



Full length article

Prevalence of binge drinking and relationships between masculine role discrepancy and binge drinking via discrepancy stress among Chinese men

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ABSTRACT

Background: Binge drinking is prevalent among male populations. Few studies have investigated masculine role discrepancy (i.e., the perception of being less masculine than the typical ‘man’)/discrepancy stress (i.e., the strain caused by perceived masculine role discrepancy) and binge drinking among men. This study aims to investigate the prevalence of binge drinking among Chinese men and the associations between masculine role discrepancy and binge drinking via discrepancy stress.

Methods: A random and population-based telephone survey was conducted among Chinese male adults (n = 2000) in Hong Kong. Their levels of masculine role discrepancy and discrepancy stress and presence of binge drinking were tested.

Results: We found that 12.3% of the participants had binge drinking behaviors during the last three months prior to the survey. Age and marital status were significantly associated with binge drinking behaviors. Discrepancy stress was positively associated with binge drinking, and it positively mediated the relationship between masculine role discrepancy and binge drinking. However, we found a negative direct association between masculine role discrepancy and binge drinking in the mediation model.

Conclusion: The study may shed light on a relatively new and important research direction that links up gender roles and substance use problems. It contributes to an understanding of the potential health impact of gender-role related issues as well as determinants of drinking problems.

1. Introduction

Globally, drinking problems including binge drinking, alcohol abuse, alcohol dependence, and alcoholism present a major public health threat, as drinking causes 1.8 million deaths annually (3.2% of all deaths). Binge drinking is defined as the consumption of at least five alcoholic beverages or standard drinks for men and four for women in a single episode within a time period (Naimi et al., 2003). It is associated with harms such as alcohol poisoning, substance use disorder, unintentional injuries, suicides, hypertension, pancreatitis, sexually transmitted diseases, meningitis, and alcohol-related deaths (Courtney and Polich, 2009; Han et al., 2018; Naimi et al., 2003). It also underlies social problems such as interpersonal violence, drunk driving, and loss in economic productivity (Alcoholism, 2000).

In most countries (e.g., the U.S., Canada, and China), men outnumber women in the prevalence of drinking problems (Capraro, 2000; Li et al., 2011), and the sex differential in drinking problems partially

explains those of morbidity, injury, and mortality (Capraro, 2000; Kann et al., 2013). Previous population-based studies have reported higher prevalence in binge drinking among male than female adults: 22.2% versus 7.2% in the U.S. (Naimi et al., 2003), 38% versus 12% in the U.K. (Prescott-Clarke and Primates, 1998), 44% versus 6% in Russia (Kauhanen et al., 1997), 57.3% versus 26.6% (16–69 years old) in mainland China (Li et al., 2011), and 14.4% versus 3.6% in Hong Kong (Kim et al., 2008). Investigation into gender-specific factors associated with binge drinking among males is warranted. To our knowledge, no study has investigated the association between masculine role discrepancy/discrepancy stress and binge drinking, although two studies conducted in the U.S. tested their relationships with drinking-related problems among men (Reidy et al., 2016a, 2017). To fill out the gap, this study investigated the relationships between masculine role discrepancy, discrepancy stress, and binge drinking among men.

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1.1. Masculine role discrepancy and discrepancy stress

Masculine role discrepancy arises when males perceive themselves as not living up to the ideal manhood and being less masculine than the typical ‘man’ (Reidy et al., 2014, 2016a). Under such circumstances, such men may believe that other people would also perceive them as not being ‘masculine’ (Reidy et al., 2016a). According to Pleck’s gender role strain paradigm (Pleck, 1995), strain and tension would result from perceived deviations from gender roles that are defined by prevailing social norms. The resulting stress is known as discrepancy stress (Reidy et al., 2014, 2016a, 2016b). Previous studies found a strong correlation between masculine role discrepancy and discrepancy stress (Reidy et al., 2014, 2017). The authors, however, speculated that masculine role discrepancy does not always result in discrepancy stress (Reidy et al., 2016a,b). We expected a positive association between masculine role discrepancy and discrepancy stress, consistent with previous empirical studies.

1.2. Discrepancy stress and binge drinking

Previous studies demonstrated that a variety of strains were associated with men’s risk behaviors, such as drug abuse, smoking, alcohol consumption, and sexual risk behaviours (Siegrist and Rodell, 2006; Sinha, 2001). Consistently, discrepancy stress was found to be positively associated with substance use disorders, injury, violence, and sexual risk behaviors (Reidy et al., 2014, 2017; Sinha, 2001). Little research has tested the relationship between discrepancy stress and binge drinking directly, although one study tested binge drinking as a part of the latent variables of substance use (Reidy et al., 2017). We hypothesized a positive association between discrepancy stress and binge drinking. This contention is supported by several theories. First, the stress coping model suggests that alcohol may be consumed as a negative coping response to stress, especially among men (Biener, 1987). Second, the affect regulation model postulates that drinking has been used as a self-medication to lessen the unpleasantness of distress (Grzywacz and Almeida, 2008). Third, binge drinking is potentially a stereotypic expression of masculinity (Peralta, 2007). Thus, to conform socially accepted gender roles, men who experience gender role-related stress, such as discrepancy stress, may act out to demonstrate their masculinity through binge drinking (Vandello and Bosson, 2013).

1.3. The association between masculine role discrepancy and binge drinking and the role of discrepancy stress

Our literature review only identified two studies that tested the relationships among masculine role discrepancy, discrepancy stress, and a particular drinking problem among men. The first study (Reidy et al., 2016a) tested the hypothesis that discrepancy stress would moderate the associations between masculine role discrepancy and stereotypically ‘masculine’ risk behaviors (i.e., getting drunk, drug use, driving while intoxicated, fighting, assault, assault with a weapon, and injury). However, the study did not find significant direct or interaction effects on getting drunk. The 600 male participants were recruited via the Amazon’s Mechanical Turk (MTurk) online data collection site and may be subject to selection bias. The second study (Reidy et al., 2017) found that discrepancy stress significantly mediated the association between masculine role discrepancy and maladaptive adjustment (i.e., hopelessness, mood disorder symptoms, substance use disorders, sexual behavior, and violence) after controlling for trauma symptoms among 592 adolescent boys. Masculine role discrepancy was negatively associated with maladaptive adjustment after discrepancy stress and trauma symptoms were controlled for. Substance use disorders were assessed by five indicators related to alcohol and drug use, and one of them was binge drinking. The study, however, did not report the specific effect of masculine role discrepancy/discrepancy stress on binge drinking. Therefore, more studies are warranted to test the relationships between

masculine role discrepancy, discrepancy stress, and binge drinking.

1.4. The present study

We investigated the prevalence of binge drinking in this population-based study conducted in males in Hong Kong. We also investigated the association between masculine role discrepancy/discrepancy stress and binge drinking. We further tested the model that masculine role discrepancy would be positively associated with discrepancy stress; in turn, discrepancy stress would be positively associated with binge drinking. The rationale of the mediation hypothesis was guided by the previously reported positive association between masculine role discrepancy and discrepancy stress (Reidy et al., 2014) and the theoretical and empirical research on the relationships between strains and substance use problems including drinking problems (Reidy et al., 2017; Siegrist and Rodell, 2006; Sinha, 2001).

2. Methods

2.1. Study design and data collection

Inclusion criteria included: 1) Chinese males, 2) age from 18 to 60 years, and 3) Hong Kong residents (holders of Hong Kong identification card). In the survey, a total of 3818 eligible prospective participants were approached and invited to participate in this study; 2000 of them completed the interviews. Anonymous telephone interviews were conducted. Telephone numbers were randomly selected from the up-to-date residential fixed-line phone directory. The interviews were conducted by well-trained and experienced interviewers between 6:00 pm and 10:30 pm to avoid over-sampling of unemployed individuals. Upon contact with a household member, the interviewers explained that the survey was anonymous and related to male behavioral and mental health. The eligible male member of each sampled household whose past birthday was closest to the day of the interview was invited to participate in the study. Participants were fully informed that their telephone number would not be recorded and their responses would be kept confidential. Verbal informed consent was sought before commencement of the survey. At least three attempts were made per night for a 2-week period, before unanswered telephone calls were considered as invalid numbers. The response rate, defined as the number of completed interviews divided by the total number of completed and incomplete interviews plus refusals, was approximately 65%. Ethics approval was obtained from the Survey and Behavioral Research Ethics Committee of the authors’ University.

2.2. Measures

Masculine role discrepancy was assessed by the masculine role discrepancy subscale of the Masculine Discrepancy Stress Scale (Reidy et al., 2014). Participants rated the 5 items on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Sample items include “I am less masculine than the average guy,” and “most women would consider me to be less masculine than the typical guy.” The Chinese version was obtained via translation-back-translation procedure. The Cronbach’s alpha was .82 in the present study.

Masculine role discrepancy stress was measured by the discrepancy stress subscale of the Masculine Discrepancy Stress Scale (Reidy et al., 2014). Participants rated the 5 items on a 7-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree). Sample items include “I worry that women find me less attractive because I’m not as macho as other guys,” and “I worry that people judge me because I’m not like the typical man.” The scale was translated and back-translated to obtain a Chinese version. The Cronbach’s alpha was .65, which was not high but acceptable.

Binge drinking behavior was assessed by a single item asking participants to indicate “In the previous three months, whether you had at

least five alcoholic beverages at a single episode.” A response with “no” was coded as 0 while “yes” was coded as 1. Similar single items have been widely used to identify binge drinking behavior in previous studies, including those conducted in a number of Chinese populations (Kim et al., 2008; Wechsler et al., 2000a,b).

2.3. Analytic plan

Univariate logistic regression analysis was conducted to test the associations between socio-demographic variables and binge drinking. Besides univariate analysis, multiple logistic regression analysis was performed to test the associations between masculine role discrepancy and binge drinking and between discrepancy stress and binge drinking adjusted for significant socio-demographic variables. Univariate odds ratios (ORu) and adjusted odds ratios (ORa) and their 95% confidence intervals (CI) were presented when appropriate. The association between masculine role discrepancy and discrepancy stress was tested by simple linear regression analysis, and the standardized coefficient (β) was reported. To test the mediation model, the multiple regression analysis included significant socio-demographic variables (control variables), masculine role discrepancy (independent variable), discrepancy stress (potential mediator), and binge drinking (dependent variable). Bootstrapping analysis was performed to identify the mediation effect of discrepancy stress in the relationship between masculine role discrepancy and binge drinking. The 95% confidence interval (CI) of the indirect effect was obtained by generating 5000 bias-corrected bootstrap samples. An indirect effect would be considered significant if the 95% CI did not contain zero. For all analyses, level of statistical significance was set at $p < .05$. These analyses were conducted by SPSS 21.0 and PROCESS.

3. Results

3.1. Descriptive statistics

Table 1 summarizes the background information of participants. About half of the participants (47.6%) were aged 51–60. Most of them (69.5%) were currently married or cohabitating with someone, and 40.3% had college education or above. The prevalence of binge drinking was 12.3% (95% CI = 11%–14%).

3.2. Factors associated with binge drinking

In the univariate analysis, age (ORu = .49; 95% CI = .35–.67; 51–60 versus 18–35 groups) and marital status (ORu = .63; 95%

Table 1
Descriptive statistics of participants' characteristics.

| | Frequency (N = 2000) | Percentage (%) |
|---------------------------------------|-------------------------|----------------|
| Age | | |
| 18–35 | 502 | 25.1 |
| 36–50 | 540 | 27.0 |
| 51–60 | 952 | 47.6 |
| Missing | 6 | 0.3 |
| Education level | | |
| Below college | 1195 | 59.7 |
| College or above | 805 | 40.3 |
| Marital status | | |
| Single | 576 | 28.8 |
| Married or cohabitating | 1389 | 69.5 |
| Divorced/separated/widowed/ others | 35 | 1.8 |
| Binge drinking | | |
| No | 1754 | 87.7 |
| Yes | 246 | 12.3 |

Table 2
Associations between socio-demographic variables and binge drinking.

| | Row % | ORu (95% CI) |
|-----------------------------------|-------|------------------|
| Age | | |
| 18–35 | 17.1 | 1.00 |
| 36–50 | 13.3 | .74 (.53, 1.05) |
| 51–60 | 9.1 | .49 (.35, .67) |
| Education level | | |
| Below college | 11.4 | 1.00 |
| College or above | 13.7 | 1.23 (.94, 1.61) |
| Marital status | | |
| Single | 16.0 | 1.00 |
| Married or cohabitating | 10.7 | .63 (.48, .84) |
| Divorced/separated/widowed/others | 14.3 | .88 (.33, 2.32) |

Note. ORu = Univariate odds ratio; 95% CI = 95% confidence interval.

CI = .48–.84; married/cohabitating men versus single men) were significantly associated with binge drinking (Table 2). Discrepancy stress was significantly associated with binge drinking both with and without adjustments for these two variables (ORu = 1.03, 95% CI = 1.00–1.05; ORa = 1.19, 95% CI = 1.01–1.41). Masculine role discrepancy was not, however, significantly associated with binge drinking in the univariate (unadjusted) or the adjusted logistic regression analysis (ORu = .99, 95% CI = .97–1.02; ORa = .94, 95% CI = .80–1.10). These results are not tabulated, as all the coefficients have been hereby written out.

3.3. The associations between masculine role discrepancy and discrepancy stress

A significant positive association was found between these two gender-related variables ($\beta = .58$, 95% CI = .48–.55). The results are not tabulated.

3.4. Mediation analysis

The mediation analysis showed that the indirect effect of masculine role discrepancy on binge drinking through discrepancy stress was significant ($B = .09$, 95% CI = .01–.17). As expected, masculine role discrepancy was positively and significantly associated with discrepancy stress ($B = .52$, 95% CI = .48–.55), while discrepancy stress was positively and significantly associated with binge drinking ($B = .17$, 95% CI = .01–.34). However, it was not expected that the direct effect between masculine role discrepancy and binge drinking would be statistically significant but negative ($B = -0.17$, 95% CI = $-.33$ to $-.02$; Table 3).

4. Discussion

Both traditional Chinese cultures and Western cultures in Hong Kong may affect men's binge drinking behaviors. Traditional Chinese cultural norms generally encourage social drinking and discourage solitary drinking among men; it is not customary for Chinese people to drink in solitude or on a daily basis (Yang, 2002). Westernization may also increase drinking behaviors and alcohol consumption among Chinese people (Cochrane et al., 2003). Thus, it is important to investigate prevalence and associated factors of binge drinking among Chinese men in Hong Kong. The current study has the strength of being an anonymous, random, and population-based telephone survey conducted in a relatively large sample of Chinese men in Hong Kong. The novel findings shed some insights on the relationships among masculine role discrepancy, discrepancy stress, and binge drinking among males.

The prevalence of binge drinking (12.3%) in this sample was noticeable and was comparable to that (14.4%) reported by Kim et al. (2008), which used the same question item to assess binge drinking in Hong Kong. It was, however, somewhat lower than that (18.5%)

Table 3
Direct and indirect effects of masculine role discrepancy and discrepancy stress on binge drinking in the mediation model.

| | Direct effect OR (95% CI) | Direct effect B (95% CI) | Indirect effect B (95% CI) |
|-------------------------------------|------------------------------|-----------------------------|----------------------------|
| Role discrepancy→Discrepancy stress | | .52 (.48, .55) | |
| Discrepancy stress→Binge drinking | 1.19 (1.00, 1.40) | .17 (.01, .34) | |
| Role discrepancy→Binge drinking | .84 (.72, .98) | -.17 (-.33, -.02) | .09 (.01, .17) |

Note. OR = Odds ratios, obtained from hierarchical logistic regression models adjusted for all significant background variables (age and marital status); 95% CI = 95% confidence interval.

reported in another local survey (Hong Kong Department of Health and Department of Community Medicine and University of Hong Kong, 2005). Differences may be partially explained by differences in methodologies and/or potential temporal changes. The Chinese culture considers drinking an expression of social bonding and indispensable during celebrations. A large proportion of the general public may not see binge drinking as a health or social problem (Lin, 1983). Since binge drinking is quite prevalent and increases health problems and other risk behaviors (Primack et al., 2010), future studies should look at the general public's attitudes toward binge drinking to inform intervention designs to reduce binge drinking. Special attention should be paid to younger and single men, as they were more likely than others to have binge drinking; the observation was consistent with previous research (Kim et al., 2008).

Corroborating Reidy's (Reidy et al., 2014, 2017) finding, we found that masculine role discrepancy was significantly and positively associated with discrepancy stress with a large effect size. One researcher suggested without strong empirical proof that there exists some moderators for the relationship between gender role discrepancy and discrepancy stress, and hence discrepancy stress might not always occur among all those who experience gender role discrepancy (Reidy et al., 2016a). It is beyond the scope of this study to test such a moderation hypothesis, but it serves as a reminder that negative consequences of masculine role discrepancy may depend on other characteristics and that caution should be used when considering whether masculine role discrepancy is a risk factor of discrepancy stress.

Moreover, we found that discrepancy stress was significantly and positively associated with binge drinking among men, as shown by the results of univariate and adjusted logistic regression as well as the mediation analyses. The results seem to support the argument that discrepancy stress may be a potential risk factor of men's risk-taking behaviors (Reidy et al., 2014; Reidy et al., 2016a; Reidy et al., 2016b, 2017); our findings have hence added binge drinking to the list of risk behaviors that may be associated with discrepancy stress. It is possible that reduction of discrepancy stress may reduce binge drinking among men with discrepancy stress. However, since there are only a couple of studies that investigated such a relationship, and its effect size was relatively small in our sample, future research is required to validate the effect of discrepancy stress and decide whether interventions are required and effective. Future studies may also explore whether there are important mediators or moderators (e.g., negative coping styles and considering binge drinking as an expression of masculinity) between discrepancy stress and binge drinking. Some other potential factors of binge drinking (e.g., general/life stress) should also be controlled in future work. If a solid causal relationship between discrepancy stress and binge drinking is established, interventions can be conducted through early gender role socialization, training on stress coping/management skills, and relaxation strategies. Some gender-sensitive cognitive-behavioral therapies have been demonstrated to be efficacious to address stress related to gender role nonconformity (Primack et al., 2010).

The study further contributes to the understanding of the relationship between masculine role discrepancy and binge drinking. The observed significant positive indirect effect of discrepancy stress supports our hypothesis. This finding may help to explicate how masculine role

discrepancy may induce risk behaviors such as binge drinking. This is consistent with a previous finding that discrepancy stress mediated the relationship between masculine role discrepancy and maladaptive adjustment (e.g., substance use disorders) among adolescent boys (Reidy et al., 2016a). Such mediation effects support the importance of reducing discrepancy stress among men.

However, we found a negative direct effect of masculine role discrepancy on binge drinking in the mediation model, which is consistent with one previous study (Reidy et al., 2017). Previous studies found that masculinity and conformity to masculinity were positively associated with binge drinking (Peralta, 2007; Young et al., 2005). It is possible that masculine role discrepancy might be negatively associated with these variables; i.e., those with high masculine role discrepancy may be less masculine and conform less to masculine roles. Future research should investigate whether masculinity and conformity to masculine roles (and other unmeasured variables) would explain the negative direct effect observed in the mediation model. Male sub-populations, such as gay men, may vary from the general population in their perception on masculine roles, prevalence of binge drinking, and the relationship between the two variables, and this is a possible direction for future research.

Masculinity and conformity and other potential unmeasured mediators of the association between masculine role discrepancy and binge drinking may be culturally dependent and affect the level of the aforementioned negative direct effect. Future cross-cultural research should be extended to test similar models for other risk behaviors that may have strong (e.g., smoking) and weak associations (e.g., physical inactivity) with masculinity and gender role conformity. Acceptability of masculine role discrepancy is also culturally dependent and is a potential moderator of the association between masculine role discrepancy and risk behaviors such as binge drinking. Thus, multi-country comparisons are greatly warranted.

As mentioned, no study has reported the total effect of masculine role discrepancy on binge drinking. We found a non-significant total effect according to the results of our univariate and adjusted logistic regression analyses. The non-significant association could be understood in terms of the presence of negative direct effect and the positive indirect effect, which have different directions. In literature of mediation analysis, the phenomenon of having opposite directions for direct versus indirect effect is known as an inconsistent mediation or a suppression effect (Davis, 1985; MacKinnon and Fairchild, 2009). Under such circumstances, the combination of the negative direct effect and the positive indirect effect would cancel out and result in a small or non-significant total effect between independent variable and dependent variable (MacKinnon and Fairchild, 2009). Previous studies have presented similar examples of inconsistent mediation that showed negative direct effect but positive indirect effect and non-significant total effect, and, conversely, positive direct effect but negative indirect effect and non-significant total effect (Wijhuizen et al., 2007).

The present study has some limitations. The cross-sectional design of the study did not allow for causal conclusions, and future longitudinal studies are warranted. Second, self-report measures may be subject to social desirability and/or recall biases; binge drinking behaviors may have been under-reported. In this study, binge drinking is defined as '5/4 drinks at least once in the past three months.' Some

previous studies used similar definitions (Wechsler et al., 1995, 2000a,b), but other studies used a more stringent and seemingly more standard one ('at least once monthly for the past year') (National Institute on Alcohol Abuse and Alcoholism, 2008) that would result in lower prevalence of binge drinking. Caution should be used when comparing prevalence across studies. Also, we only focused on binge drinking, and conclusions could not be generalized to other types of drinking problems. We only tested a single mediator; other potential gender-related mediators should be considered. We only focused on masculine role variables, and the conclusions are likely to differ from those of similar model involving feminine role variables, so future studies are warranted. In addition, the internal reliability of the discrepancy stress scale was relatively low. Future research may use other measures to validate the results. In addition, the response rate was moderate, although it was comparable to those of the previous local and international telephone surveys (Chan et al., 2007; Gellin et al., 2000). Finally, although a high proportion of households have fixed phone lines, the use of such may potentially induce selection bias. For various reasons, the sampled 50–60 age group may have been over-represented compared to the Hong Kong Census data (47.6% versus 30%) (CSD, 2018) and thus introduced selection bias which may have somewhat influenced the prevalence of binge drinking in our study. Readers should interpret the findings cautiously in view of such potential bias.

In summary, this study reported the relationships between gender-related variables and binge drinking in a large Chinese male general population sample. We confirmed that discrepancy stress was positively associated with binge drinking and masculine role discrepancy, and it positively mediated the relationship between masculine role discrepancy and binge drinking. These findings support our hypotheses. Further studies have been suggested and are required to understand whether interventions should be launched. It is interesting that we found a negative direct effect and non-significant total effect of masculine role discrepancy on binge drinking. More studies are warranted to validate these results. The study has shed light on a relatively new, important, and growing research direction that links up gender role discrepancy and risk behaviors. It helps understand potential health impacts of gender-role related issues as well as determinants of drinking problems and other risk behaviors, especially those that are stereotypically related to gender roles (e.g., smoking and drug use). Future studies, including qualitative ones, are warranted.

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Contributors

JTFL designed the original study as principal investigator. XY conceptualized the aims and hypotheses for the study and conducted analyses. XY and JTFL took primary responsibility for drafting the introduction, results, discussion, and tables. ZW assisted with study design and data collection. MCML assisted with data collection. All authors have contributed to and approved the final article.

Conflict of interest

No conflict declared.

References

Biener, L., 1987. Gender differences in the use of substances for coping. In: Barnett, R.C., Biener, L., Baruch, G.K. (Eds.), *Gender and Stress*. Free Press, New York, NY, pp. 330–349.

Capraro, R.L., 2000. Why college men drink: alcohol, adventure, and the paradox of masculinity. *J. Am. Coll. Health* 48, 307–315.

Census and Statistics Department, 2018. Population Estimates. The Government of the Hong Kong Special Administrative Region, Hong Kong.

Chan, S., So, W.K.W., Wong, D.C.N., Tiwari, A., 2007. Improving older adults' knowledge and practice of preventive measures through a telephone health education during the SARS epidemic in Hong Kong: a pilot study. *Int. J. Nurs. Stud.* 44, 1120–1127.

Cochrane, J., Chen, H., Conigrave, K.M., Hao, W., 2003. Alcohol use in China. *Alcohol Alcohol.* 38, 537–542.

Courtney, K.E., Polich, J., 2009. Binge drinking in young adults: data, definitions, and determinants. *Psychol. Bull.* 135, 142–156.

Davis, J., 1985. *The Logic of Causal Order*. SAGE Publications, Thousand Oaks, CA.

Gellin, B.G., Maibach, E.W., Marcuse, E.K., Informat, N.N.I., 2000. Do parents understand immunizations? A national telephone survey. *Pediatrics* 106, 1097–1102.

Grzywacz, J.G., Almeida, D.M., 2008. Stress and binge drinking: a daily process examination of stressor pile-up and socioeconomic status in affect regulation. *Int. J. Stress Manag.* 15, 364–380.

Han, B.H., Moore, A.A., Sherman, S.E., Palamar, J.J., 2018. Prevalence and correlates of binge drinking among older adults with multimorbidity. *Drug Alcohol Depend.* 187, 48–54.

Hong Kong Department of Health and Department of Community Medicine, University of Hong Kong, 2005. Population Health Survey 2003/2004. Hong Kong Department of Health, Hong Kong.

Kann, L., McManus, T., Harris, W.A., Shanklin, S.L., Flint, K.H., 2013. Youth risk behavior surveillance—United States. *Morb. Mortal. Wkly. Rep. Surveill. Summ.* 63, 1–168.

Kauhanen, J., Kaplan, G.A., Goldberg, D.E., Salonen, J.T., 1997. Beer bingeing and mortality: results from the Kuopio ischaemic heart disease risk factor study, a prospective population based study. *Brit. Med. J.* 315, 846–851.

Kim, J.H., Lee, S., Chow, J., Lau, J., Tsang, A., Choi, J., Griffiths, S.M., 2008. Prevalence and the factors associated with binge drinking, alcohol abuse, and alcohol dependence: a population-based study of Chinese adults in Hong Kong. *Alcohol Alcohol.* 43, 360–370.

Li, Y.C., Jiang, Y., Zhang, M., Yin, P., Wu, F., Zhao, W.H., 2011. Drinking behaviour among men and women in China: the 2007 China chronic disease and risk factor surveillance. *Addiction* 106, 1946–1956.

Lin, T.Y., 1983. Psychiatry and Chinese-culture. *West. J. Med.* 139, 862–867.

MacKinnon, D.P., Fairchild, A.J., 2009. Current directions in mediation analysis. *Curr. Dir. Psychol. Sci.* 18, 16–20.

Naimi, T.S., Brewer, R.D., Mokdad, A., Denny, C., Serdula, M.K., Marks, J.S., 2003. Binge drinking among US adults. *JAMA* 289, 70–75.

National Institute on Alcohol Abuse and Alcoholism (NIAAA), 2000. Tenth Special Report to the US Congress on Alcohol and Health. National Institutes of Health, Bethesda, MD.

National Institute on Alcohol Abuse and Alcoholism (NIAAA), 2008. *Helping Patients Who Drink Too Much: A Clinician's Guide*. National Institutes of Health, Bethesda, MD.

Peralta, R.L., 2007. College alcohol use and the embodiment of hegemonic masculinity among European American men. *Sex Roles* 56, 741–756.

Pleck, J., 1995. The gender role strain paradigm: an update. In: Levant, R.F., Pollack, W.S. (Eds.), *A New Psychology of Men*. Basic Books, New York, NY.

Prescott-Clarke, P., Primates, P., 1998. Health Survey for England '96: A Survey Carried Out on Behalf of the Department of Health. The Stationery Office, London.

Primack, J.M., Addis, M.E., Syzdek, M., Miller, I.W., 2010. The men's stress workshop: a gender-sensitive treatment for depressed men. *Cog. Behav. Pract.* 17, 77–87.

Reidy, D.E., Berke, D.S., Gentile, B., Zeichner, A., 2014. Man enough? Masculine discrepancy stress and intimate partner violence. *Pers. Individ. Differences* 68, 160–164.

Reidy, D.E., Berke, D.S., Gentile, B., Zeichner, A., 2016a. Masculine discrepancy stress, substance use, assault and injury in a survey of US men. *Inj. Prev.* 22, 370–374.

Reidy, D.E., Brookmeyer, K.A., Gentile, B., Berke, D.S., Zeichner, A., 2016b. Gender role discrepancy stress, high-risk sexual behavior, and sexually transmitted disease. *Arch. Sex. Behav.* 45, 459–465.

Reidy, D.E., Smith-Darden, J.P., Vivolo-Kantor, A.M., 2017. Masculine discrepancy stress and psychosocial maladjustment: implications for behavioral and mental health of adolescent boys. *Psychol. Men Masculinities* 19, 560–569.

Siegrist, J., Rodell, A., 2006. Work stress and health risk behavior. *Scand. J. Work Environ. Health* 32, 473–481.

Sinha, R., 2001. How does stress increase risk of drug abuse and relapse? *Psychopharmacology* 158, 343–359.

Vandello, J.A., Bosson, J.K., 2013. Hard won and easily lost: a review and synthesis of theory and research on precarious manhood. *Psychol. Men Masculinities* 14, 101–113.

Wechsler, H., Dowdall, G.W., Davenport, A., Rimm, E.B., 1995. A gender-specific measure of binge drinking among college students. *Am. J. Publ. Health* 85, 982–985.

Wechsler, H., Kuo, M., Lee, H., Dowdall, G.W., 2000a. Environmental correlates of underage alcohol use and related problems of college students. *Am. J. Prev. Med.* 19, 24–29.

Wechsler, H., Lee, J.E., Kuo, M.C., Lee, H., 2000b. College binge drinking in the 1990s: a continuing problem—results of the Harvard School of Public Health 1999 college alcohol study. *J. Am. Coll. Health* 48, 199–210.

Wijhuizen, G.J., de Jong, R., Hopman-Rock, M., 2007. Older persons afraid of falling reduce physical activity to prevent outdoor falls. *Prev. Med.* 44, 260–264.

Yang, M.J., 2002. The Chinese drinking problem: a review of the literature and its implication in a cross-cultural study. *Kaohsiung J. Med. Sci.* 18, 543–550.

Young, A.M., Morales, M., McCabe, S.E., Boyd, C.J., D'Arcy, H., 2005. Drinking like a guy: frequent binge drinking among undergraduate women. *Subst. Use Misuse* 40, 241–267.