportion of Canadians who drank more than they did. The magnitude of discrepancy is comparable with findings consistently reported in the college student literature (Neighbors *et al.*, 2006). In contrast, the perception of the proportion of Canadians who were abstinent was fairly accurate. This finding is in sharp contrast with normative misperceptions for smokers where a general population sample of Canadian smokers overestimated the proportion of Canadian smokers

Table 3. Correlations between normative perceptions and age and levels of alcohol consumption

Variable	Age	Last week drinking	AUDIT
% perceived same sex who drink more	-0.07*	-0.25*	-0.21*
% perceived minus actual drink more <sup>a</sup>	-0.03	-0.10*	-0.08
% perceived same sex abstinent	0.05	0.02	0.05
% perceived minus actual abstinent <sup>b</sup>	0.07*	0.07*	0.06
% perceived same sex that have 7+drinks per week	0.05	0.21*	0.11*
% perceived minus actual that have 7+drinks per week <sup>c</sup>	0.03	0.17*	0.10*

<sup>a</sup>The respondents' estimate of the percent of Canadians of the same sex who drink more than they do minus the percent who actually drink more (population data grouped by age and sex).

<sup>b</sup>The respondents' estimate of the percent of Canadians of the same sex who are abstinent minus the percent who are actually abstinent (population data grouped by sex).

<sup>c</sup>The respondents' estimate of the percent of Canadians of the same sex who drink seven or more drinks per week minus the percent who actually drink seven or more drinks per week (population data grouped by sex).

\* $P < 0.001$ .

by 20% (Cunningham and Selby, 2007). It is possible that some of this difference could be due to variations in the way the question was asked—smokers were asked to estimate the percent of Canadians their own age and sex who smoked, while drinkers in the present study were asked to estimate the percent of people their own sex who did not drink at all. However, it is difficult to imagine that the degree of difference was solely due to this difference in wording, pointing to a potentially interesting contrast in normative misperceptions between smokers and drinkers that merits further examination.

As predicted, there was a statistically significant association between severity of the persons' own drinking and the extent to which drinking norms were overestimated. These correlations were relatively small, however, indicating that this is not a powerful relationship. One limitation to generalizing these results to the general population of all alcohol drinkers is that the sample was restricted to problem drinkers (i.e. those with an AUDIT score of 8 or more). Although this is a liberal definition of problem drinking, restricting the sample in this manner could have led to reductions in the observed relationship between severity of alcohol consumption and levels of normative misperceptions.

There was only limited evidence of an association between the participants' age and their estimates of how much others drink. One limitation of this finding was that participants' estimates of how much other Canadians drink was not age specific. As was mentioned earlier, in the related research with smokers, where age was strongly associated with normative misperceptions, smokers were asked to estimate the percent of Canadians their age and sex who smoked (as opposed to the present study where participants were just asked how much Canadians of their same sex drank, Cunningham and Selby, 2007). Although this difference was intentional because age-independent norms were the most relevant for the larger intervention trial of which this survey is a part (Cunningham *et al.*, 2008), it is possible that the relationship between norms and age exists only with normative misperceptions about the proportion of people one's own age who drink (or smoke).

Another issue to consider with normative misperception research to-date is the assumption that comparison data of general population drinking such as were used here are the gold standard. Self-reported drinking on these population surveys under-reports the actual amount of alcohol consumed (when compared with alcohol sales data generated estimates of per capita consumption, Stockwell *et al.*, 2004). Thus, it is possible that the extent of normative misperception reported in the present (and other) studies are in fact overestimates of the extent to which heavy drinkers overestimate how much others drink.

Despite our uncertainty about the accuracy of general population comparison data, there probably still exists some level of normative misperception, particularly among heavier drinkers, if for no other reason than their tendency to spend time with other heavier drinkers. Irrespective of the actual degree of accuracy of population norms data, interventions targeting normative misperceptions might be useful in general population samples as they have proved to be among college students. Some research already demonstrates that brief interventions targeting normative misperceptions in general population samples have an impact (Cunningham *et al.*, 2001; Wild *et al.*, 2007; Cunningham *et al.*, 2009). However, to date, these studies have not tested whether the impact of these brief interventions is actually mediated by reductions in normative misperceptions among those who reduce their drinking. Nevertheless, further research in this area would appear to be warranted, both to increase our understanding of why (and how much) heavy drinkers overestimate other's drinking and to explore whether correcting these misperceptions is an active ingredient in motivating change from problem drinking.

*Funding* — This research was supported by the National Institute on Alcohol Abuse and Alcoholism (NIAAA)—Grant #R01 AA015680-01A2. In addition, support to CAMH for salary of scientists and infrastructure has been provided by the Ontario Ministry of Health and Long-Term Care. The views expressed here do not necessarily reflect those of the Ministry of Health and Long-Term Care. K.H. was supported by a VA HSR&D Career Scientist Award. J.A.C. is also supported as the Canada Research Chair on Brief Interventions for Addictive Behaviours.

## REFERENCES

- Babor TF, De La Fuente MF, Saunders JB. *et al.* (1989) *AUDIT—The Alcohol Use Disorders Identification Test: Guidelines for Use in Primary Health Care*. Geneva, Switzerland: World Health Organization.
- Baer JS, Stacy A, Larimer M. (1991) Biases in the perception of drinking norms among college students. *J Stud Alcohol* 52:580–6.
- Becker MH, Rosenstock IM. (1987) Comparing social learning theory and the health belief model. In Ward WBS (ed). *Advances in Health Education and Promotion*, Vol. 2. Greenwich, CT: JAI Press, 245–9.
- Bertholet N, Gaume J, Faouzi M. *et al.* (2011) Perception of the amount of drinking by others in a sample of 20-year-old men: the more I think you drink, the more I drink. *Alcohol Alcohol* 46:83–7.
- Cunningham JA, Selby PL. (2007) Implications of the normative fallacy in young adult smokers aged 19–24 years. *Am J Public Health* 97:1399–400.
- Cunningham JA, Wild TC, Bondy SJ. *et al.* (2001) Impact of normative feedback on problem drinkers: a small-area population study. *J Stud Alcohol* 62:228–33.
- Cunningham JA, Neighbors C, Wild C. *et al.* (2008) Ultra-brief intervention for problem drinkers: research protocol. *BMC Public Health* 8:298.

- Cunningham JA, Wild TC, Cordingley J. *et al.* (2009) A randomized controlled trial of an internet-based intervention for alcohol abusers. *Addiction* **104**:2023–32.
- Doumas DM, McKinley LL, Book P. (2009) Evaluation of two Web-based alcohol interventions for mandated college students. *J Subs Abuse Treat* **36**:65–74.
- Health Canada (2009) *Canadian Alcohol and Drug Use Monitoring Survey 2008: Microdata User Guide*. Ottawa: Health Canada.
- Kanfer FH (1986) Implications of a self-regulation model of therapy for treatment of addictive behaviors. In Miller WR, Heather Ns (eds). *Treating Addictive Behaviors: Processes of Change*. New York: Plenum.
- Kypri K, Langley JD. (2003) Perceived social norms and their relation to university student drinking. *J Stud Alcohol* **64**:829–34.
- Neal DJ, Carey KB. (2004) Developing discrepancy within self-regulation theory: use of personalized normative feedback and personal strivings with heavy-drinking college students. *Addict Behav* **29**:281–97.
- Neighbors C, Larimer ME, Lewis MA. (2004) Targeting misperceptions of descriptive drinking norms: efficacy of a computer-delivered personalized normative feedback intervention. *J Cons Clin Psychol* **72**:434–47.
- Neighbors C, Dillard AJ, Lewis MA. *et al.* (2006) Normative misperceptions and temporal precedence of perceived norms and drinking. *J Stud Alcohol* **67**:290–9.
- Riper H, van Straten A, Keuken M. *et al.* (2009) Curbing problem drinking with personalized-feedback interventions: a meta-analysis. *Am J Prev Med* **36**:247–55.
- Saunders JB, Conigrave KM. (1990) Early identification of alcohol problems. *Canad Med Assoc J* **143**:1060–9.
- Stockwell T, Donath S, Cooper-Stanbury M. *et al.* (2004) Under-reporting of alcohol consumption in household surveys: a comparison of quantity-frequency, graduated-frequency and recent recall. *Addiction* **99**:1024–33.
- Wild TC. (2002) Personal drinking and sociocultural drinking norms: a representative population study. *J Stud Alcohol* **63**:469–75.
- Wild TC, Cunningham JA, Roberts AB. (2007) Controlled study of brief personalized assessment-feedback for drinkers interested in self-help. *Addiction* **102**:241–50.