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Descriptive and Injunctive Norms in College Drinking: A Meta-Analytic Integration

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Abstract

Objective—Many college students overestimate both the drinking behaviors (descriptive norms) and the approval of drinking (injunctive norms) of their peers. As a result, consistent self-other discrepancies (SODs) have been observed, in which self-perceptions of drinking behaviors and approval of drinking are usually lower than comparable judgments of others. These self-other discrepancies form the foundation of the currently popular "social norms approach" to alcohol abuse prevention, which conveys to students the actual campus norms regarding drinking behaviors and approval of alcohol use. However, little attention has been paid to the factors that can influence the magnitude of self-other discrepancies.

Method—This meta-analytic integration of 23 studies evaluated the influence of five predictors of SODs: norm type (injunctive or descriptive), gender, reference group, question specificity, and campus size. These studies rendered 102 separate tests of self-other differences in descriptive and injunctive forms, representing the responses of 53,825 participants.

Results—All five predictors were significantly related to self-other differences in the perception of norms. Greater SODs were evident for injunctive norms, estimates by women, distal reference groups, non-specific questions, and on smaller campuses.

Conclusions—More systematic attention should be given to how norms are assessed; specifically, SODs can be maximized or minimized depending on the specificity of the behaviors/attitudes evaluated and the reference groups chosen for comparison.

In the last decade, the "social norms approach" to reducing excessive alcohol use on college campuses has enjoyed a swell of support (DeJong and Linkenbach, 1999; Keeling, 2000). This approach posits that the majority of students overestimate the use and approval of alcohol by campus peers; as a result, these students are less inclined to view their own alcohol use as problematic (see also Perkins, 1997 and 2002 for reviews). The social norms approach, then, proposes that correcting these misperceived norms will result in students gaining a new perspective on the risks associated with their personal alcohol use. This approach is often carried out on a large scale, such as campus-wide media campaigns (e.g., Haines and Spear, 1996). In theory, this new perspective will lead to reductions in alcohol use and the adoption of more conservative attitudes towards drinking. In light of the significance of social norms in alcohol abuse prevention efforts, greater attention to the variability within the drinking norms literature is warranted.

Perceived Norms in the College Context

Two types of norms have been assessed in the college drinking literature: descriptive and injunctive norms. Descriptive norms refer to the perception of other's quantity and frequency

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of drinking (the norms of "is"), and are based largely on observations of how people consume alcohol in discrete drinking situations. Injunctive norms, on the other hand, refer to the perceived approval of drinking (the norms of "ought"), and represent perceived moral rules of the peer group. Injunctive norms assist an individual to determine what is acceptable and unacceptable social behavior (Cialdini et al., 1990).

Norms are constructed by evaluating the raw data from three primary sources: observable behaviors, direct and indirect communications, and knowledge of the self (Miller and Prentice, 1996). The first source of normative information, observable behavior, is often the most available source of information about others, yet it is susceptible to the fundamental attribution error. This refers to the tendency of individuals to view others' behaviors as reflective of stable dispositional traits rather than influenced by situational variables (Ross, 1977). The second source of normative information, direct (what words mean) and indirect (what words imply) communication, also has its flaws. Information may be distorted intentionally or unintentionally. Finally, personal attitudes and behaviors also influence the perception of norms. This phenomenon is labeled the false consensus effect, in which people tend to think that others think and act as they do (see Mullen and Hu, 1988 for a review). These different sources of information are combined in an additive fashion (Miller and Prentice, 1996), sometimes leading to inaccurate estimates of others' behaviors and attitudes. Therefore, the information that one can utilize when evaluating others' behaviors and attitudes can be biased in a variety of ways.

It is not surprising, then, that perceived descriptive and injunctive norms related to drinking are often inaccurate. Surveys consistently report that students overestimate the quantity and frequency of their peers' alcohol consumption (e.g., Baer and Carney, 1993). This overestimate occurs regardless of the specific reference group used: close friends, best friend, typical student, average student, or fellow fraternity/sorority house member. Furthermore, students are remarkably consistent in reporting that they drink the same or less than others (see Borsari and Carey, 2001); only male members of Greek houses with reputations for heavy drinking have reported personal use as higher than that of all other students (Larimer et al., 1997). Therefore, although the hierarchy of drinking levels may change, students tend to believe that someone else drinks more than they do. Similar discrepancies occur when students evaluate other's approval of heavy drinking or drunkenness: others are usually seen as more accepting of such behaviors than are the raters themselves (Perkins and Berkowitz, 1986b; Prentice and Miller, 1993). Such normative perceptions make heavy alcohol use appear to be common and socially acceptable (Borsari and Carey, 2001).

Central to the effectiveness of the social norms approach is addressing the discrepancy between one's own views and/or behaviors and those of others. Because students tend to view others as drinking more and being more tolerant of alcohol use than themselves, the new student may be unaware that a given level of drinking is heavy or risky. Indeed, being surrounded by peers perceived to approve of heavy drinking can directly influence one's consumption even above other social background factors such as age, year in school and number of close friends (Perkins, 2002). If students perceive others' use to be higher than their own, reductions in drinking are unlikely because personal use is viewed as less risky than the social norm. Conversely, if the students perceive personal use to be higher than the norm, then re-evaluation of personal drinking habits is likely. Such a re-evaluation is precisely what social norms campaigns attempt to accomplish by educating students about the actual drinking norms on campus, which are typically lower than the perceived norms. The intuitive appeal of this concept has led to a veritable explosion of norm education campaigns on campuses across the country. To date, the results of these efforts have been mixed, with some reporting substantial reductions in drinking (e.g., Haines and Spear, 1996) and others reporting no changes (e.g., Werch et al., 2000).

Such disparate findings suggest the need for a better understanding of the actual phenomenon of interest: the perceived discrepancy between personal behaviors and attitudes and those of others. To this end, we aim to increase the knowledge of drinking norms on college campuses in three ways. First, we will perform a meta-analytic integration of the existing research on (mis)perceived norms in order to evaluate the presence and strength of self-other discrepancies (SODs). Second, we will examine how several predictors derived from the research literature influence SODs. Finally, we will discuss the implications of our findings in regards to assessing norms and facilitating behavior change.

Potential Predictors of Self-Other Discrepancies

Previous research has focused primarily on the presence of normative misperceptions, with occasional speculation about mechanisms that might contribute to observed SODs. Therefore, we identified five variables from the literature addressing perceived norms that we hypothesized to significantly influence the magnitude of SODs: type of norm assessed, gender, proximity of the reference group, question salience, and campus size.

Norm Type—To our knowledge, a comparative evaluation of SODs for injunctive vs. descriptive norms had not previously been presented. Descriptive norms are related to the observation of others' overt behaviors (how much and how often they drink), while injunctive norms are based on the inference of others' approval of drinking. Therefore, it is likely that estimation of descriptive norms involves the encoding, storage and retrieval of others' drinking behavior, whereas injunctive norms estimation requires students to encode, store and retrieve others' statements of (dis)approval, and/or generate such inferences from other's behaviors. As mentioned earlier, combining different sources of information may lead to inaccurate estimates of others' attitudes (Miller and Prentice, 1996): this integration may be more biased to the extent that greater inference is involved. Thus, we predict that SODs for injunctive norms may be more exaggerated because they are based on less direct information.

Gender—To date, six studies have evaluated gender differences in norm perception. Some have found that women perceive larger SODs than men (Baer and Carney, 1993; Prentice and Miller, 1993; Perkins and Berkowitz, 1986b; Larimer et al., 1997), whereas others studies have found no differences (Read et al., 2001; Schroeder and Prentice, 1998). Despite such mixed findings, it is possible that gender differences in alcohol use may influence norm perception. Specifically, women consistently report drinking less than do men (O'Malley and Johnston, 2002), yet most women also drink in mixed groups (Orcutt, 1991; Rosenbluth et al., 1978). Such a combination of lower personal use in the context of the more noticeable, heavier use of males may result in the perception that others drink more, resulting in larger SODs. Therefore, it is likely that women will perceive greater SODs than do men.

Reference Group—The use of a wide variety of possible reference groups, and the need to understand their respective influence on personal behaviors, has plagued social norms research for years (Miller and Prentice, 1994). The college drinking literature is no exception, using reference groups that vary in their proximity to the student: consider the variation of reference groups from "your best friend" (Baer and Carney, 1993) to "a typical member of your athletic team" (Thombs, 2000) to "most students" (Haines and Spear, 1996). Thus, it is likely that each of these reference groups differ in their degree of familiarity and specificity to the participant. Research has indicated that students' perceptions become more distorted for groups that they know less well (Baer et al., 1991; Perkins, 1997) and that SODs are significantly lower for familiar versus unfamiliar others (Prentice, 1990). Thus, estimates for proximal reference groups (e.g., best friend) may be more factually based than more distal groups (e.g., average student), resulting in lower SODs.

Question Specificity—It is possible that variations in the specificity of questions assessing descriptive and injunctive norms may contribute to the SODs reported in the literature. Questions evaluating specific behaviors (e.g., how much did your friends drink in the past week) may elicit more calculation by the student than questions that are more vague (e.g., how many times did your friends drink in the past year). Therefore, questions that assess specific information may result in lower SODs than questions requiring information that is more difficult to estimate.

Campus size—The size of the campus may also play a role in norm misperception. If norms are based on behaviors that are noticeable in the environment (Perkins, 1997), students at larger universities may be less certain of their estimates of descriptive and injunctive norms. Students on large campuses may be aware that they have never seen or met most of the other students on campus. This may result in more erroneous over-estimates, as these students have relatively little information on which to base their estimates. On smaller campuses, where “everybody knows everyone else”, students may be more confident in their estimates of others’ drinking because they know a larger proportion of the total student body. As a result, based on students that they know, their estimates may be more factually based. Therefore, SODs may be greater on larger campuses.

To date, no systematic evaluation of these predictors on SODs has been conducted. In an effort to address these issues inherent in the norms literature, a meta-analytic integration (Glass et al., 1981; Mullen, 1989; Rosenthal, 1991) was conducted on research evaluating the misperceptions of norms on college campuses.

Method

Standard literature search techniques were utilized to conduct an exhaustive search for studies evaluating perceived norms: on-line computer searches, ancestry and descendancy approaches, and correspondence with researchers active in the domain (the “invisible college”; see Mullen, 1989 for a discussion of literature search techniques). Data available as of February 2002 were eligible for inclusion.

Studies were included if they met the following criteria. First, participants had to be college students. Second, the study had to utilize a self-other comparison using the same question stem with only the reference group being changed (e.g., how much do *you* drink during a typical drinking occasion; how much does *the average student* drink during a typical drinking occasion). Finally, studies had to report a test of the self-other difference in norm perception. Third, for studies evaluating a norm intervention (e.g., Haines and Spear, 1996), only baseline data were included.

An extensive literature reveals that perceived support of others for drinking is consistently associated with personal alcohol use (Adams and Nagoshi, 1999; Agostinelli et al., 1995; Alva, 1998; Baer, 1994; Banks and Smith, 1980; Burrell, 1992; Clapp and McDonnell, 2000; Gomberg et al., 2001; Liccione, 1980; Lo, 1995; Nagoshi, 1999; Nagoshi et al., 1994; Peeler et al., 2000; Perkins and Wechsler, 1996; Sher et al., 2001; Turrisi, 1999; Walters, 2000; Walters et al., 2000; Wechsler and Kuo, 2000; Werner et al., 1996; Werch et al., 2000; Wood et al., 2001), and, to a lesser extent, alcohol related problems (Nagoshi, 1999; Wood et al., 2001). Although suggesting a strong link between perceived norms and alcohol use (see Borsari and Carey, 2001), this research was not included in this meta-analysis because variables representing norms combined items assessing both injunctive and descriptive norms (e.g., Perkins and Wechsler, 1996) and/or self-other comparisons did not use identical question stems (e.g., Burrell, 1990). Finally, lost data precluded the use of four studies (Baer et al., 1991; Barnett et al., 1996; Mooney and Corcoran, 1991; Thombs et al., 1997).

In the course of conducting this literature search, more than 40 published and unpublished articles, reports, and theses were examined. Of these, the selection criteria rendered a total of 23 includable studies (Baer and Carney, 1993; Borsari and Carey, 2000; Bourgeois and Bowen, 2001; Brown et al., 2000; Carter and Kahnweiler, 2000; Collins, Carey and Sliwinski, 2002; Corbin and Fromme, 2000; Dreer et al., 2000; Fabiano et al., 1996; Haines and Spear, 1996; Larimer et al., 1997; Neal and Carey, in press; Perkins and Berkowitz, 1986 a,b; Perkins et al., 1999; Prentice and Miller, 1993, three studies; Read, et al., 2002; Schroeder and Prentice, 1998; Steffian, 1999; Thombs 2000; Wood et al., 2000). Self-other discrepancies were defined as differences between (a) personal drinking and/or approval of alcohol use and (b) estimates of drinking and/or approval of alcohol use by a reference group. These studies rendered 102 separate tests of SODs in descriptive and injunctive norms, representing the responses of 53,825 participants

In addition to providing the requisite statistical information, each hypothesis test was coded for direction of effect (+ = reference group's approval or drinking behaviors was *greater than* that of the self ; − = *less than* that of the self), gender (% male), and school size: these three predictors were directly coded by two judges with perfect agreement. *Campus size* was obtained from undergraduate populations reported in campus websites or in Custard et al. (2000). Two additional predictors addressed methodological features: reference groups and question specificity. Four judges were asked to rate all 28 of the *reference groups* used in the included studies on a scale of 0 (proximal – defined as "close by, next or nearest to the participant") to 100 (distal – defined as "farthest away from the participant"; mean interjudge $\underline{r}$ = .759; Spearman-Brown effective reliability R = .925). Each reference group was assigned the mean rating of the four judges and this value used as a predictor. For *question specificity*, the judges also rated the 34 different types of questions used to assess norms in each study on a scale of 0 ("specific attitudes or behaviors") to 100 ("vague attitudes or behaviors"; mean interjudge $\underline{r}$ = .849; Spearman-Brown effective reliability R = .957).

Each hypothesis test and its corresponding predictor information for the meta-analytic database are presented in Table 1. Effect sizes used in this meta-analysis represent the within-subject mean difference between self and other ratings. All analyses were conducted using Mullen's Advanced BASIC meta-analytic database management system (Mullen 1989), which employs Rosenthal and Rubin techniques (Rosenthal 1991): the significance level of an effect is provided by Z, or standard normal deviate, and its associated $\underline{p}$ value; Z_{Fisher} is used as an indicator of effect size; and relationships between predictors and effect sizes are provided by the correlation coefficient $\underline{r}$.

Results

General Effects

The combined results of the 102 tests of the self-other discrepancy, leaving each hypothesis test unweighted (i.e., weighting by unit 1) revealed a significant (Z = 91.847, p = 2.94E–39), medium (Z_{Fisher} = 0.342) effect. Of the 102 hypothesis tests, 93 (91%) reported a positive self-other discrepancy (participants viewed others as drinking more or having more tolerant views of alcohol use than themselves). An extremely substantial failsafe number of $N_{fs(p=.05)}$ = 317, 878.8 indicates that close to 318,000 studies reporting no SODs would be required before the results of this meta-analysis could be ascribed to sampling error. Thus, there appears to be substantial evidence supporting the existence of self-other norm discrepancy among college students.

Two considerations should be noted regarding these analyses. First, unweighted analyses were necessary because of an inordinate discontinuity on sample size: one of the studies (Perkins et al., 1999) had a much larger sample size (N=45,853) than any of the other studies included in

the meta-analysis (whose mean sample size was N=362). Weighting by sample size would have resulted in the SODs from this study overwhelming the effects from other studies. However, it should be noted that the effect rendered by the Perkins et al. (1999) study was functionally equivalent (mean Z_{Fisher} = .439) to the mean effect of the remaining 22 studies (mean Z_{Fisher} = .476). Second, the included studies reported a varying number of hypothesis tests, and each was treated as an independent observation: this assumption of independence is patently false. However, without making this assumption, we would have been forced to choose the "best" hypothesis test from each study or to pool the results from all the hypothesis tests to create a single test. Both of these alternatives create more problems with assumptions and arbitrariness than the present assumption of independence.

Consider the results of a supplemental meta-analysis of wholly independent effects, in which multiple hypothesis tests from each study were combined into a single test (e.g., the 24 hypothesis tests from Bourgeois and Bowen (2001) were combined into a single effect size). This provided 23 distinct, wholly independent hypothesis tests, one from each study. The results of this supplemental meta-analysis (unweighted mean Z_{Fisher} = .474) are somewhat greater in magnitude than those of the meta-analysis of the entire main database (unweighted mean Z_{Fisher} = .342). As the effect sizes for both the main and supplemental meta-analyses are both in the moderate range (Cohen, 1977), the degree of distortion engendered by the assumption of independence in the original 102 hypothesis tests in the main database is (at worst) tolerable.

Predictors of SODs

Norm Type—A significant (Z = 84.713, p = 2.94E–39), small (Z_{Fisher} = .291) effect was obtained for the 65 hypothesis tests that tested SODs in descriptive norms. A significant (Z = 40.218, p = 2.94E–39), medium (Z_{Fisher} = .433) effect was obtained for the 37 hypothesis tests based on comparisons involving injunctive norms. The difference between the magnitudes of these two effects was significant (Z=5.587, p=1.315E–08), indicating that SODs in student's perceived approval of alcohol use (injunctive norms) exceeded those in drinking behaviors (descriptive norms).

Gender—SODs varied as a function of gender (r = −.181, Z = 4.331, p = 7.51E–06). In general, then, women report greater SODs than men when evaluating norms. To test whether this was the case for both injunctive and descriptive norms, a supplementary analysis was performed. Studies that used single-gender samples were eligible for this analysis, and effect sizes derived from men- or women-only statistical tests (e.g., Bourgeois and Bowen, 2001). For injunctive norms, a significant (Z = 28.406, p = 2.94E–39), medium (Z_{Fisher} = .460) effect was obtained for the 18 hypothesis tests that tested women's SODs. A significant (Z = 24.109, p = 2.94E–39) but smaller (Z_{Fisher} = .392) effect was obtained for the 18 hypothesis tests that evaluated men's SODs. The difference between the magnitudes of these two effects was significant (Z = 1.567, p= .058), indicating that there were greater SODs in women's perceived injunctive norms than for men. For descriptive norms, women exhibited greater SODs (18 hypothesis tests; Z=26.367; p = 2.94E–39; Z_{Fisher} = .295) than did men (29 hypothesis tests; Z=14.231; p = 2.58E–32; Z_{Fisher} = .186), and the difference between the magnitudes of these two effects was also significant (Z = 3.024, p = .001). In sum, women exhibit greater SODs when reporting both injunctive and descriptive norms.

Greek membership—The influence of Greek membership on these results must be considered, for two reasons. First, members of the Greek system tend to perceive non-members' drinking as being *less* than their own. Second, comparisons of Greek and non-Greek members' norm perceptions are confounded by norm type. Specifically, all Greek-only studies evaluated descriptive norms (Baer and Carney, 1993; Carter and Kahnweiler, 2000; Larimer et al.,

1997), and all non-Greek only studies evaluated injunctive norms (Prentice and Miller, 1993; Schroeder and Prentice, 1998). To explore the influence of Greek membership on SODs, two supplementary analyses were performed. A comparison of the norm perception of Greeks versus non-Greeks revealed a significant tendency for SODs to decrease as a function of Greek membership. Specifically, a significant (Z = 7.89, p = .832E-15) but small (Z_{Fisher} = .058) effect was found for the 26 hypothesis tests that used Greek members. The 10 hypothesis tests using non-Greek samples produced a significant (Z = 14.587, p = 3.48E-33), moderate (Z_{Fisher} = .375) effect. The SODs in the 66 hypothesis tests using mixed samples (i.e., contained both members and non-members of the Greek system) were also significant (Z = 103.55, p = 2.94E-39), demonstrating a moderate (Z_{Fisher} =.449) effect size. As expected, the difference between the magnitude of Greek versus non-Greek SODs was quite significant (Z = 7.167, p = 9.45E-13), indicating that Greek members perceive significantly smaller SODs.

Because Greek membership is confounded with norm type, we compared the effect sizes of SODs for injunctive and descriptive norms in mixed samples. A significant (Z = 14.395, p = 1.026E–32), small (Z_{Fisher} = .146) effect was obtained for the 36 hypothesis tests that tested descriptive norms. A significant (Z = 102.92, p = 2.94E–39), larger (Z_{Fisher} = .446) effect was obtained for the 39 hypothesis tests from the injunctive norms studies. The difference between the magnitudes of these two effects was significant (Z = 36.461, p = 2.94E–39). Thus, these analyses confirm that greater SODs in injunctive norms than in descriptive norms were observed in the subset of studies that utilized mixed samples, just as in the main analyses.

Reference Group—SODs also varied as a function of the proximity of the reference group (r = .139, Z = 3.589, p = 1.66E–4). As the reference group becomes more distant (e.g., the average student on campus), the magnitude of the SODs becomes greater.

Question Specificity—A significant (r = −.121, Z = 3.206, p = 6.735E-4) negative relationship emerged between the specificity of the question and the magnitude of the SOD. The more specific the behavior assessed by the question, the smaller the self-other discrepancies. Therefore, SODs become more extreme when evaluating behaviors or attitudes defined in vague or general terms.

Campus Size—A corresponding campus size could be obtained for 98 hypothesis tests. The Perkins et al. (1999) study was excluded because it used aggregate data from over 140 different schools. A significant inverse relationship emerged between SODs and the size of the campus (r = −.419, Z = 10.125, p = 2.7197E–21). Thus, students on larger campuses report smaller SODs than students on smaller campuses.

Discussion

This meta-analysis provides a quantification of the extent of the discrepancy between students' descriptions of their own drinking behaviors and attitudes towards drinking, and their perceptions of others' drinking behaviors and attitudes. The findings confirm that most students view themselves as drinking less and being less approving of alcohol use than peer reference groups; overall, the effect size was medium, according to guidelines established by Cohen (1977). However, the magnitude of norm misperception is influenced by several factors related to the type of norm assessed, the students, campus and the framing of the question. First, self-other discrepancies in injunctive norms are larger than those for descriptive norms. Second, women tend to overestimate descriptive and injunctive norms to a greater extent than do men. Third, self-other discrepancies increase as the reference group becomes more distal. Fourth, specific questions tended to result in smaller SODs than more vague ones. Fifth, large campuses were found to have smaller SODs than smaller campuses. Thus, many different factors

contribute to the (in)accuracy of perceived norms. The findings of this study have implications for future social norms research.

One conclusion that can be drawn from this meta-analysis is that the degree of norm misperception may be, in part, a result of how the norm is assessed. Specifically, the proximity of the reference group to the individual and the specificity of the information being obtained should both be carefully considered when assessing drinking norms. To clarify these effects, a supplemental analysis was performed comparing studies that assessed norms of distal targets using a non-specific question (conditions that should result in greater SODs) versus studies that assessed norms of proximal targets using specific questions (conditions that should result in smaller SODs). Indeed, the fourteen SODs derived from distal targets with non-specific questions were significantly larger (mean Z_{Fisher} = .441) than the fourteen SODs derived from proximal targets with specific questions (mean Z_{Fisher} = .285; Z = 3.544, p = .0002). Thus, using non-specific questions with distal reference groups will result in larger self-other differences than using specific questions with proximal reference groups. Researchers should carefully select their reference groups and assess specific behaviors and attitudes in order to gather information relevant to the students that are trying to influence. Such efforts will reduce inflated SODs that may be a result of challenging questions rather than a genuine misperception of norms.

These assessment considerations aside, perhaps the most important aspect of norm (mis) perception is its relevance for behavior and attitude change. To date, the inclusion of norm education in interventions aimed at reducing college drinking has had promising results. Interventions that attempted to change descriptive norms have reported significant reductions in norm perception (Barnett et al., 1996; Borsari and Carey, 2000; Haines and Spear, 1996; Steffian, 1999; Walters, 2000; Walters et al., 2000); furthermore, self-reported alcohol use decreased following most of these interventions. Therefore, descriptive norm education, administered in a variety of formats, appears to be an effective method of changing student perceptions of others' drinking. It is unclear whether similar changes occur with injunctive norms; only two interventions have been published. One large scale study found that four weeks after receiving norm education, both dormitory residents and Greek members reported decreases in the perceived approval of alcohol use of close friends and the typical student (Barnett et al., 1996). In contrast, Schroeder and Prentice (1998) did not detect any group differences in norm perception at a longer (4–6 month) follow-up. These studies indicate that correcting misperceived norms may have some influence on behavior; however, precisely how this may occur is unclear. Therefore, this meta-analytic integration offers some guidance to future interventions using descriptive and injunctive norms.

First, although the magnitude of SODs increases as the reference group becomes more distal, it is possible that the relevance of the reference group decreases as well. Information relating what the "typical student" does may be easier for the student to dismiss than the norms of a more relevant group, such as best friends or fellow Greek members. Thus, it is possible that norms from groups that are more proximal, and presumably more relevant to the student will be more likely to result in behavior change than the norms from less relevant groups. Evidence supporting this hypothesis comes from research indicating that local norms play more powerful role in self-evaluation than global norms (Prentice and Miller, 1994). Indeed, everyone is not weighted equally when creating norms. Instead, personal behaviors and attitudes will be influenced most by individuals that "are highly similar to the self, share an important category membership with the self, are reference others [whose behaviors and attitudes are valued], and place the self in a positive light" (Miller and Prentice, 1996, p. 813). For example, Agostinelli and colleagues (in press) have suggested that increases in the problem recognition in personal alcohol use may occur when college students evaluate the drinking habits of immediate peer groups instead of more distal individuals. Therefore, social norms interventions may better

serve students by focusing on the drinking of more proximal, relevant groups (e.g., male freshmen). Although the self-other discrepancies may be smaller, the information may be impactful. These are empirical questions that await formal testing.

Second, the gender of the recipients of norm interventions deserves further consideration. The results of this meta-analysis suggest that women endorse greater SODs than men. However, previous research suggests that women are more resistant than men to changing their misperceptions. For example, Prentice and Miller (1993) found that, at 8 week follow-up, men had reduced their self-other discrepancies, but women showed no such change. Schroeder and Prentice (1998) replicated these results, observing that women maintained their injunctive norm discrepancy over time. An untested hypothesis proposes that gender differences in the use of alcohol in socialization may have accounted for this change. Specifically, men may be more visible in the drinking environment than women: drinking groups tend to be all male or mixed genders. As a result, men assume that normative information applies to other men, and may have to reconcile their personal use with perceived norms. Although women tend to report greater SODs, they may perceive norms to be more descriptive of men's behavior than their own. Thus, generic normative feedback may have a lesser influence on women's drinking (Read et al., 2001). The implication of this finding is that normative information may have to be gender-specific to have an effect on women's alcohol-related behaviors and attitudes.

Third, the size of the campus may also influence the effects of social norms campaigns on behavior. The finding that the larger the campus, the smaller the SODs reported by students was counter-intuitive; however, this may have been a function of the way students estimate the descriptive and injunctive norms. Students on small campuses may consider their friends as representative of the campus in general. Therefore, these students would have a vested interest in estimating that others on campus drink more and are more approving of alcohol use than they. To think otherwise would imply that they were among the heaviest drinkers on campus, a realization that would make many students uncomfortable. Therefore, there is a distinct advantage of misperceiving norms on smaller campuses. On larger campuses, however, students may realize that they don't personally know most of the other students. As a result, the behaviors of the other students may not be seen as relevant, or even knowable. Estimating the behaviors and attitudes of a large campus may be a much more difficult task. As a result, when making their estimates, students on larger campuses may rely more on their personal behaviors and attitudes and those of their friends as a point of reference. Both the decreased relevance of others' behaviors and attitudes and the difficulty of making norm estimates may result in the lower SODs on large campuses. If this is the case, then norms campaigns may be more effective on smaller campuses because the impact of learning that "most of the students on this small campus drink this way" may be more influential.

Finally, the intention of the social norms approach is to convey that the actual levels of alcohol use and attitudes towards drinking on campus are more moderate that most students suppose (Perkins, 2002). This information challenges students' personal beliefs and behaviors that heavy drinking is prevalent and acceptable, and "as students begin to adhere to more accurately perceived norms that are relatively more moderate, the actual norms become even more moderate as the process of misperception leading to misuse is reversed" (Perkins, 2002, p. 169). However, given the limitations of the evaluation research conducted thus far, it is difficult to ascertain what is responsible for observed campus-wide reductions in drinking following a norms intervention (e.g., Haines and Spear 1996). Such reductions may be a reflection of actual behavior and/or attitude change or a norm-driven response bias. Being educated on accurate drinking norms on campus may make students wary of reporting their own use as exceeding those norms. Therefore, it is important to establish the relationship between SODs and personal alcohol use to determine precisely how these interventions have influenced behavior.

These questions reflect the paradox that faces researchers as they attempt to develop social norms messages that can be effective *and* influence the greatest number of students. Dissemination of accurate normative information to correct large SODs may encourage individuals to change personal approval of alcohol use and/or drinking behaviors. Such a monotonic relationship between the size of SODs and behavior/attitude change would recommend the use of injunctive norms, distal reference groups, and non-specific questions as the most effective ways to provoke the largest SODs that would prompt self-evaluation in students. However, it is unclear that normative information addressing these SODs would be effective; to the contrary, it may be relatively easy for the student to dismiss. In particular, the relevance of the reference group being conveyed also must be considered: Information about peer groups of little importance to the individual may not bring about much re-evaluation of one's drinking. This presents a problem, as smaller SODs exist among the reference groups that are likely to be the most proximal (and likely more relevant) to the student. Therefore, future research needs to address the relationship between SODs and perceived relevance of the normative comparison in order to develop the most effective means of communicating to the students the notion that others don't drink as much as they originally supposed.

Some limitations of this meta-analytic integration should be noted. First, norm type and Greek membership were confounded, making it difficult to determine the respective influence of these two variables on SODs. Second, the interrater reliabilities for the proximity of the reference group and question specificity, while acceptable, were not perfect. The challenge deriving proximity ratings from the literature suggests that future research using SODs should make explicit their assumptions about the proximity of reference groups. Third, because we used group means to calculate SODs, we were unable to test the relationship among the predictors, SODs, and personal alcohol use. As a result, we cannot test the question of whether the relationship between SODs and alcohol use is equally strong at all levels of potential predictors. Prior research has shown that the SOD-consumption relationship is robust, even when all the factors that might affect the size of the SOD (our predictors) are left to vary. Therefore, a systematic evaluation of these potential moderating relationships is the logical next step for research in this field.

In sum, a variety of factors influence the perception of self-other discrepancies in drinking behavior and alcohol-related attitudes. The social norms approach is a promising prevention strategy because it is based on actual data about alcohol-related attitudes and drinking behaviors on campus. That said, the results from this meta-analysis reveal that the respondent gender, type of norm assessed, reference group, question specificity, and campus size all influence the size of the SOD. Social norms correction efforts should consider factors related to the assessment methods, person variables, and the campus context to maximize their effectiveness.

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Table 1

Hypothesis tests included in the meta-analytic database.

Study	Statistic	Z_{Fisher}	Norm[a]	Gender[b]	Greek[c]	Group[d]	Specificity[e]	Size[f]
Baer and Carney (1993)	t(454) = 68.411, N = 252 [+]	.451	1	0	1	51.50	96.75	25,273
Baer and Carney (1993)	t(454) = 32.03, N = 252 [+]	.263	1	100	1	51.50	96.75	25,273
Baer and Carney (1993)	t(454) = 1.037, N = 252 [+]	.048	1	100	1	2.50	96.75	25,273
Baer and Carney (1993)	t(454) = 1.932, N = 252 [+]	.065	1	0	1	2.50	96.75	25,273
Berkowitz and Perkins (1986)	t(1115) = 24.40, N = 1116 [+]	.678	0	56.0	0	66.00	4.25	1,781
Borsari and Carey (2000)	F(1,208) = 11.925, N = 57 [+]	.237	1	0	0	7.00	93.50	10,491
Borsari and Carey (2000)	F(1,208) = 49.164, N = 57 [+]	.469	1	0	0	43.75	93.50	10,491
Borsari and Carey (2000)	F(1,208) = 45.063, N = 57 [+]	.450	1	100	0	43.75	93.50	10,491
Borsari and Carey (2000)	F(1,208) = 27.330, N = 57 [+]	.355	1	100	0	7.00	93.50	10,491
Bourgeouis and Bowen (2001)	F(1,212) = 36.805, N = 57 [+]	.406	0	0	0	11.00	14.50	8,547
Bourgeouis and Bowen (2001)	F(1,212) = 43.350, N = 57 [+]	.438	0	0	0	51.50	14.50	8,547
Bourgeouis and Bowen (2001)	F(1,212) = 16.033, N = 51 [+]	.272	0	100	0	11.50	14.50	8,547
Bourgeouis and Bowen (2001)	F(1,212) = 74.320, N = 51 [+]	.562	0	100	0	51.50	14.50	8,547
Bourgeouis and Bowen (2001)	F(1,212) = 10.092, N = 57 [+]	.217	0	0	0	11.00	62.25	8,547
Bourgeouis and Bowen (2001)	F(1,212) = 22.319, N = 57 [+]	.319	0	0	0	51.50	62.25	8,547
Bourgeouis and Bowen (2001)	F(1,212) = 13.568, N = 51 [+]	.250	0	100	0	11.00	62.25	8,547
Bourgeouis and Bowen (2001)	F(1,212) = 31.929, N = 51 [+]	.379	0	100	0	51.50	62.25	8,547
Bourgeouis and Bowen (2001)	F(1,212) = 22.849, N = 57 [+]	.323	0	0	0	11.00	15.50	8,547
Bourgeouis and Bowen (2001)	F(1,212) = 62.695, N = 57 [+]	.520	0	0	0	51.50	15.50	8,547
Bourgeouis and Bowen (2001)	F(1,212) = 32.863, N = 51 [+]	.384	0	100	0	11.00	15.50	8,547
Bourgeouis and Bowen (2001)	F(1,212) = 62.683, N = 51 [+]	.520	0	100	0	51.50	15.50	8,547
Bourgeouis and Bowen (2001)	F(1,212) = 16.958, N = 57 [+]	.279	0	0	0	11.00	36.50	8,547
Bourgeouis and Bowen (2001)	F(1,212) = 707.975, N = 57 [+]	1.363	0	0	0	51.50	36.50	8,547
Bourgeouis and Bowen (2001)	F(1,212) = 31.738, N = 51 [+]	.378	0	100	0	11.00	36.50	8,547
Bourgeouis and Bowen (2001)	F(1,212) = 80.403, N = 51 [+]	.582	0	100	0	51.50	36.50	8,547
Bourgeouis and Bowen (2001)	F(1,212) = 29.021, N = 57 [+]	.362	0	0	0	11.00	62.25	8,547
Bourgeouis and Bowen (2001)	F(1,212) = 45.103, N = 57 [+]	.446	0	0	0	51.50	62.25	8,547
Bourgeouis and Bowen (2001)	F(1,212) = 34.882, N = 51 [+]	.395	0	100	0	11.00	62.25	8,547
Bourgeouis and Bowen (2001)	F(1,212) = 69.992, N = 51 [+]	.547	0	100	0	51.50	62.25	8,547
Bourgeouis and Bowen (2001)	F(1,212) = 18.249, N = 57 [+]	.289	0	0	0	11.00	25.25	8,547

Study	Statistic	Z_{Fisher}	Norm[a]	Gender[b]	Greek[c]	Group[d]	Specificity[e]	Size[f]
Bourgeouis and Bowen (2001)	F(1,212) = 30.188, N = 57 [+]	.369	0	0	0	51.50	25.25	8,547
Bourgeouis and Bowen (2001)	F(1,212) = 47.053, N = 51 [+]	.455	0	100	0	11.00	25.25	8,547
Bourgeouis and Bowen (2001)	F(1,212) = 18.989, N = 51 [+]	.295	0	100	0	51.50	25.25	8,547
Brown et al. (2000)	t(480) = 24.809, N = 481 [+]	.972	1	42	0	32.50	57.75	12,003
Brown et al. (2000)	t(480) = 18.411, N = 481 [+]	.764	1	42	0	62.00	57.75	12,003
Carter and Kahnweiler (2000)	F(1,1445) = 7.146, N = 289 [+]	.070	1	100	1	25.38	68.63	5,996
Carter and Kahnweiler (2000)	F(1,1445) = 12.17, N = 291 [−]	−.092	1	100	1	69.75	68.63	5,996
Carter and Kahnweiler (2000)	F(1,1445) = 1.46, N = 290 [+]	.032	1	100	1	2.75	68.63	5,996
Carter and Kahnweiler (2000)	F(1,1445) = 6.74, N = 293 [+]	.068	1	100	1	55.00	68.63	5,996
Collins et al. (2002)	F(1,406) = 42.923, N = 81 [+]	.320	1	100	0	65.50	73.25	10,491
Collins et al. (2002)	F(1,406) = 102.250, N = 81 [+]	.483	1	0	0	50.50	73.25	10,491
Collins et al. (2002)	F(1,406) = 1727.004, N = 81 [+]	1.471	1	100	0	50.50	73.25	10,491
Collins et al. (2002)	F(1,406) = 84.023, N = 81 [+]	.441	1	0	0	65.50	73.25	10,491
Corbin and Fromme (2000)	t(264) = 13.926, N = 265 [+]	.777	1	0	0	32.50	96.75	37,203
Corbin and Fromme (2000)	t(482) = 11.621, N = 483 [+]	.507	1	100	0	32.50	96.75	37,203
Dreer et al. (2000)	t(314) = 14.2, N = 315 [+]	.734	1	100	0	71.50	54.75	3,533
Fabiano et al. (1996)	F(1,452) = 250.216, N = 263 [+]	.688	1	0	0	43.75	53.75	12,056
Fabiano et al. (1996)	F(1,452) = 92.025, N = 191 [+]	.437	1	100	0	43.75	53.75	12,056
Haines and Spear (1996)	F(1,632) = 333.735, N = 63 [+]	.674	1	46.0	0	71.50	54.75	23,348
Haines and Spear (1996)	F(1,632) = 164.063, N = 83 [+]	.490	1	45.7	0	71.50	54.75	23,348
Haines and Spear (1996)	F(1,632) = 135.316, N = 216 [+]	.448	1	45.4	0	71.50	54.75	23,348
Haines and Spear (1996)	F(1,632) = 0.526, N = 194 [−]	−.029	1	45.2	0	71.50	54.75	23,348
Haines and Spear (1996)	F(1,632) = 54.829, N = 81 [−]	−.290	1	45.6	0	71.50	54.75	23,348
Larimer et al. (1997)	F(1,1038) = 64.431, N = 77 [−]	−.247	1	100	1	50.75	54.50	25,273
Larimer et al. (1997)	F(1,1038) = 27.000, N = 45 [+]	.161	1	100	1	50.75	54.50	25,273
Larimer et al. (1997)	F(1,1038) = 24.372, N = 33 [+]	.153	1	100	1	50.75	54.50	25,273
Larimer et al. (1997)	F(1,1038) = 63.730, N = 64 [+]	.245	1	0	1	50.75	54.50	25,273
Larimer et al. (1997)	F(1,1038) = 38.334, N = 82 [+]	.191	1	0	1	50.75	54.50	25,273
Larimer et al. (1997)	F(1,1038) = 30.009, N = 51 [+]	.169	1	0	1	50.75	54.50	25,273
Larimer et al. (1997)	F(1,1038) = 2.127, N = 77 [−]	−.005	1	100	1	19.75	54.50	25,273
Larimer et al. (1997)	F(1,1038) = 5.553, N = 45 [+]	.074	1	100	1	19.75	54.50	25,273
Larimer et al. (1997)	F(1,1038) = 6.492, N = 33 [+]	.079	1	100	1	19.75	54.50	25,273
Larimer et al. (1997)	F(1,1038) = 26.778, N = 64 [+]	.160	1	0	1	19.75	54.50	25,273
Larimer et al. (1997)	F(1,1038) = 22.749, N = 82 [+]	.148	1	0	1	19.75	54.50	25,273
Larimer et al. (1997)	F(1,1038) = 14.431, N = 51 [+]	.118	1	0	1	19.75	54.50	25,273
Larimer et al. (1997)	F(1,1038) = 323.963, N = 77 [−]	−.533	1	100	1	55.00	54.50	25,273
Larimer et al., (1997)	F(1,1038) = 7.442, N = 45 [−]	−.085	1	100	1	55.00	54.50	25,273
Larimer et al. (1997)	F(1,1038) = 1.764, N = 33 [−]	−.041	1	100	1	55.00	54.50	25,273
Larimer et al. (1997)	F(1,1038) = 5.896, N = 82 [+]	.075	1	0	1	55.00	54.50	25,273
Larimer et al. (1997)	F(1,1038) = 5.643, N = 51 [+]	.074	1	0	1	55.00	54.50	25,273
Larimer et al. (1997)	F(1,1038) = 14.775, N = 64 [+]	.119	1	0	1	55.00	54.50	25,273
Neal and Carey (in press)	F(1,181) = 41.528, N = 89 [+]	.462	1	100	0	71.75	82.00	10,491
Neal and Carey (in press)	F(1,181) = 44.753, N = 89 [+]	.479	1	0	0	71.75	82.00	10,491
Perkins and Berkowitz (1986)	t(617) = 22.83, N = 618 [+]	.678	0	0	0	66.00	4.25	1,781
Perkins and Berkowitz (1986)	t(740) = 11.289, N = 741 [+]	.404	0	100	0	66.00	4.25	1,781

Study	Statistic	Z_{Fisher}	Norm[a]	Gender[b]	Greek[c]	Group[d]	Specificity[e]	Size[f]
Perkins et al. (1999)	t(45,849) = 63.438, N = 884 [+]	.292	1	-	0	43.75	53.75	-
Perkins et al. (1999)	t(45,849) = 131.784, N = 4386 [+]	.582	1	-	0	43.75	53.75	-
Perkins et al. (1999)	t(45,849) = 185.567, N = 26,288 [+]	.784	1	-	0	43.75	53.75	-
Perkins et al. (1999)	t(45,849) = 21.210, N = 14,295 [+]	.099	1	-	0	43.75	53.75	-
Prentice and Miller (1993; Study 1)	t(130) = 2.950, N = 132 [+]	.256	0	100	−1	66.00	13.00	4,624
Prentice and Miller (1993; Study 1)	t(130) = 7.608, N = 132 [+]	.626	0	0	−1	66.00	13.00	4,624
Prentice and Miller (1993; Study 2)	t(476) = 4.206, N = 242 [+]	.192	0	100	−1	7.25	13.00	4,624
Prentice and Miller (1993; Study 2)	t(476) = 6.406, N = 242 [+]	.274	0	100	−1	71.75	13.00	4,624
Prentice and Miller (1993; Study 2)	t(476) = 8.463, N = 242 [+]	.379	0	0	−1	71.75	13.00	4,624
Prentice and Miller (1993; Study 2)	t(476) = 4.553, N = 242 [+]	.208	0	0	−1	7.25	13.00	4,624
Prentice and Miller (1993; Study 3)	t(24) = 2.731, N = 25 [+]	.532	0	0	−1	71.75	9.75	4,624
Prentice and Miller (1993; Study 3)	t(24) = 2.864, N = 25 [+]	.532	0	100	−1	71.75	9.75	4,624
Read et al. (2002)	t(311) = 6.460, N = 312 [+]	.359	1	28	0	32.50	65.00	10,483
Read et al. (2002)	t(311) = 9.517, N = 312 [+]	.516	1	28	0	32.50	70.00	10,483
Schroeder and Prentice (1998)	t(137) = 4.538, N = 143 [+]	.377	0	0	−1	71.75	11.50	4,624
Schroeder and Prentice (1998)	t(137) = 4.173, N = 143 [+]	.350	0	100	−1	71.45	11.50	4,624
Steffian (1999)	t(34) = 1.144, N = 35 [+]	.195	1	100	0	43.75	75.00	8,597
Steffian (1999)	t(35) = 1.586, N = 36 [+]	.264	1	100	0	43.75	75.00	8,597
Steffian (1999)	t(34) = 0.495, N = 35 [+]	.085	1	100	0	43.75	58.25	8,597
Steffian (1999)	t(35) = −0.981, N = 36 [−]	−.165	1	100	0	43.75	58.25	8,597
Steffian (1999)	t(34) = 1.193, N = 35 [+]	.203	1	100	0	43.75	75.25	8,597
Steffian (1999)	t(35) = 1.796, N = 36 [−]	.298	1	100	0	43.75	75.25	8,597
Thombs (2000)	t(290) = 9.74, N = 291 [+]	.545	1	58.9	0	38.00	56.25	20,743
Thombs (2000)	t(291) = 18.73, N = 292 [+]	.949	1	58.9	0	44.50	56.25	20,743
Wood et al. (2000)	t(473) = 7.614, N = 474 [+]	.343	1	34	0	32.50	70.00	10,483
Wood et al. (2000)	t(461) = 5.493, N = 462 [+]	.253	1	34	0	32.50	61.75	10,483
Wood et al. (2000)	t(473) = 10.551, N = 474 [+]	.468	1	34	0	32.50	59.50	10,483

Notes: Plus and minus signs in brackets indicate direction of effect entry.

[a] 0 = Injunctive, 1 = Descriptive.

[b] Percent male.

[c] −1 = Non-Greek; 0 = mixed; 1 = Greek.

[d] 0 = proximal, 100 = distal.

[e] 0 = specific, 100 = vague

[f] School size.