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BRIEF REPORT

A Replication and Extension of the Factor Structure of the Masculine Drinking Norms Measure (MDNM) and Associations With Drinking Behaviors in a Multisite Sample of College Men

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Gender-specific norms are learned, which can influence social norms, attitudes, and behaviors in specific situations. For example, men who conform to certain masculine norms/ideals may express their masculinity by drinking alcohol. Recent research examining the association between endorsement of alcohol-specific masculine norms and men's risk for heavy consumption and adverse alcohol-related outcomes is mixed. Using a large, college sample of self-identified men ($n = 1,350$; $M_{age} = 20.10$/$SD = 1.80$; 12 universities), we examined the psychometric properties of the Masculine Drinking Norms Measure, and the extent to which the masculine drinking norms of *excess* (e.g., "A real man can drink a lot") and *control* (e.g., "A real man knows when he has had enough to drink and is able to stop") are associated with alcohol use and negative drinking consequences over and above demographic correlates of alcohol use (age, fraternity membership, athletic involvement) and general, nonalcohol focused masculine norms (Conformity to Masculine Norms Inventory–29). Consistent with the hypotheses and prior research, we found evidence for a two-factor solution (*excess* and *control*) for the Masculine Drinking Norms Measure with excellent model fit. Multivariate analyses indicated that *excess* was positively associated with alcohol use and negative drinking consequences (adjusting for alcohol use) while *control* was not significantly related to either outcome. Moreover, *excess* was one of the strongest correlates of alcohol use. Our findings provide further evidence for the utility of the masculine drinking norm of excess in predicting alcohol use and negative drinking consequences over and above demographic factors and general masculine norms among college men.

Public Significance Statement
Studies indicate that endorsement of masculine drinking norms can either increase or decrease men's risk for heavy drinking and adverse alcohol consequences, depending on the norm endorsed. Results from the present study indicated that the Masculine Drinking Norms Measure is a reliable and valid measure of alcohol-specific masculine norms among college men broadly. Moreover, college men who endorse the masculine drinking norms of *excess* (e.g., "a real man can drink a lot") are at risk for increased alcohol use and negative drinking consequences. To further understand the associations between masculinity and alcohol use among college men, more focus on masculine norms that are specific to alcohol use is needed.

Keywords: masculine drinking norms, masculine norms, alcohol use, alcohol consequences

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National data suggest certain segments of the young adult population (those ages 18–25) are at risk for alcohol misuse (National Institute on Alcohol Abuse and Alcoholism [NIAAA], 2024). Over a quarter of young adult men or college students in general who use alcohol engaged in binge drinking in the past month (NIAAA, 2024). Problematic alcohol use among college students continues to be a public health concern (NIAAA, 2024). One well-established sociocultural risk factor for increased alcohol use and negative drinking consequences among college men is adherence to masculine norms (e.g., Iwamoto et al., 2011; Zamboanga et al., 2023). However, general masculine norms are broadly defined, making their specific connection to drinking behaviors unclear. Importantly, masculinity may be expressed behaviorally based on the context (Addis et al., 2010). Therefore, the purpose of this study is to examine alcohol-specific masculine norms and their link to drinking behaviors in a large, multisite sample of college men.

According to gender schema theory, gender-specific attitudes, norms, and behaviors are socially learned (Addis et al., 2010; Bem, 1981; Perrotte & Zamboanga, 2021). Some men are socialized to believe that heavy alcohol use personifies masculine behavior (Lemle & Mishkind, 1989; Peralta, 2007). As such, men who conform to masculine norms and ideals may express their masculinity by drinking heavily, which can increase their risk for negative drinking outcomes. Indeed, meta-analytic studies have shown a small but positive association between total scores on the Conformity to Masculine Norms Inventory (CMNI; Mahalik et al., 2003), a general measure of masculine norms, and substance use (includes alcohol use, $r = .09$, Wong et al., 2017; alcohol use, $r = .17$, Zamboanga, Newins, et al., 2024). The CMNI consists of eight subscales: Playboy, Self-Reliance, Violence, Heterosexual Presentation, Winning, Risk-Taking, Emotional Control, and Power Over Women. Several of these subscales have been linked to drinking behaviors among college-attending and noncollege-attending men (e.g., Gerdes & Levant, 2018; Iwamoto et al., 2011; Zamboanga et al., 2015; Zamboanga et al., 2017). Since the CMNI measures broad masculine norms, these norms are conceptually more distal to drinking behaviors than alcohol-specific masculine norms, which may help explain the small correlation between the CMNI and alcohol/substance use.

To improve the specificity of masculine norms, particularly in relation to alcohol use, researchers developed the Masculine Drinking Norms Measure (MDNM; Perrotte et al., 2020; Zamboanga et al., 2023). The MDNM was adapted from a measure initially developed for Mexican American men (Traditional Machismo/Caballerismo Scale; Arciniega et al., 2008) and consists of two distinct norms: *excess* (e.g., "A real man can drink a lot") and *control* (e.g., "It would be shameful for a man to lose his cool in social drinking situations"). Research with first year Hispanic college men found evidence for a two-factor model of excess and control (Perrotte et al., 2020). Findings also indicated that while adjusting for the Traditional Machismo/Caballerismo Scale subscales, excess was positively associated with alcohol use and negative drinking consequences while control was inversely related to negative drinking consequences

(Perrotte et al., 2020). Moreover, using a large national sample of male NCAA varsity student-athletes who were participants in a randomized controlled trial of *myPlaybook*, an athlete-specific alcohol/substance use intervention program (Wyrick et al., 2014), Zamboanga et al. (2023) found support for the MDNM's two-factor model structure. This study also found that while accounting for age, fraternity affiliation, race/ethnicity, sports type, and multiple subscales on the CMNI-29, excess was related positively with alcohol use and negative drinking consequences while control was inversely associated with alcohol use but not negative drinking consequences.

Study Aims

While prior research provides support for the two-factor structure model of the MDNM and evidence for the unique associations between alcohol-specific masculine norms and drinking outcomes over and above general masculine norms among Hispanic college men in their first year in college and male NCAA varsity student-athletes, it is unclear if such findings extend to college men in general. This is an important research question given that student-athletes report more alcohol use and negative drinking consequences than nonstudent-athletes (Martens et al., 2006; Mastroleo et al., 2019; Zhou & Heim, 2014). Moreover, the adjustment process that is typically associated with the transition to college can increase first year students' vulnerability to heavy drinking (Merrill & Carey, 2016; NIAAA, 2024). Taken together, NCAA varsity athletes' (Zamboanga et al., 2023) or Hispanic first year college students' (Perrotte et al., 2020) risk for heavy alcohol use may differ from the broader population of college men. Thus, we sought to replicate and extend prior work on the MDNM using a large, multisite sample of college men. Our study aims were to investigate the factor structure and item loadings of the MDNM and examine the extent to which excess and control are associated with alcohol use and negative drinking consequences over and above known demographic correlates of alcohol use including age, membership in a Greek fraternity, athletic involvement (e.g., Meilman et al., 1999; Merrill & Carey, 2016; Zhou & Heim, 2014), and general masculine norms (CMNI-29). Based on the prior research (Perrotte et al., 2020; Zamboanga et al., 2023), we expected to find a two-factor solution (i.e., excess and control) of the MDNM in this multisite sample of college men. We also expected excess to be positively associated with alcohol use and negative drinking consequences and control to be negatively related to both drinking outcomes.

Method

Participants and Procedure

The Acculturation and Substance Use Research Team (e.g., Zamboanga, Merrill, et al., 2024) collected data for the current multisite self-report survey study with undergraduates ($N = 10,320$) from 12 large public U.S. universities (Southwest = 6, Midwest = 2,

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Southeast = 2, Atlantic Coast = 1, Northeast = 1) via research participant pools in psychology departments, psychology-related classes, and email notifications across three semesters (spring and fall in 2018; spring in 2019). Students could receive research credits, extra credit for class, or be entered to win a prize for study participation. Each site investigator received institutional review board approval to collect data at their respective sites. In light of our study aims and given that the MDNM consists of face-valid items that center around masculine norms of excessive or controlled alcohol use, we restricted our college sample to 1,350 young adults (ages 18–25) who self-identified as men[1] and reported current alcohol use (i.e., a score of 2 or more on the alcohol frequency item on the Alcohol Use Disorders Identification Test–Consumption (AUDIT-C; Barry et al., 2015).

Measures

Participants indicated their age, race/ethnicity[2] (White = 62.3%, Hispanic = 20.2%, Black/African American = 8.1%, Asian/Asian American = 5.9%, multiracial/other = 1.9%, Black Haitian/ Caribbean Islander = 1.1%, Native American/Indigenous = 0.4%), membership status in a Greek fraternity (0 = *nonfraternity member/* 1 = *fraternity member*), and athletic involvement (0 = *not involved in athletics/*1 = *involved in athletics*: elite = 2.8%, varsity = 11.3%, recreational-club sports, intramural = 25.2%, recreational-informal competitions = 13%; Table 1). We assessed masculine drinking norms with the MDNM[3] (six-items; Perrotte et al., 2020; Zamboanga et al., 2023) using a 4-point scale (1 = *strongly disagree* to 4 = *strongly agree*). We also measured conformity to traditional masculine norms with the CMNI-29 (Hsu & Iwamoto, 2014), which included seven of the eight subscales.[4] Participants indicated how much they agreed with each item using a 4-point scale (0 = *strongly disagree* to 3 = *strongly agree*). Finally, to measure alcohol frequency/consumption and negative drinking consequences, participants completed the AUDIT-C (three-items; Barry et al., 2015) and the Brief Young Adult Alcohol Consequences Questionnaire (B-YAACQ; 24-items; Kahler et al., 2005), respectively. On the B-YAACQ, participants indicated if they experienced (0 = *no/*1 = *yes*) each drinking consequence (e.g., "I have passed out from drinking") in the past 30 days. For analysis, we computed mean scores for the MDNM, CMNI-29, AUDIT-C, while total scores were computed for the B-YAACQ.

Analytic Approach

We conducted a confirmatory factor analysis for the MDNM using MPlus Version 8.10 (Muthén & Muthén, 1998–2017) using maximum likelihood estimation. To determine good model fit, the following fit statistics and respective criteria were used: Bentler's comparative fit index and the Tucker–Lewis index > .95 (Hu & Bentler, 1999), root-mean-square error of approximation (RMSEA) < .08 (Brown, 2006; Newsom, 2005), and standardized root-mean-square residual < .08 (Hu & Bentler, 1999; Newsom, 2005). The chi-square goodness of fit test is also reported but is given less weight than other fit statistics due to its sensitivity to large sample sizes (Stevens, 2009). Correlations between subscale scores on the MDNM, AUDIT-C, and the B-YAACQ were calculated using SPSS Version 27. A linear regression was estimated to predict alcohol use, and a negative binomial regression was estimated to predict negative

drinking consequences. Covariates included in the models were age, fraternity status, athletic involvement, and seven CMNI-29 subscales: Playboy, Self-Reliance, Violence, Heterosexual Presentation, Winning, Risk-Taking, Emotional Control, and Power Over Women. Alcohol use was included as a covariate in the regression model predicting negative drinking consequences.

Results

Descriptive statistics and bivariate correlations among the study variables are presented in Table 1. Confirmatory factor analysis results indicated excellent model fit, $\chi^2(8) = 28.088$, $p \leq .001$; comparative fit index = .99; Tucker–Lewis index = .98; RMSEA = .04; 90% CI of RMSEA = .03–.06; standardized root-mean-square residual = .03. All items loaded highly on their assigned factor (Table 2). Although Cronbach's α is sensitive to the number of scale items, and despite having only three items on each MDNM subscale, the internal consistency values were acceptable for excess (α = .77) and control (α = .68; Vaske et al., 2017). The regression models predicting alcohol use, $R^2 = .196$, $F(12, 1301) = 26.350$, $p < .001$, and negative drinking consequences, $\chi^2(13) = 301.091$, $p < .001$, were significant. Results indicated that after adjusting for the covariates, excess was associated positively with alcohol use and negative drinking consequences, while control was not significantly related to either outcome variable (Table 3). In addition, compared to the covariates in the regression model, the masculine drinking norm of excess was the second strongest predictor of alcohol use (after fraternity status).

Discussion

Using a large multisite sample of college men who reported current alcohol use, we investigated the factor structure of the MDNM and examined the extent to which the masculine drinking norms of excess and control were associated with alcohol use and negative consequences over and above general masculine norms and known demographic correlates of alcohol use. As hypothesized, we found evidence for a two-factor solution for the MDNM which fit

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[1] Includes seven transgender men.

[2] We examined differences in endorsement of both masculine drinking norms between White and non-White students (*excess*: White = 2.07 vs. non-White = 1.99; *control*: White = 3.23 vs. non-White = 3.17) and found no statistically significant differences between these groups, *excess:* $t(1315) = 1.68$, $p = .093$, Cohen's $d = .096$; *control*: $t(902.65) = 1.34$, $p = .155$, Cohen's $d = .081$.

[3] We examined differences in endorsement of both masculine drinking norms between heterosexual and nonheterosexual college men (*excess*: heterosexual = 2.07 vs. nonheterosexual = 1.70; *control*: heterosexual = 3.22 vs. nonheterosexual = 3.03) and found statistically significant differences between these groups, *excess:* $t(123.61) = 5.35$, $p < .001$, Cohen's $d = .479$; *control:* $t(110.69) = 2.22$, $p = .028$, Cohen's $d = .269$. Thus, it will be important for future research to further examine the extent to which these group differences are associated with risky drinking behaviors.

[4] The heterosexual presentation (e.g., "I try to avoid being perceived as gay") subscale on the CMNI-29 contains the most items and due to space limitations in the questionnaire, we were not able to include this subscale in the survey. Other subscales on the CMNI-29 include: playboy (e.g., "I would feel good if I had many sexual partners"), self-reliance (e.g., "I hate asking for help"), winning (e.g., "I don't mind losing" reverse scored), risk-taking (e.g., "I take risks"), emotional control (e.g., "I tend to share my feelings" reverse scored), violence ("Violence is almost never justified" reverse-scored), and power over women (e.g., "Women should be subservient to men").

Table 1
Bivariate Correlations and Descriptive Statistics

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	M/(SD)/%	Range	α
Alcohol outcomes																	
1. Alcohol use[a]	—														5.84 (2.09)	2–12	.68
2. Negative drinking consequences[b]	.43*	—													5.21 (5.01)	0–24	.89
Demographics																	
3. Age	-.11*	.01	—												20.10 (1.80)	18–25	
4. Fraternity status[c]	.27*	.16*	-.11*	—											27.9%		
5. Athletic involvement[d]	.14*	.06*	-.21*	.07*	—										52.3%		
General masculine norms																	
6. Playboy[e]	.16*	.21*	.02	-.03	.06*	—									0.91 (0.76)	0–3	.84
7. Self-reliance[e]	.09*	.15*	.01	.01	-.03	.19*	—								1.40 (0.71)	0–3	.82
8. Violence[e]	.09*	-.02	-.06*	.04	.09*	-.06*	-.10*	—							1.71 (0.69)	0–3	.82
9. Winning[e]	.16*	.02	-.10*	.10*	.23*	-.09*	-.03	.38*	—						1.75 (0.68)	0–3	.83
10. Risk-taking[e]	.18*	.25*	-.04	.03	.03	.25*	.13*	-.03	-.04	—					1.60 (0.61)	0–3	.79
11. Emotional control[e]	.06*	-.05	-.05	.05	.05	-.03	.15*	.25*	.27*	-.14*	—				1.62 (0.76)	0–3	.87
12. Power over women[e]	.15*	.21*	-.04*	.06*	.15*	.37*	.13*	.03	-.05	.20*	-.05	—			0.81 (0.65)	0–3	.83
Masculine drinking norms																	
13. Excess[f]	**.29***	**.25***	-.14*	.06*	.11*	.25*	.21*	.11*	.11*	.18*	.07*	.35*	—		2.03 (0.78)	1–4	.77
14. Control[f]	-.01	-.03	.02	.01	-.01	-.09*	.06*	.004	.04	.05	.003	-.07*	.14*	—	3.20 (0.72)	1–4	.68

Note. *n*'s range from 1,283 to 1,350. Bivariate correlations. Significant correlations among the primary variables of interest (masculine drinking norms) are highlighted in bold. α = Cronbach's alpha.
[a] Alcohol Use Disorders Identification Test–Consumption. [b] Brief Young Adult Alcohol Consequences Questionnaire. [c] Fraternity status (0 = *nonfraternity member*/1 = *fraternity member*). [d] Athletic involvement (0 = *not involved in athletics*/1 = *involved in athletics*). [e] Conformity to Masculine Norms Inventory. [f] Masculine Drinking Norms Measure.
* *p* < .05.

Table 2

Confirmatory Factor Analytic Loadings for the Masculine Drinking Norms Measure (n = 1,324)

Item	Estimate	SE	Estimate/SE	StdY
Factor 1: Excess				
1. A real man can drink a lot.	1.00			.83
2. Men should respect those who can drink a lot.	0.84	.04	19.74	.68
3. It is important not to be the "lightweight drinker" in a group.	0.86	.04	19.80	.68
Factor 2: Control				
4. A real man knows when he has had enough to drink and is able to stop.	1.00			.65
5. It would be shameful for a man to lose his cool in social drinking situations.	1.11	.08	13.54	.68
6. Men must always display good manners even if he has had a lot to drink.	0.87	.06	14.23	.60

Note. All factor loadings are significant at $p < .001$ besides Items 1 and 4 which were fixed at 1.00 in the model. Twenty-six participants with missing data were deleted listwise from the original sample in this analysis. SE = standard error; StdY = factor loading standardized based on the latent factor.

the data well, and all items loaded on their respective factor. This supports the two-factor structure model for the MDNM among Hispanic college men (Perrotte et al., 2020), male NCAA student-athletes (Zamboanga et al., 2023), and now a general college student sample of men.

Consistent with the prior research (Perrotte et al., 2020; Zamboanga et al., 2023) and as hypothesized, we also found excess to be positively associated with alcohol use and negative consequences. Moreover, of the correlates examined in this study, excess had one of the largest regression coefficients for alcohol use (except for fraternity status). As such, clinicians working with college men engaging in problematic drinking behaviors could consider identifying and challenging potential masculine beliefs of excess that positively relate to heavy drinking and related consequences.

Bivariate and multivariate findings indicated that the masculine drinking norm of control was not significantly associated with

alcohol use and negative drinking consequences. These findings differ somewhat from the multivariate findings reported in Perrotte et al.'s (2020) prospective study where they found that control was inversely associated with negative consequences but not alcohol use. Although Zamboanga et al.'s (2023) multivariate findings with a large NCAA sample of male student-athletes indicated that control was negatively correlated with alcohol use and negative drinking consequences, they also found that the bivariate correlations between control and these outcome variables were small ($r = -.05$). Based on the latter and present findings, the correlation (and strength of the association) between control and drinking behaviors is unclear and therefore warrants further examination. Nevertheless, when it comes to alcohol use and negative drinking consequences, these findings suggest that prioritizing the masculine drinking norm of excess over control in interventions could produce more meaningful change among college men more broadly.

Table 3

Masculine Drinking Norms as Predictors of Alcohol Use and Negative Drinking Consequences

		Alcohol use[a]					Negative drinking consequences[b]				
					95% CI					95% CI	
Variable	β	B	SE	p	LL	UL	B	SE	p	LL	UL
Masculine drinking norms											
Excess[c]	**.216**	0.581	.076	**<.001**	0.431	0.731	**0.100**	.040	**.012**	0.022	0.177
Control[c]	−.041	−0.119	.074	.109	−0.265	0.026	−0.073	.040	.065	−0.150	0.004
Covariates											
Age	−.044	−0.051	.030	.089	−0.109	0.008	0.036	.016	.020	0.006	0.067
Fraternity status[d]	.241	1.121	.117	<.001	0.891	1.351	0.113	.062	.066	−0.008	0.234
Athletic involvement[e]	.053	0.222	.111	.045	0.005	0.439	0.003	.057	.952	−0.109	0.116
Playboy[f]	.081	0.225	.077	.004	0.073	0.376	0.073	.040	.065	−0.004	0.151
Self-reliance[f]	.013	0.038	.079	.627	−0.116	0.192	0.100	.040	.012	0.022	0.179
Violence[f]	.018	0.053	.084	.527	−0.112	0.218	−0.049	.043	.252	−0.132	0.035
Winning[f]	.095	0.293	.088	<.001	0.121	0.465	0.043	.045	.346	−0.046	0.132
Risk-taking[f]	.116	0.397	.090	<.001	0.220	0.574	0.210	.046	<.001	0.119	0.301
Emotional control[f]	.021	0.057	.075	.444	−0.090	0.204	−0.077	.038	.043	−0.153	−0.002
Power over women[f]	−.001	−0.004	.092	.962	−0.185	0.176	0.050	.046	.281	−0.041	0.141
Alcohol use[a]							0.180	.015	<.001	0.151	0.210

Note. We estimated a linear regression model for alcohol use and a negative binomial regression model for negative drinking consequences. Significant effects among the primary variables of interest (masculine drinking norms) are highlighted in bold. β = standardized estimates; B = unstandardized estimates; SE = standardized error; CI = confidence interval; LL = lower limit; UL = lower limit.
[a] Alcohol Use Disorders Identification Test–Consumption. [b] Brief Young Adult Alcohol Consequences Questionnaire. [c] Masculine Drinking Norms Measure. [d] Fraternity status (0 = *nonfraternity member*/1 = *fraternity member*). [e] Athletic involvement (0 = *not involved in athletics*/1 = *involved in athletics*). [f] Conformity to Masculine Norms Inventory–29.

Among the covariates and consistent with the prior work (NIAAA, 2024; Zhou & Heim, 2014), membership in a fraternity or athletic involvement was associated positively with alcohol use. Three of the seven general masculine norms were significantly and positively associated with alcohol use, and three were significantly positively related (except emotional control) to negative drinking consequences. While these findings were not the primary focus of our study, they are consistent with prior research with general college student populations (e.g., Gerdes & Levant, 2018; Iwamoto et al., 2011, 2014) and highlight the importance of general masculine gender role norms in explaining alcohol use and related consequences, particularly risk-taking given its link to both outcomes.

The present study consists of a large sample of college men from 12 different universities; however, there are several limitations. First, we restricted our sample to male college drinkers (age = 18–25), most of whom were White (∼62%). Thus, to further our understanding of masculine norms and alcohol use/nonuse, researchers could conduct latent profile analysis to empirically derive subgroups of college men based on the extent to which they conform to traditional masculine norms and endorse alcohol-specific masculine norms, and then examine differences in alcohol use/nonuse patterns between these groups. Future research could also examine the extent to which the association between masculine drinking norms and drinking behaviors might differ among older students, diverse racial/ethnic groups, and sexual minority individuals (see Footnote 3) given research showing group differences in alcohol use prevalence in these populations (e.g., Delker et al., 2016; Lui & Zamboanga, 2019; Talley et al., 2016). Second, we did not include one of the CMNI-29 subscales (heterosexual presentation) in our study. Also, given the self-report method of our data collection, it is possible that students may have misreported their drinking behaviors. Third, we acknowledge the marginal Cronbach's α estimate (.68) for the control subscale of the MDNM. Finally, inferences of causal associations between the study variables cannot be made due to the cross-sectional study design. Despite these limitations, our findings provide further evidence for the two-factor structure solution of the MDNM, and the utility of masculine drinking norms of excess in predicting alcohol use and negative consequences over and above general masculine norms and demographics. We hope that the present study will inspire and inform future psychometric work on alcohol-specific drinking norms and research designed to elucidate their proximity to drinking behaviors among men.

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