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Optimizing Personalized Normative Feedback: The Use of Gender-Specific Referents*

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Abstract

Objective—Many brief interventions include personalized normative feedback (PNF) using gender-specific or gender-neutral referents. Several theories suggest that information pertaining to more socially proximal referents should have greater influence on one's behavior compared with more socially distal referents. The current research evaluated whether gender specificity of the normative referent employed in PNF related to intervention efficacy.

Method—Following baseline assessment, 185 college students (45.2% women) were randomly assigned to one of three intervention conditions: gender-specific feedback, gender-neutral feedback, or assessment-only control. Immediately after completing measures of perceived norms, alcohol consumption, and gender identity, participants in the gender-neutral and gender-specific intervention conditions were provided with computerized information detailing their own drinking behavior, their perceptions of student drinking, and actual student drinking.

Results—After a 1-month follow-up, the results indicated that normative feedback was effective in changing perceived norms and reducing alcohol consumption for both intervention groups for women and men. The results provide support, however, for changes in perceived gender-specific norms as a mediator of the effects of normative feedback on reduced drinking behavior for women only. Additionally, gender-specific feedback was found to be more effective for women higher in gender identity, relative to the gender-neutral feedback. A post-assessment follow-up telephone survey administered to assess potential demand characteristics corroborated the intervention effects.

Conclusions—Results extend previous research documenting efficacy of computer delivered PNF. Gender specificity and gender identity appear to be important elements to consider for PNF intervention efficacy for women.

Heavy drinking among college students continues to be an epidemic problem and has inspired a considerable amount of intervention research. One particular intervention that has recently gained widespread attention is the social-norms approach (Perkins, 2002; Wechsler et al., 2004). The social-norms approach, social marketing, and personalized normative feedback (PNF; Lewis and Neighbors, 2006; Neighbors et al., 2004) rely on the assumption that correcting overestimated peer drinking norms results in reduced drinking and related consequences. Social marketing tends to take a general mass media approach; whereas PNF tailors responses provided by students to frame normative information in relation to personal drinking behavior.

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Brief interventions using PNF vary in the specificity of the referent employed. Recent suggestions have been made proposing that gender-specific referents may produce greater reductions in drinking compared with gender-neutral referents (Borsari and Carey, 2003; Lewis and Neighbors, 2006; Walters and Neighbors, 2005). The present research explored the relevance of gender specificity in the context of Social Comparison Theory (Festinger, 1954), Social Impact Theory (Latane, 1981), and Social Identity Theory (SIT; Tajfel, 1981, 1982; Tajfel and Turner, 1979, 1986). The current research is the first study to empirically evaluate whether gender specificity of the referent employed in PNF relates to intervention efficacy and to evaluate the extent to which group identity might moderate the importance of specificity in PNF.

Gender specificity and PNF

Social Comparison Theory (Festinger, 1954) and Social Impact Theory (Latane, 1981) suggest that information pertaining to more socially proximal comparison referents (i.e., gender-specific norms) should be perceived as more relevant and therefore be more influential than information pertaining to more distal comparison referents (i.e., gender-neutral norms). Specificity of norms varies from relatively vague (i.e., typical student) to very specific (i.e., best friends). Following the theoretical bases of the social-norms approach (i.e., presenting actual norms to reduce normative misperceptions and, in turn, reduce drinking), the present research evaluated gender specificity, assuming the importance of identifying a referent that is relevant yet is not associated with extreme drinking norms (Lewis and Neighbors, 2006). An underlying assumption of this approach is that, whereas it may be important to consider which norms to present, it is critically important that the norms be accurate and factual. Otherwise one runs the risk of undermining the legitimacy of the approach.

Previous research has laid the groundwork for testing the efficacy of gender-specific PNF. Research has shown that students have gender-specific normative misperceptions (Lewis and Neighbors, 2004), thus making an appropriate referent choice for the social-norms approach because normative misperceptions are essential. Moreover, Lewis and Neighbors (2004) found that gender-specific normative misperceptions were stronger predictors of problematic drinking than gender-neutral norms, especially for women. These findings suggest that using gender-specific PNF may be particularly effective for women.

This hypothesis is of importance because previous research has shown gender differences in perceived norms over time (Prentice and Miller, 1993; Schroeder and Prentice, 1998), such that women are more resistant than men to changing peer drinking norm misperceptions. One suggestion for these gender differences is that the typical student may be perceived as male by both men and women (Borsari and Carey, 2003; Lewis and Neighbors, 2004; 2006a). Lewis and Neighbors (2006b) found that, when men estimated gender-neutral drinking norms, they overwhelmingly perceived the typical student as male. In contrast, when women estimated gender-neutral drinking norms, about half perceived the typical student as male, whereas the remaining women perceived the typical student as female. Because some women perceive the typical student as male, PNF that uses gender-neutral norms may provide a subjectively less relevant referent (i.e., opposite-gender norms).

The efficacy of gender-specific PNF may differ for men and women for two key reasons. First, there are gender differences in alcohol consumption (Ham and Hope, 2003), which cause male gender-specific norms to be higher than gender-neutral drinking norms and female gender-specific norms to be lower than gender-neutral norms. For men, being presented with more prevalent drinking norms may weaken the efficacy of PNF.

The second reason relates to the perceptions of the typical college student. Because men perceive the typical student as male when estimating peer norms, using the typical student as

a normative referent is functionally equivalent to using a male gender-specific referent. Because of this finding, gender-neutral PNF may be more effective for men, compared with gender-specific PNF, because it would prescribe less prevalent actual drinking norms to a proximal comparison group.

In contrast, for women, gender-specific PNF would present less-prevalent actual norms and would provide a more proximal group, which suggests that it may be more effective compared with gender-neutral PNF. In summary, specificity of the normative referent is an important aspect to consider when following a social-norms approach, as it should relate to intervention efficacy.

Social identity and PNF

According to SIT (Tajfel, 1981, 1982; Tajfel and Turner, 1979, 1986), people adopt the prototypical attitudes and beliefs of the in-group as their own. When college students find out that there is a discrepancy in their drinking behavior with that of their same-gender peers, according to SIT they should be motivated to address this discrepancy to the extent that they strongly identify with that group (i.e., gender; Wood, 2000).

Moreover, SIT proposes that norms and behaviors are tied to groups that are most salient. Previous research (Terry and Hogg, 1996) has supported this proposition, such that perceived norms for a relevant reference group predicted intentions to engage in regular exercise and sun-protective behaviors. This proposition was true only for those individuals who identified strongly with the reference group.

In sum, SIT provides an important caveat to the notion that more specific reference groups are more influential: the extent to which an individual views the comparison dimension as important. Because the strength with which individuals identify with reference groups affects intervention outcomes, the current research aimed to evaluate gender identity as a moderator of PNF efficacy.

Demand characteristics and PNF

An important limitation of research literature on PNF relates to the reliability and validity of self-reported drinking behavior. PNF interventions have relied exclusively on self-report to examine changes in normative perceptions and drinking behavior (Borsari and Carey, 2001, 2003). Recent research examining self-reported alcohol use suggests that the accuracy of self-reported drinking is variable (Carey and Hustad, 2002; Clapp et al., 2006; Hustad and Carey, 2005). It depends in part on the number of drinks consumed, the time spent drinking, and several environmental factors (e.g., party size and presence of food; Clapp et al., 2006).

In addition to concerns related to the reliability and validity of self-reported alcohol use, it is important to consider the potential impact of demand characteristics in intervention studies (Rosenthal, 1980; Sears, 1986). More specifically, it is possible that students who receive information (i.e., PNF) that they believe is supposed to make them report less drinking at follow-up may report less drinking to be “a good subject.” A secondary aim of this study was to evaluate potential effects of demand characteristics by calling a subset of participants after follow-up and asking them about their drinking in the context of a presumably unrelated survey.

Current research

Based on the above considerations, we expected that gender-specific PNF would be more effective than gender-neutral PNF and that this finding would be especially true for individuals who were higher in gender identity. In addition, the present research addressed concerns

relating to demand characteristics by including an additional follow-up assessment that was ostensibly unrelated to the intervention study.

Method

Participants

Screening and recruitment—Participants were screened from a sample of 981 students from psychology classes, based on the peak number of drinks reported in the previous month. Students who indicated at least one heavy drinking episode (five/four drinks at one sitting for men/women, respectively) were eligible to participate. Based on these criteria, 677 students (45% women) were eligible to participate. Similar criteria have been used to identify high-risk samples in previous intervention studies (e.g., Marlatt et al., 1998; Neighbors et al., 2004).

Power analyses focused on evaluating the effect of the intervention on perceived norms and alcohol consumption. A recent review evaluating personalized feedback interventions for college student drinking (Walters and Neighbors, 2005) found that across 13 studies the majority of effect sizes were in the small-to-medium range. Given this consideration, we anticipated that the present intervention would have effects in the medium ($f = .20-.25$) range (Cohen, 1988, 1992). Power analyses indicated that a sample size of 186 would yield .80 power to detect differences among three groups with an effect size of $f = .23$.

One hundred eighty-five students (54.6% women) were successfully recruited for participation in this study. The average (SD) participant age was 20.1 (1.8) years. The participants were 97.3% white and 2.7% of other races. Students received extra course credit as compensation for participation.

Attrition—One hundred sixty-five students completed follow-up assessment (89%). Participants who dropped out did not differ with respect to completers in baseline gender-specific perceived norms ($t < 1$), baseline gender-neutral perceived norms ($t < 1$), or baseline alcohol consumption ($t < 1$). In addition, attrition did not differ by gender.

Procedure

Study procedures included baseline assessment, PNF intervention, 1-month follow-up, and an ostensibly unrelated follow-up, henceforth referred to as the “tailgating follow-up.” During the spring semester, the participants were contacted by phone, email, or both to schedule assessments. Baseline assessment occurred approximately 2 weeks after screening. After providing informed consent, individuals completed the baseline assessment via computer in a controlled laboratory setting on campus. Assessments included measures of demographic information, perceived drinking norms, alcohol consumption, and gender identity.

Students were randomly assigned to gender-specific PNF, gender-neutral PNF, or assessment-only control. PNF was provided via computer immediately after baseline assessment. Procedures for 1-month follow-up were similar to baseline assessment, with the exception that no feedback was provided.

Approximately 2 weeks after the 1-month follow-up, attempts were made to contact half of the students to assess drinking behavior in a context other than the laboratory. The purpose of the tailgating survey was to assess self-reported drinking in a context presumably unrelated to the intervention study to evaluate potential demand characteristics. This procedure consisted of a survey conducted via telephone, and it appeared to measure football tailgating and drinking. Thus, students were unaware at the time of the phone survey that their responses would be compared with responses at the 1-month follow-up (i.e., that the phone survey was related to the initial study). This was a plausible cover because, at the time of the study, the campus was

in debate over whether alcohol should be allowed during tailgating at the football stadium on campus. Forty-five percent of the participants completed the tailgating survey. Students were thanked and debriefed. All procedures were approved by the university's institutional review board.

PNF—In the informed consent process, students were told that the study was designed to evaluate students' own drinking and their perceptions of other students' drinking and that some students would receive personalized feedback showing how their own drinking and their perceptions of other students' drinking compared with actual campus drinking norms. Students who received PNF viewed the feedback on the computer screen for 1 to 2 minutes as it printed. Participants were given the printout to take with them. Because study protocol did not include interaction or discussion regarding the PNF, communication and interaction between the experimenter and participants were limited, because students answered the survey via computer and were simply given their PNF without discussion.

Occasionally, students would make comments or ask questions regarding the PNF. Most commonly, students stated that they were surprised that they drank so much more than the typical student, or they asked whether the actual norms presented were real. In these instances, the experimenter would answer any questions. For example, the experimenter would indicate that the actual drinking norm provided in the PNF was the real norm for a sample of students from their university.

PNF was modeled after the feedback component of the Brief Alcohol Screening and Intervention for College Students intervention (Dimeff et al., 1999). It was consistent with that used in previous research (Borsari and Carey, 2000; Larimer et al., 2001; Murphy et al., 2001; Neighbors et al., 2004, 2006). PNF provided information regarding personal drinking, perceptions of typical student drinking, and actual typical student drinking norms. Information pertaining to perceptions of typical student drinking and actual typical student drinking norms provided a discrepancy suggesting to heavy-drinking students that "most students don't drink as much as you think they do." Feedback relating to personal drinking behavior and actual typical student drinking norms provided students with a discrepancy pointing out to heavy-drinking students that "most students don't drink as much as you do." Actual typical student drinking behavior norms were based on screening data. Participants' percentile ranking comparing their drinking with other students drinking also was provided (Dimeff et al., 1999; Neighbors et al., 2004, 2006).

Measures

Perceived norms—Perceived gender-specific norms and perceived gender-neutral norms were measured as latent variables consisting of perceived typical weekly drinking, perceived typical number of drinks consumed per drinking occasion, and perceived typical drinking occasions per week (i.e., perceived frequency). Perceived norms were measured by two versions of the Drinking Norms Rating Form (Baer et al., 1991). The gender-neutral version assessed the perceived typical number of drinks consumed per drinking occasion (e.g., "How many drinks, on average, do you think a typical student at your college consumes on a given occasion?") and the perceived frequency (e.g., "How often do you think a typical student at your college consumes alcohol?"). The gender-specific version (Lewis and Neighbors, 2004) was identical to the gender-neutral version except that items were framed for the "typical male" and the "typical female." Both versions assessed perceived typical weekly drinking. Participants filled in the average number of standard drinks they thought that the typical (male/female) student consumed for each day of the week over the previous month. Scores represented the average number of drinks consumed each day of the week over the previous month.

Alcohol consumption—Drinking was measured as a latent variable consisting of overall consumption, typical weekly drinking, and typical number of drinks consumed per drinking occasion. The Alcohol Consumption Inventory (Knee and Neighbors, 2002) consists of eight items. Four items assess the number of occasions the participant consumed five or more drinks at one sitting in various periods. Four items assess the number of drinks consumed in a given time frame (e.g., “On average, how many drinks do you consume on weekends [Friday-Sunday]?”). Response options are presented as 7-point options from 0 (zero) to 6 (more). The anchor for the “more” option varied by item (more than 5 for frequency of consuming five or more drinks in a 1-week period; more than 10 for frequency of consuming five or more drinks in a 1-month period; and more than 15 for items assessing number of drinks). The Alcohol Consumption Inventory is scored by taking the mean of all items, with higher scores indicating more alcohol consumption (baseline $\alpha = .94$, follow-up $\alpha = .95$).

Typical weekly drinking was assessed with the Daily Drinking Questionnaire (Collins et al., 1985), in which participants reported the average number of standard drinks consumed and the time period of consumption for each day of the week for the previous month. Scores represent the average number of drinks consumed each week for the previous month.

The typical number of drinks consumed per drinking occasion and the typical drinking frequency were assessed by two items from the Quantity Frequency Scale (QF Scale; Dimeff et al., 1999). The typical number of drinks consumed per drinking occasion was assessed by the following item: “During the last month, when you have consumed alcohol, how many drinks on average did you typically consume on a given occasion?” Responses ranged from 0 (zero) to 25 (25 or more). Finally, typical drinking frequency was assessed by the following item: “On average, during the last month, how often have you consumed alcohol?” Responses ranged from 0 (zero) to 7 (every day).

Gender identity—A revised version of the Collective Self-Esteem Scale (Luhtanen and Crocker, 1992) measured gender identity. Luhtanen and Crocker (1992) support the use of the Collective Self-Esteem Scale with a more specific measure for a particular group. In addition, altering this scale for a particular group has not compromised its psychometric properties (Luhtanen and Crocker, 1992). Example items for the gender version are “In general, belonging to my gender is an important part of my self-image,” and “The gender group I belong to is an important reflection of who I am.” Participants rate each response on a scale from 1 (strongly disagree) to 7 (strongly agree). Consistent with the authors’ suggestions and previous research (Luhtanen and Crocker, 1992), responses were averaged to create a summary score (baseline $\alpha = .80$, follow-up $\alpha = .84$).

Tailgating follow-up—Participants responded to items related to tailgating and personal drinking behavior. An example item is “Do you think that tailgating should be allowed at sport activities?” Participants reported drinking frequency and drinks per occasion over the previous month. These two items were identical to items from the QF Scale (Dimeff et al., 1999) included in the baseline and follow-up assessments and were the focus of the tailgating follow-up analyses.

Results

Data screening

Data were screened for outliers, multicollinearity, and normality. Ten univariate outliers (Tabachnick and Fidell, 2001) on baseline and follow-up variables were Winsorized (Cohen, 2001), such that outliers were replaced with the next highest value that was not determined to be an outlier. Based on criteria for Mahalanobis distance (Tabachnick and Fidell, 2001), three cases were determined to be multivariate outliers ($p < .001$) and were excluded from analyses.

The final data set consisted of 182 cases (gender-specific feedback: $n = 65$ [32 women, 33 men]; gender-neutral feedback: $n = 60$ [39 women, 21 men]; control group: $n = 57$ [27 women, 30 men]).

Multicollinearity was assessed for perceived norms and drinking at baseline and follow-up. All condition indexes were below 30, and no variables had more than one Variance Proportion greater than .50, suggesting that multicollinearity was not problematic (Tabachnick and Fidell, 2001).

Finally, no extreme univariate departures from normality were evident for any variable (Kline, 1998; West et al., 1995). There were no baseline differences among groups for gender-specific perceived norms ($t < 1$) or alcohol consumption ($t < 1$).

Gender-specific and gender-neutral feedback reduce gender-specific drinking norms

To determine whether students who received either gender-specific or gender-neutral PNF had more accurate normative perceptions, compared with students in the control group, data were analyzed using a one-way multivariate analysis of covariance. Dependent variables included follow-up perceived typical weekly drinking, perceived typical number of drinks consumed per drinking occasion, and perceived typical drinking frequency. Baseline drinking norms and gender were included as covariates. Normative feedback group was included as the independent variable.

Significant group differences were found for follow-up perceived norms (Wilks' $\Lambda = .67$; $F = 10.98$, 6/298 df, $p < .001$). The findings suggest that the relationship between feedback group and the dependent variables was small (partial $\eta^2 = .18$). Post hoc univariate tests using Fisher's Least Significant Difference (Cohen, 2001) revealed significant group differences for perceived typical weekly drinking ($F = 19.42$, 2/157 df, $p < .001$), perceived typical number of drinks consumed per drinking occasion, ($F = 19.93$, 2/157 df, $p < .001$), and perceived typical drinking frequency ($F = 18.70$, 2/157 df, $p < .001$). PNF had small-to-medium effects on norms ($f = .19$) at 1-month follow-up. By convention, effect sizes of .10, .25, and .40 are considered small, medium, and large (Cohen, 1992). In sum, corrections of gender-specific normative misperceptions were evident for both men and women who received either type of feedback, relative to control participants, with large effect sizes for men and medium-to-large effect sizes for women. There were no significant interactions among intervention group and gender. Table 1 provides estimated marginal means and effect sizes.

Gender-specific feedback and gender-neutral feedback reduce alcohol consumption

The same analysis strategy was used to assess group differences in alcohol consumption. The findings revealed group differences for follow-up alcohol consumption (Wilks' $\Lambda = .83$; $F = 4.81$, 6/298 df, $p < .001$). The results suggest that the relationship between feedback group and the dependent variables was small (partial $\eta^2 = .09$). Univariate analysis revealed group differences for typical weekly drinking ($F = 11.48$, 2/157 df, $p < .001$), overall alcohol consumption ($F = 8.58$, 2/157 df, $p < .001$), and typical number of drinks consumed per drinking occasion ($F = 3.56$, 2/157 df, $p < .05$). PNF had small effects on drinking ($f = .13$) at 1-month follow-up.

In sum, reductions in drinking were evident for both men and women who received either type of feedback, relative to control participants, with medium-to-large effect sizes for men and small effect sizes for women. As with perceived norms, PNF efficacy did not differ by gender. Estimated marginal means and effect sizes are presented in Table 1.

Evaluation of the effect of PNF on drinking owing to changes in gender-specific perceived norms

A secondary analysis strategy was used to test the effect of PNF on drinking owing to changes in gender-specific perceived norms: multigroup Structural Equation Modeling (SEM; Bollen, 1982), with full information maximum likelihood using AMOS 4.0 (Small Waters Corp., Chicago, IL; Arbuckle and Wothke, 2000). Models were evaluated using the Comparative Fit Index (CFI; Bentler, 1990), the Normed Fit Index (NFI; Bentler and Bonett, 1980), and the Root Mean Square Error of Approximation (RMSEA; Browne and Cudeck, 1993). Values exceeding .95 and .90 indicate good fit for the CFI and the NFI, respectively. RMSEA values equal to or below .05 indicate excellent fit, values between .05 and .08 indicate reasonable fit, and values larger than .10 are indicative of a poor-fitting model (Browne and Cudeck, 1993). Chi-square difference tests were used to compare model fit between nested models.

The social-norms approach suggests that reducing exaggerated perceptions of peer drinking norms will reduce drinking. To evaluate the theoretical mechanism behind PNF interventions, changes in perceived gender-specific drinking norms were assessed as a mediator of the impact of PNF on alcohol consumption. The criteria described by Kenny and colleagues were used to evaluate mediation (Baron and Kenny, 1986; Kenny et al., 1998). Support for mediation requires four criteria to be met:

1. effect of X (gender-specific and gender-neutral normative feedback) on Y (follow-up drinking);
2. effect of X on M (follow-up perceived gender-specific norms);
3. M predicts Y (controlling for X); and
4. impact of X on Y is no longer significant or is substantially reduced when controlling for M.

The effects of gender-specific and gender-neutral PNF on follow-up drinking and follow-up perceived norms were previously shown (i.e., Criteria 1 and 2). The third and fourth criteria were evaluated using SEM. Follow-up drinking was concurrently predicted from feedback and follow-up perceived norms (controlling for baseline drinking and perceived norms).

Mediation was tested separately for women and men. Feedback interventions were collapsed; thus the variable feedback was dummy coded for PNF or no PNF. When evaluating mediation for women, the model provided good fit and demonstrated evidence for the remaining mediation criteria ($\chi^2 = 93.59$, 58 df, $p < .001$; NFI = .96; CFI = .99; RMSEA = .08). The third mediation criterion was met such that follow-up norms were associated with follow-up drinking when controlling for feedback ($B = .20$, $SE = .074$, $p < .01$). The fourth criterion was met such that the effect of feedback on follow-up drinking was no longer significant when controlling for follow-up norms ($B = -.91$, $SE = .71$, $p = NS$).

Finally, to assess whether this relationship was substantially reduced, a model was tested in which the effect of feedback on drinking occurred only through changes in perceived norms at follow-up. Follow-up measures of perceived norms and drinking controlled for baseline differences in perceived norms and drinking, which were allowed to covary. This model constrained the direct path from normative feedback to follow-up drinking to zero and provided good fit ($\chi^2 = 93.59$, 58 df, $p < .001$; NFI = .96; CFI = .99; RMSEA = .08). Freeing the constrained path between normative feedback and follow-up drinking did not result in better fit ($\chi^2 = 1.51$, 1 df, $p = NS$).

Thus, mediation criteria were met providing support for changes in perceived gender-specific norms as a mediator of the effects of normative feedback on reduced drinking behavior for

women. When evaluating mediation for gender-specific norms for men, the model provided poor fit, as indicated by a RMSEA score $> .10$, thus not demonstrating mediation ($\chi^2 = 113.76$, 56 df, $p < .001$; NFI = .95; CFI = .98; RMSEA = .11).

Gender-specific feedback is more effective for women with higher gender identity

Multi-group SEM was used to assess whether PNF was more effective among individuals who identified more strongly with their gender. First, follow-up drinking was examined as a function of baseline gender identity, controlling for baseline drinking. Measurement errors for all baseline drinking indicators were allowed to covary with their respective errors. A baseline model was fit in which the path from gender identity to follow-up drinking was constrained to equality across groups ($\chi^2 = 142.35$, 101 df, $p < .05$; NFI = .96; CFI = .99; RMSEA = .05). Moderation was tested by comparing this model to a second model in which the path from gender identity was free to vary across groups. The unconstrained model improved fit ($\chi^2 \Delta = 7.30$, 2 df, $p < .05$; $\chi^2 = 135.04$, 99 df, $p < .05$; NFI = .96; CFI = .99; RMSEA = .05), providing support for gender identity as a moderator of intervention efficacy for women.

In both the control group and the gender-neutral feedback group, gender identity was not associated with changes in drinking at follow-up ($B = 1.23$, $SE = .76$, NS; and $B = .014$, $SE = .74$, NS, respectively). In the gender-specific PNF condition, however, women who were higher in gender identity reported greater drinking reductions at follow-up ($B = -1.64$, $SE = .64$, $p < .05$).

Figure 1 presents standardized coefficients for follow-up drinking as a function of gender identity for drinking, controlling for baseline drinking by the intervention group. Gender identity did not moderate intervention effects for men.

Evaluation of demand characteristics

A series of repeated-measures analyses of variance were conducted to examine differences between drinking behaviors reported at the 1-month follow-up that occurred in the laboratory and in the second (tailgating) follow-up as a function of intervention group. The results indicate that there were no differences between drinking frequency reported at follow-up in the laboratory and in the tailgating follow-up ($F = 0.29$, 1/77 df, $p = \text{NS}$). Moreover, there were no overall differences as a function of intervention group ($F = 0.69$, 1/77 df, $p = \text{NS}$).

The same results were found for the typical number of drinks per occasion. There were no differences between the number of drinks per occasion reported at follow-up in the laboratory and the number of drinks per occasion reported via phone or Internet in the ostensibly unrelated tailgating survey ($F = 0.26$, 1/76 df, $p = \text{NS}$). The results did not vary by intervention group ($F = 0.44$, 1/76 df, $p = \text{NS}$). These findings indicate that students consistently reported their drinking behavior at follow-up in two contexts (one clearly related to the initial study and one unrelated to the initial study) and that these results did not vary among the three intervention groups.

Discussion

Prior research demonstrating gender differences in social norms (Borsari and Carey, 2003; Prentice and Miller, 1993; Schroeder and Prentice, 1998), perceptions of typical student gender (Lewis and Neighbors, 2006b), and social expectations of alcohol use on campus (Suls and Green, 2003) underscore the importance of evaluating gender specificity in social-norms interventions. The current research replicates and extends previous research demonstrating the efficacy of PNF as a single component intervention for college student drinking (Neighbors et al., 2004, 2006).

Previous studies employing PNF alone or in combination with other components have varied in the specificity of referents employed. No studies have previously evaluated the extent to which specificity matters, and there has been no prior empirical basis for choosing which referent to use. Moreover, no studies have previously considered the importance of the reference group to the individual receiving feedback. The current research suggests that gender specificity matters (at least for women) but only in combination with personal identification with the reference group.

Although both types of feedback were comparably effective, the present findings provide some support for using gender-specific feedback for women and gender-neutral feedback for men. Specifically, the results provide support for changes in perceived gender-specific norms as a mediator of the effects of PNF on reduced drinking behavior for women. Moreover, gender-specific feedback presents lower drinking norms and is especially effective for women higher in gender identity. In addition, women perceive the typical student as both male and female (Lewis and Neighbors, 2006b). Combined, these findings suggest that providing gender-specific feedback allows women to have a more proximal comparison referent, although this seems to matter primarily for women who are higher in gender identity, which is consistent with SIT (Wood, 2000). The findings suggest that the extent to which an individual views the normative referent as important is related to PNF efficacy.

The current results demonstrate that, although both gender-specific and gender-neutral PNF corrected norms and reduced drinking for women and men, both interventions were less effective for women. This finding was not expected because it is inconsistent with previous research showing that interventions using personalized feedback generally are equally effective for men and women (Walters and Neighbors, 2005).

The finding that gender-specific feedback is especially effective for those women higher in gender identity is of clinical importance, since it is one way PNF interventions can be made more effective for women. Determining what types of interventions are most effective for certain populations is important, as interventions can be tailored to those who are targeted for treatment. More generally, these findings suggest the need to consider the importance of the reference group to the individual receiving normative feedback. In a clinical setting, this might translate to discussion about the individual's social identity and presenting norms for a referent that corresponds with the individual's social identity.

PNF may be less effective for women because of differences in social expectancies surrounding alcohol. Students may perceive drinking as being more of a male activity, causing females to be less affected by normative information. For instance, prior research found that students believe that men experience more social pressures to drink and feel more embarrassment if they express drinking concerns (Suls and Green, 2003). In addition, society's view of female alcohol consumption is less accepting. Heavy alcohol consumption by women is perceived as more deviant (Sheehan and Ridge, 2001) and as being led by sexual motives (Blume, 1991; Parks and Scheidt, 2000). Because of differing social expectancies, men may pay more attention to normative drinking information, making PNF more relevant. In addition, women's drinking norms are lower than men's drinking norms (Ham and Hope, 2003). As a result, it may be harder to reduce drinking norms that are at a lower starting point because there is less room for change.

An important limitation of the present research is that all drinking measures were self-report, which presents some concern regarding reliability and validity (Carey and Hustad, 2002; Clapp et al., 2006; Hustad and Carey, 2005). A strength of the current research was the use of the tailgating follow-up, which provided support for students consistently reporting their drinking in two unrelated contexts, the initial study and the tailgating survey. Moreover, this finding

reduces concerns regarding demand characteristics in the current study, given that students did not know that this phone survey was part of the initial study. If demand characteristics were responsible for intervention effects, participants in one of the intervention groups would presumably be more likely to report reducing drinking or perceived norms as a result of receiving PNF during the intervention follow-up but not during the tailgating follow-up. Students' responses during the tailgating follow-up, however, were not different from responses during the follow-up in the laboratory, regardless of intervention group.

Future directions/conclusions

This research provides a foundation for determining the optimal referent for PNF interventions. Future research evaluating other specific normative referents in regard to ethnicity, age, and self-defined referents is warranted. Ultimately this line of research may help determine what kind of feedback is most effective for whom. In addition, future research needs to examine how injunctive and descriptive norms compare in terms of correcting normative misperceptions for various target and referent groups.

In summary, this research replicates previous findings demonstrating the efficacy of PNF as a single component intervention to reduce college student drinking. Additionally, this is the first study to empirically evaluate specificity of the normative reference group, which is a critical theoretical component relating to normative influence. Results provide support for using gender-specific PNF for women who are higher in gender identity. Interventions using PNF have been consistently effective among heavy-drinking college students. Given the relatively inconsistent findings associated with social marketing programs currently employed at colleges across the nation, PNF may be a viable alternative relying on the same theoretical foundation.

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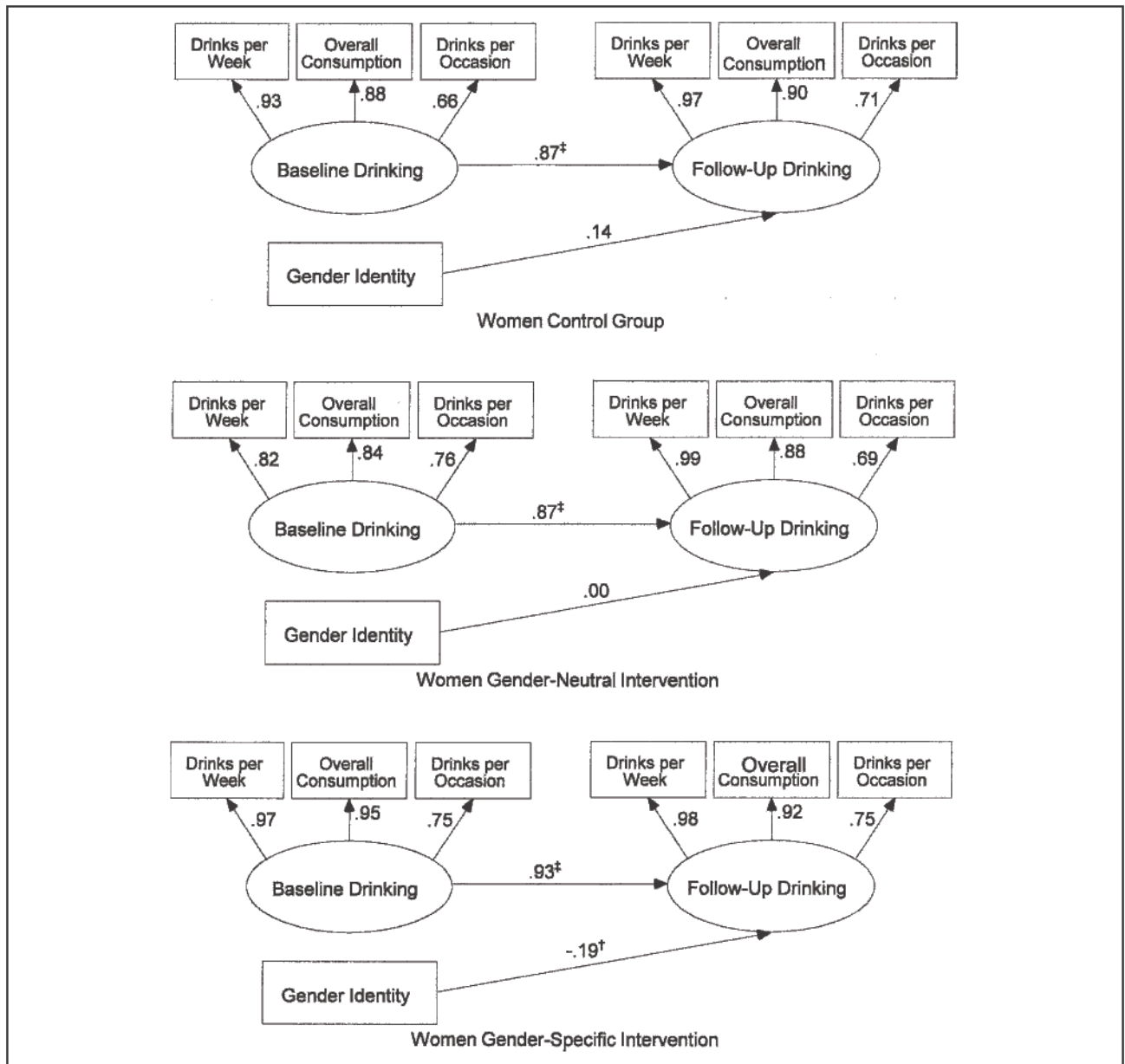


Figure 1.
 Gender identity as moderator of gender-specific feedback efficacy for women
[†] $p < .01$; [‡] $p < .001$.

Table 1
 Estimated marginal means and standard errors for perceived norms and alcohol consumption at 1-month follow-up

Variable	Control Mean (SE)	Gender-neutral Mean (SE)	<i>f</i>	Gender-specific Mean (SE)	<i>f</i>
Perceived norms					
Week					
Men	19.95 (1.25)	11.12 (1.40)	.41	12.44 (1.13)	.43
Women	15.03 (1.24)	10.61 (1.03)	.28	10.10 (1.17)	.27
Occasion					
Men	3.51 (0.17)	2.51 (0.14)	.46	2.60 (0.16)	.37
Women	3.19 (0.17)	2.46 (0.14)	.33	2.30 (0.16)	.36
Frequency					
Men	2.35 (0.20)	1.60 (0.21)	.23	1.26 (0.17)	.41
Women	2.10 (0.19)	1.21 (0.16)	.36	1.20 (0.18)	.43
Alcohol consumption					
Week					
Men	14.42 (0.73)	9.33 (1.00)	.33	8.89 (0.79)	.45
Women	9.40 (0.88)	7.62 (0.71)	.16	7.92 (0.79)	.13
ACI					
Men	2.34 (0.14)	1.94 (0.16)	.16	1.54 (0.13)	.40
Women	1.76 (0.14)	1.60 (0.12)	.09	1.47 (0.13)	.14
Occasion					
Men	3.27 (0.21)	2.96 (0.25)	.08	2.51 (0.20)	.25
Women	2.60 (0.22)	2.27 (0.18)	.12	2.28 (0.20)	.10

Notes: Week represents typical drinks consumed per week; Occasion represents typical drinks consumed per drinking occasion; Frequency represents typical drinking frequency per week; and ACI represents overall alcohol consumption. Effect sizes (*f*) for intervention effects were calculated as the difference between means divided by the pooled standard deviation divided by two.