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Deposited on: 20 September 2016
Title: Self-other Differences in Student Drinking Norms Research: The Role of Impression Management, Self-deception and Measurement Methodology

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Original submission: 27/04/16
Resubmission 1: 19/08/16
Resubmission 2: 12/09/16
Source of support: None

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ABSTRACT

Background: Data-driven student drinking norms interventions are based on reported normative overestimation of the extent and approval of an average student’s drinking. Self-reported differences between personal and perceived normative drinking behaviors and attitudes are taken at face value as evidence of actual levels of overestimation. This study investigates whether commonly used data collection methods and socially desirable responding may inadvertently impede establishing 'objective' drinking norms.

Methods: UK students [N=421; 69% female; Mean age 20.22 years (SD = 2.5)] were randomly assigned to one of three versions of a drinking norms questionnaire: The standard multi-target questionnaire assessed respondents' drinking attitudes and behaviors (frequency of consumption, heavy drinking, units on a typical occasion) as well as drinking attitudes and behaviors for an ‘average student’. Two deconstructed versions of this questionnaire assessed identical behaviors and attitudes for participants themselves or an ‘average student’. The Balanced Inventory of Desirable Responding was also administered.

Results: Students who answered questions about themselves and peers reported more extreme perceived drinking attitudes for the average student compared with those reporting solely on the ‘average student’. Personal and perceived reports of drinking behaviors did not differ between multi- and single-target versions of the questionnaire. Among those who completed the multi-target questionnaire, after controlling for demographics and weekly drinking, socially desirable responding was related positively with the magnitude of difference between students’ own reported behaviors/attitudes and those perceived for the average student.
Conclusions: Standard methodological practices and socially desirable responding may be sources of bias in peer norm overestimation research.

INTRODUCTION

Drinking norms interventions are widely used in efforts to curb risky drinking practices among students (DeJong et al., 2006, DeJong et al., 2009, Haines et al., 2005, Moore et al., 2013, Moreira et al., 2009, Perkins, 2002, Perkins, 2003, Wechsler et al., 2003, Foxcroft et al., 2015). In these data-driven intervention approaches, self-report questionnaires gauging personal drinking behaviors and attitudes alongside matching perceptions for a normative target (e.g. the ‘average student’) feature heavily throughout assessment, intervention activities and evaluations. Self-other differences or differences between actual and perceived alcohol-related behaviors (i.e. descriptive) and attitudes/approval (i.e. injunctive) support intervention efforts designed to counter errors in perception by revealing 'actual' rather than attributed norms. This is often achieved by feeding back and contrasting aggregate personal and peer norms to the target population in order to encourage revision of perceptions and behavior in line with (typically) lower actual drinking norms. Similar data collection exercises can be used to evaluate the impact of the intervention on behavior and perception and update future iterations in long running intervention programs.

Evidence that the standard data collection methodologies used in this field provide a reliable and accurate picture of young people’s actual and perceived drinking environments tends to be drawn from the broader alcohol epidemiologic field (e.g. Babor et al., 2000, Midanik, 1988, Del Boca and Darkes, 2003). Investigations of data collection methodologies employed within the drinking norms field are

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1 Descriptive and injunctive norms are appropriate social psychological terms widely used in the student drinking norms literature to distinguish normative behavior from normative approval of behavior. However, we refer to drinking behavior and drinking attitudes throughout much of the paper because our focus is often individual-reporting behavior rather than normative processes.
rare (Pape, 2012). Accumulating evidence, however, suggests there may be elements of drinking norms research methods that are potential sources of bias that may exaggerate peer norm overestimation. One selective review of the research concluded that peer norm overestimation may be an exaggerated phenomenon, with potential sources of exaggeration including sampling bias, a tendency to use forced choice response options and limited attention to potential underestimation of peer norms (Pape, 2012). The results of experimental studies have also questioned the ‘objectivity’ of data obtained in the context of drinking norms research. In these studies, students have been found to adjust their own reports downwards when exposed to information about their peer group’s standing (Cunningham and Wong, 2013, Klein and Kunda, 1993, Lombardi and Choplin, 2010).

Melson and colleagues (2011, 2012) investigated whether the common methodological practice in drinking norms research of questioning students conjointly about themselves and their peers impacted response patterns underpinning peer norm overestimation. Here, school pupils who completed a standard multi-target version of a drinking norms questionnaire, which included both personal and peer (the ‘typical pupil’) alcohol-related measures, reported more extreme perceived peer attitudes and were more likely to report that peers would consume alcoholic drinks compared to when the peer target was assessed in isolation. The impact of the manipulation was limited to shifts in perception responses rather than pupils’ own reported behavior and attitudes and key frequency of consumption and drunkenness responses were unaffected, suggesting limitations to the generalizability of this effect. As Melson et al. (2011) conducted their research with school pupils the extent to which these findings may be observed in university/college student populations has not yet been examined. This is important for a number of reasons. First, most drinking norms research and interventions have targeted university and college students. University and college students’ age, developmental phase and likely experience with alcohol means they may have more established drinking patterns and robust beliefs about their wider peer group (e.g. Monk and Heim, 2016). As a result they may be less sensitive to
features of the measurement tool. It is also important to establish that Melson et al.’s (2011) findings are not due to the demand characteristics of asking an adolescent population to complete sensitive measures in a classroom environment (McCambridge and Strang, 2006, Percy et al., 2005). Recent challenges reproducing evidence in psychological science suggest further caution against overreliance on effects obtained from single studies (Open Science Collaboration, 2015).

Moreover, it is unclear whether the measurement effect reported by Melson and colleagues (2011) indicates a specific methodological artifact or a broader motive of presenting an overly positive version of oneself. Socially desirable responding (SDR) is the tendency to offer overly positive self-descriptions during self-report questionnaire assessments (Paulhus, 1984, Paulhus, 2002). Contemporary conceptualisations of SDR emphasize two dimensions: ‘Impression management’, reflecting conscious regulation of personal characteristics, attributes and behaviors, so as to cast oneself in a favorable light; and ‘self-deception’, an unconscious propensity to think about oneself in overly positive self-esteem maintaining ways when retrieving information during response (Paulhus, 2002, Paulhus, 1984, Holtgraves, 2004). In this vein, North American College students scoring highly on a measure of impression management reported consuming 33% fewer drinks and lower AUDIT scores than those in the moderate or low range. Self-deception was unrelated to drinking behavior but was associated with reporting fewer alcohol-related problems (Davis et al., 2010, Lanyon and Carle, 2007, Paulhus, 1991, Paulhus, 2002, Paulhus and Reynolds, 1995, Paulhus et al., 1995). These findings suggest that students may intentionally distort reports of their drinking behavior and related problems so as to cast themselves favorably to others. In limited circumstances they are also prone to the effects of self-deception.

Recent research has highlighted SDR as a potential source of bias in self-reported student drinking responses (Davis et al., 2010). As a result SDR holds promise for understanding whether the self-other
differences observed in student drinking norms research reliably indicate drinking norm discrepancies or, to some extent, a socially motivated drive to present an overly positive version of oneself. Different dimensions of SDR may also be important for determining the nature of self-other difference measurement. Specifically, if self-other differences for peer group drinking behavior and attitudes are associated with impression management, then self-other differences may reflect intentional strategies to present an unrealistic and overly positive version of oneself. Associations with self-deception, on the other hand, may point towards a role for unconscious self-esteem maintaining biases in self-other difference reporting. Investigating the role of SDR in reported self-other differences will help elucidate the extent to which SDR poses a risk to reliable and valid measurement of self-other differences. Clarifying the likely motivational base of any SDR bias will also inform our understanding of the underlying processes involved and guide the development of effective strategies to minimize socially desirable response patterns.

Given their importance within student drinking norms research and interventions, remarkably few studies have investigated the reliability and validity of ‘self’ and ‘other’ drinking responses. The present study seeks to address this shortcoming in the literature by extending one of few methodological studies in this field (Melson et al., 2011). Consistent with earlier research, it was predicted that responses to a drinking norm questionnaire, which assesses personal and perceived drinking-related behaviors or attitudes conjointly, will differ from those that assess personal and perceived measures in isolation. Although observing the presence of specific measurement artifacts is important, understanding when and why they are likely to arise is crucial for advancing knowledge that may support effective strategies to limit threats to objective measurements of drinking norms. Therefore the central aim of this research was to investigate whether SDR plays a role in self-other differences reported by students, with the expectation that SDR would be positively associated with self-other differences.
MATERIALS AND METHODS

Participants and Procedures
The research took place at two UK universities. Students (18-30 years) who had consumed alcohol in the past year were invited to participate in an online ‘Student Drinking Survey’ via a URL advertised on university social media, communication networks and research participation pools. Following self-selection, eligible participants provided informed consent prior to allocation to one of three different study conditions via a randomization function embedded in the online questionnaire. Ethics review committees approved the research at both institutions.

Design
Between-participants experimental design, with randomization to one of three different versions of a drinking norms questionnaire [(i) multi-target (MT) version or (ii) single-target ‘personal’ (ST\textsuperscript{PERS}) or (iii) single-target ‘average student’ (ST\textsuperscript{AS}) versions].

Measures
In overview, students provided demographic details (age, gender, ethnicity, year of study) and completed target-specific (‘personal’ and/or perceived ‘average student’) measures of drinking behavior and attitudes, as well as a measure of socially desirable responding.

Three different versions of a questionnaire were constructed. The first version was designed to closely resemble a standard type of questionnaire employed in this field (e.g., Haines et al., 2005) and included items to record students’ own alcohol-related behaviors and attitudes, in addition to their perceptions of each behavior and attitudes for the ‘average student your own age at your university’ [i.e., a multi-target (MT) version]. Two single-target (ST) questionnaires included items corresponding
to a single target [i.e. single-target: ‘personal’ (ST\textsuperscript{PERS}) or ‘average student’ (ST\textsuperscript{AS})]. Notwithstanding the omission of the other target, both ST versions of the questionnaire were identical to the full MT version.

\textit{Drinking behavior}

Drinking behavior and perceptions of other students’ behavior were assessed using original and modified AUDIT-C items (Bush et al., 1998). Referring to the past 12 months, students reported how often a drink containing alcohol had been consumed, how many units of alcohol were drank on a typical occasion and how frequently eight units of alcohol were consumed on one occasion. While the original versions of the AUDIT-C items were used to assess students’ own behavior, modified items assessed perceptions of identical behaviors for the ‘average student your own age at the university’. Original and modified versions of these items differed only in the specific target-referent of the item (e.g. ‘How often do \textit{you} [the average student your own age at the university] have a drink containing alcohol?’). Responses were used to calculate mean monthly frequencies of consumption, heavy drinking and the usual quantity of units consumed on drinking occasions. Recent seven-day consumption was obtained by asking students to record the units of alcohol consumed on each of seven days for a ‘typical week in the past month’. Accompanying information provided guidance on the UK alcohol unit content of popular drinks and volumes.

\textit{Drinking attitudes}

Attitudes and perceived attitudes to drinking were assessed using a scale described by Lewis et al. (2010) in a study with US college students. After removing four items of limited cultural relevance in a UK student population, the acceptability of 11 different alcohol-related behaviors were rated by students for themselves and/or the acceptability of each behavior perceived for the average student the respondent’s own age. Representative items include ‘Playing drinking games’ and ‘Drinking alcohol
daily’. Ratings were scored as unacceptable (1) through to acceptable (7) and summed to create separate personal and average student attitude indexes (Min=11, Max=77). Internal consistency of each index was good (α=0.81-0.82) (Paulhus et al., 1995).

**Socially desirable responding**

Socially desirable responding was assessed using the Balanced Inventory of Desirable Responding-Version 6 (BIDR: Paulhus, 1991), a 40-item measure of the propensity to provide overly positive self-descriptions. Twenty positive and negative items tap the self-deception dimension of SDR, reflecting unintended enhancement of personal abilities and qualities, or denial of undesirable ones. Twenty positive and negative items also measure impression management, reflecting purposeful inflation of socially desirable behaviors and qualities. Representative items are ‘I never regret my decisions’ (self-deception) and ‘I never cover up my mistakes’ (impression management), with all items recorded on 7-point scales (*not true to very true*). The BIDR has received support as a valid measure of providing overly positive self-descriptions via convergent and discriminant associations with other measures of SDR and exaggerated virtue, adjustment, coping, self-esteem, ‘lie’ scales and under different role play instructions (Lanyon and Carle, 2007, Paulhus, 1991, Paulhus et al., 1995). Importantly, overly positive self-descriptions are only reflected in endorsement of extreme response categories 6-7 or 1-2 (depending on positive or negative framing of items), indicating responses which are too good to be true. These are scored as ‘1’ with all other response categories scored ‘0’ (Paulhus, 1991). Impression management and self-deception item scores are summed separately (Min = 0, Max = 20 for both). In the present study internal consistency of both subscales was adequate (α = .67-.76) and within the normal range (e.g., Davis et al., 2010, Paulhus, 1991).

**Analysis**
Data from the two institutions were pooled to create a single dataset. We considered a nested approach to analyses to account for possible within-cluster similarity of responses at the two institutions. However, intraclass correlation coefficients for drinking behaviors, attitudes and SDR were very small and indicated that 1% or less of variability was accounted for at the institution-level. Given limited evidence that responses were clustered within institutions we analyzed the pooled dataset. Frequency of heavy drinking and seven-day consumption distributions were positively skewed and values were log transformed for main analyses, although descriptive statistics retain the untransformed values for ease of interpretation. To address the first hypothesis, personal and perceived versions of the AUDIT-C items and attitude indexes were compared between the MT and corresponding ST versions of the questionnaire using t-tests and Cohen’s d. For the second hypothesis, analyses were necessarily restricted to students who completed the MT version of the questionnaire. Relationships between study variables were initially examined using zero-order correlations. Consistent with other studies, self-other difference values were calculated by subtracting personal from perceived response values for each AUDIT-C item and the drinking attitude indexes (Carey et al., 2006). Four hierarchical regression models were then constructed to examine whether SDR accounted for unique variance in self-other differences beyond demographics and recent seven-day consumption. Self-other differences were used as the key outcome variables in regression analyses based on their theoretical and practical significance in normative drinking research and interventions.

RESULTS

A total of 421 participants across the two university institutions provided complete data, 322 (76%) from one institution and 99 (24%) from a second. As participants self-selected into the study, participation rates are not available. These samples were similar to the relevant student rolls on the proportion reporting White ethnicity, but female gender, younger, and undergraduate students were
overrepresented. The pooled dataset was over two thirds (69%) female, primarily undergraduate (94%) with an average age of 20.22 years (SD = 2.5). Half (50%) identified as ‘White British’ (or another White UK nationality), 38% White other and 12% Mixed, Black or Asian. Following randomization, 142 students completed the MT version of the questionnaire, 158 completed the ST\textsuperscript{PERS} version and 121 completed the ST\textsuperscript{AS} version \[\chi^2_{(2, 421)} = 4.91, p > .05\]. Randomization of participants to complete the different version of the questionnaire was successful. Participants’ did not differ significantly across demographic variables: gender \[\chi^2_{(2, 421)} = 0.622, p > .05\], age \[F_{(2, 420)} = 0.22, p > .05\] year of study \[\chi^2_{(2, 419)} = 0.1, p > .05\] or ethnicity \[\chi^2_{(2, 411)} = 0.98, p > .05\].

**Questionnaire version**

Table 1 presents mean (SD) drinking behavior responses and attitude index scores obtained from the MT and corresponding ST versions of the questionnaire. Responses of students who completed the MT and ST\textsuperscript{PERS} versions of the questionnaire did not differ for students’ own reported frequencies of consumption, heavy drinking, quantity of units on a typical occasion or the attitude index. There were also no differences between the MT and ST\textsuperscript{AS} versions of the questionnaire in reported perceptions of the average student’s drinking behavior. However, students who completed the MT version of the questionnaire had higher perceived attitude index scores than those who completed the ST\textsuperscript{AS} version.

**Socially desirable responding**

Table 2 presents zero-order correlations for SDR subscales and key study variables. Inter-correlations for students’ personal and perceived drinking behaviors and demographics were broadly in line with the existing literature. Personal drinking behaviors and corresponding perceptions tended to be positively associated, although personal attitudes were unrelated to perceptions of the average
student’s attitudes. Increasing age was associated with lighter drinking and more conservative attitudes, while male gender tended to be associated with heavier personal drinking and perceived drinking frequencies. Impression management was positively associated with female gender, perceptions of the average student’s drinking frequency and negatively associated with students’ own typical unit consumption and attitudes. Self-deception was positively associated with perceptions of the average student’s heavy drinking. Two aspects of the relationship between SDR and AUDIT-C or attitudes measures are noteworthy. First, SDR was associated with all three AUDIT-C drinking behaviors and drinking attitudes, either via ‘personal’ or perceived ‘average student’ responses. Second, SDR was positively associated with reported perceptions of the average student’s behaviors and negatively associated with students’ own reported behaviors or attitudes.

TABLE 3 AROUND HERE (APPENDED)

Whether SDR accounted for unique variance in self-other differences was investigated by regressing the four self-other difference values separately on demographics (step 1), seven-day consumption (step 2) and SDR subscales (step 3).

In each final model (Table 3), seven-day consumption and SDR subscales independently predicted self-other differences. Lower seven-day consumption strongly predicted larger self-other differences in each model ($\beta$’s = -0.32 to -0.60, $ps < .001$). Higher impression management predicted larger self-other differences for frequency of consumption, typical units and attitudes ($\beta$’s = 0.19 to 0.22, $ps < .05$) and higher self-deception predicted larger self-other differences for heavy drinking frequency ($\beta$ = 0.16, $p < .05$). Increasing age and female gender initially predicted larger self-other differences for drinking frequency and attitudes, but were not independent of other factors in final models. Step 1 of the drinking frequency and attitude index models accounted for 5% and 8% of the variance in self-
other differences respectively. Seven-day consumption accounted for an additional 11-30% of variance across all four models, before SDR subscales accounted for a further 3-4% of the variance.

Possible moderation of the relationship between SDR subscales and self-other differences by gender was investigated by entering the product of SDR subscales and gender as interaction terms. These did not account for additional variance in self-other differences (data not reported). Figure 1 (a-d) depicts the increasing magnitude of self-other differences across low, medium and high impression management or self-deception scores (based on tertile splits) for AUDIT-C drinking behaviors and attitudes.

FIGURE 1(a-d) AROUND HERE (APPENDED)

DISCUSSION

This study investigated whether commonly used data collection methods and socially desirable responding (SDR) may contribute to frequently observed self-other differences within student drinking norms research. For the first time, we report that self-other differences appear to increase in relation to SDR, a reporting bias possibly reflecting a tendency to provide overly positive self-descriptions. A modest, but consistent, 3-4% of variance in self-other differences was accounted for by SDR across three dimensions of student drinking behavior and drinking attitudes, raising the possibility that SDR may be a common feature of observed self-other differences. Classifying participants as low, medium or high on SDR indicates that students who tend to respond on a socially desirable basis report markedly larger self-other differences than students less prone to SDR.

Whether SDR plays a causal role in determining the magnitude of self-other differences cannot be determined from the cross-sectional design of this part of the study. Available evidence and the results
of the present study, however, lend support to the contention that self-other differences may be exaggerated as a result of students’ potentially casting themselves in too favorable a light. First, the measure of SDR used in this study has received support as a valid measure of providing overly positive self-descriptions, increasing confidence that desirable responding influences self-other difference measurement (Lanyon and Carle, 2007, Paulhus, 1991, Paulhus et al., 1995). Second, the question of whether observed self-other differences are objectively larger for high SDR scorers because they tend to be more moderate drinkers has partly been addressed in previous research carried out by Davis and colleagues (2010). Their research examined the extent to which differences in drinking reports across levels of impression management were independent of traits that would predict genuinely more moderate consumption. Consistent with an account based on biased reporting rather than true differences in behavior, statistically adjusting for impulsivity-constraint, a key predictor of drinking behavior (Hair and Hampson, 2006, Granò et al., 2004, Curcio and George, 2011) did not alter the significantly lower levels of alcohol use, hazardous drinking and problems reported by students scoring high on impression management. Furthermore, if the present findings were due to SDR and self-other differences sharing a common etiology, or associations, with unmeasured ‘third’ variables, we would expect SDR patterns to parallel known reporting patterns including the positive association between students’ own drinking and peer perceptions (Carey et al., 2006). However, the present results indicate that SDR is both negatively correlated with students’ own behavior and also positively correlated with perceptions of peer behavior. The current findings therefore suggest that socially desirable responding may exaggerate measured discrepancies between students’ real and perceived drinking patterns.

As well as casting a degree of doubt on the size of self-other differences frequently obtained in drinking norms research, the current findings may have implications for intervention approaches. Importantly, these implications do not speak directly to the efficacy of normative intervention
approaches, but may be most relevant when considering the design and conduct of interventions. Data-driven norms interventions are unique in the field because self-other difference measurements are typically used during assessment, intervention and evaluation. In extreme cases of desirable responding, it is therefore conceivable that observed self-other differences may differ markedly from those which are true of the population, potentially influencing practitioner decision-making concerning where scarce resources are targeted. However, highlighting larger self-other differences as part of a normative intervention may also be preferred by practitioners due to the heightened salience and increased opportunity to alert students to perception-behavior discrepancies. In turn, students exposed to larger self-other differences may experience heightened dissonance that motivates a reduction in drinking; raising the possibility that SDR may actually increase the potency of an intervention. However, it seems prudent to suggest that careful consideration be given to the pros and cons of highlighting self-other differences that may, to a greater or lesser extent, reflect SDR. Although there may be some advantage to including larger self-other differences as part of an intervention, promoting accurate information is often considered a key element of normative intervention.

A further aim was to investigate whether commonly used data collection methods may contribute to self-other differences. Here, students questioned about their own drinking behaviors and attitudes, as well as those of the average student, reported more permissive attitudes among their peers than students asked solely about their perceptions of the average student. In contrast, students’ own attitudes did not differ between questionnaires and reports of drinking behaviors (both personal and perceived) and appeared to be more robust to the questionnaire manipulation. Underscoring the need for research to improve measurement within drinking norms research (Monk and Heim, 2014, Pape, 2012, Simons-Morton and Kuntsche, 2012), these findings extend those of Melson et al. (2011) to university settings which are frequently the target of drinking norms research and interventions. In doing so, we confirm that there appears to be a reproducible effect of the type of questionnaire used to
measure perceived drinking attitudes, which has the potential to increase the magnitude of self-other differences. Data in this study were collected remotely via an online survey, and used a different set of measures than in previous research. This suggests the measurement effect is not in itself an artifact of a specific set of attitude statements or of questioning a young sample in classroom environments (McCambridge and Strang, 2006, Percy et al., 2005, Open Science Collaboration, 2015). Importantly, this study also provides further evidence that student drinking behavior and perception responses appear to be robust to multi- or single-target presentation. This increases confidence that self-other differences/normative overestimation of drinking behavior may be unaffected by this aspect of standard methodology. The multi-target questionnaire used in this research assessed a single order of target presentation (‘self-then-peer’), which does not control for possible ordering effects, but is consistent with available guidance and likely to reflect applied practice (Haines et al., 2005). The possible inflation of the true magnitude of discrepancy for personal and perceived drinking attitudes means researchers may prefer to consider alternatives to multi-target questionnaires when attempting to quantify accurately this type of discrepancy.

Our finding that SDR is related to self-other differences offers a useful starting point for investigating possible mechanisms responsible for the differences obtained in perceived peer attitudes using multi- and single-target questionnaires. However, SDR was unrelated to perceptions of the average student’s drinking attitudes, suggesting that alternative accounts may be needed to explain this effect. One possibility is that multi-target questionnaires encourage a more context-specific form of SDR, distinct from the stable trait operationalization of SDR in this study. Research that can manipulate social desirability demands during assessments may help to identify whether self-other differences vary as a function of more contextually-dependent social desirability (e.g., Holtgraves, 2004).
A strength of the study was the use of a multi-dimensional measure of SDR (Paulhus, 1991, Crowne and Marlowe, 1960), enabling tentative hypotheses about SDR processes that may influence drinking norms reports. Self-deception was positively associated with frequency of heavy drinking self-other differences, while impression management was positively related to self-other differences for drinking frequency and units on a typical occasion and attitudes. Biased estimates of heavy drinking self-other differences may therefore be obtained when students unintentionally retrieve overly positive self-esteem maintaining information during questionnaire assessments. In contrast, biased self-other differences for drinking frequency, quantity and attitudes may be obtained because students consciously distort reports in order to present a more favorable version of themselves. One possible explanation for the association of self-deception with frequency of heavy drinking self-other differences may lie in the self-esteem maintaining function of self-deception. Self-deceptive responding may become increasingly likely as questions deal with risky or health-compromising behaviors such as heavy drinking. Consistent with this account, Davis et al. (2010) also found that self-deception was unrelated to basic consumption reports but was negatively associated with reporting drinking problems. Strategies to limit the impact of SDR may also benefit from consideration of the different SDR processes. Thus, while confidentiality is often stressed during questionnaire assessments, a procedure that may help to reduce the impact of impression management, this is unlikely to address the hypothesised self-deception processes. Future research may therefore usefully develop and test targeted messages designed to minimize the impact of self-deception, for instance by encouraging more careful or balanced information retrieval.

The different SDR processes reported here also hold possible implications for applied drinking norms interventions. Credibility of normative feedback is a key moderator of intervention effectiveness (e.g., Thombs et al., 2004, Polonec et al., 2006). Among students with strong impression management biases (i.e., reflecting conscious and intentional distortion of responses to present a more favorable version of
themselves), projecting this response bias onto peers could lead some to dismiss normative feedback components of interventions as poor reflections of real world norms. Additionally, among students who self-deceive, a drinking norms intervention might actually help to counter self-deceptive responding if, following exposure, respondents are encouraged to confront biased information retrieval. These possible implications are speculative and require further examination in carefully designed studies or by incorporating measures of SDR into evaluations of drinking norm interventions.

There are several possible limitations to this study. We used a self-selecting sample with an overrepresentation of females and younger undergraduate students. Notwithstanding these limitations, we note that the experimental findings reported closely resemble those obtained in previous research using a gender-balanced cohort of much younger of adolescent pupils (Melson et al., 2011), increasing confidence that our results are unlikely to be due to selection bias. The current research used distal (average student) targets because this is the dominant target within this field of research. However, it remains to be investigated whether perceptions of a more proximal target such as close friends would be less sensitive to measurement effects or unrelated to SDR. This area of research therefore warrants further exploration. Overall, while the experimental findings are consistent with earlier research, the role of socially desirable responding is novel and further investigation of its relationship to self-other differences and peer norm overestimation seems prudent.

In conclusion, self-reported differences between personal and perceived drinking behaviors and attitudes are frequently taken at face value as evidence of actual levels of normative overestimation within student populations. The present study indicates that reported self-other differences in drinking behaviors and attitudes may partly reflect socially desirable responding and be a possible by-product of standard methodological practices. Overestimation of peer drinking, as commonly reported, may not reflect ‘objective’ levels of overestimation in student populations.


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Table 1. Mean (SD) drinking and attitude index scores for multi- and single-target versions of the questionnaire

<table>
<thead>
<tr>
<th>Questionnaire version</th>
<th>Questionnaire version</th>
<th>Questionnaire version</th>
<th>Questionnaire version</th>
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<tbody>
<tr>
<td></td>
<td>MT</td>
<td>ST&lt;sup&gt;PERS&lt;/sup&gt;</td>
<td>MT</td>
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<tr>
<td>AUDIT Frequency of consumption</td>
<td>7.38 (4.99)</td>
<td>7.11 (4.93)</td>
<td>0.48&lt;sup&gt;NS&lt;/sup&gt;</td>
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<td>AUDIT Typical occasion units</td>
<td>6.1 (3.06)</td>
<td>5.80 (2.83)</td>
<td>0.88&lt;sup&gt;NS&lt;/sup&gt;</td>
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<td>AUDIT heavy drinking</td>
<td>2.43 (3.81)</td>
<td>2.31 (3.65)</td>
<td>0.3&lt;sup&gt;NS&lt;/sup&gt;</td>
</tr>
<tr>
<td>Drinking attitudes</td>
<td>48.51 (9.99)</td>
<td>46.66 (11.43)</td>
<td>1.48&lt;sup&gt;NS&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

***P < .001; NS P > .05; d = Cohen’s d

MT: Multi-target version of the questionnaire; ST<sup>PERS</sup>: Single-target ‘personal’ version of the questionnaire; ST<sup>AS</sup>: Single-target ‘average student’ version of the questionnaire.

AUDIT frequency of heavy drinking values were log transformed
Table 2: Correlations for key study variables

<table>
<thead>
<tr>
<th></th>
<th>1 BIDR SD</th>
<th>2 BIDR IM</th>
<th>3 AUD(^{pers}) Freq</th>
<th>4 AUD(^{as}) Freq</th>
<th>5 AUD(^{pers}) Quan</th>
<th>6 AUD(^{as}) Quan</th>
<th>7 AUD(^{pers}) Heavy</th>
<th>8 AUD(^{as}) Heavy</th>
<th>9 Attitude Index(^{pers})</th>
<th>10 Attitude Index(^{as})</th>
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<th>13 Gender</th>
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<td>1</td>
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<td>-.041</td>
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Table 3. Hierarchical regression analyses of socially desirable responding and self-other differences in frequency of consumption, typical occasion units, frequency of heavy drinking and attitudes

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Figure 1 (a-d): Mean self-other difference values at low, moderate and high (1a) impression management for AUDIT frequency of consumption, (1b) impression management for AUDIT quantity of units consumed on a typical occasion, (1c) impression management for drinking attitudes index scores, and (1d) self-deception for AUDIT frequency of heavy drinking.
Table 1:

***$P < .001$; NS $P > .05$; $d =$ Cohen’s $d$

MT: Multi-target version of the questionnaire; ST$^{\text{PERS}}$: Single-target ‘personal’ version of the questionnaire; ST$^{\text{AS}}$: Single-target ‘average student’ version of the questionnaire.

AUDIT frequency of heavy drinking values were log transformed.

Table 2:

MT respondents only $N = 142$

* $P < .05$; ** $P < .01$; *** $P < .001$

BIDR SD/IM = Balanced Inventory of Desirable Responding Self-deception/Impression management subscales

AUD Freq/Quan/Heavy = AUDIT Frequency of consumption/AUDIT Typical quantity of units consumed on a drinking occasion/AUDIT Frequency of heavy drinking

7-day consum = recent seven-day consumption.

Gender: Male = 0, female = 1

AUDIT frequency of heavy drinking and the seven-day consumption values were log transformed.

Table 3:

MT respondents only $N = 142$

† $P = .051$; * $P < .05$; ** $P < .01$; *** $P < .001$, NS $P > .05$

SOD = self-other difference; BIDR SD/IM = Balanced Inventory of Desirable Responding Self-deception/Impression management subscales.

7-day consum = recent seven-day consumption.

AUDIT frequency of heavy drinking and seven-day consumption values were log transformed.
Figure 1 (a-d):

Mean self-other difference values at low, moderate and high (1a) impression management for AUDIT frequency of consumption, (1b) impression management for AUDIT quantity of units consumed on a typical occasion, (1c) impression management for drinking attitudes index scores, and (1d) self-deception for AUDIT frequency of heavy drinking.