

Published in final edited form as:

*Soc Sci Med.* 2012 July ; 75(1): 60–68. doi:10.1016/j.socscimed.2012.02.017.

## Macro-level gender equality and alcohol consumption: A multi-level analysis across U.S. States

**Sarah C.M. Roberts\***

ANSIRH, Bixby Center for Global Reproductive Health, University of California, San Francisco, 1330 Broadway Street, Suite 1100, Oakland, CA 94612, United States

### Abstract

Higher levels of women's alcohol consumption have long been attributed to increases in gender equality. However, only limited research examines the relationship between gender equality and alcohol consumption. This study examined associations between five measures of state-level gender equality and five alcohol consumption measures in the United States. Survey data regarding men's and women's alcohol consumption from the 2005 Behavioral Risk Factor Surveillance System were linked to state-level indicators of gender equality. Gender equality indicators included state-level women's socioeconomic status, gender equality in socioeconomic status, reproductive rights, policies relating to violence against women, and women's political participation. Alcohol consumption measures included past 30-day drinker status, drinking frequency, binge drinking, volume, and risky drinking. Other than drinker status, consumption is measured for drinkers only. Multi-level linear and logistic regression models adjusted for individual demographics as well as state-level income inequality, median income, and % Evangelical Protestant/Mormon. All gender equality indicators were positively associated with both women's and men's drinker status in models adjusting only for individual-level covariates; associations were not significant in models adjusting for other state-level characteristics. All other associations between gender equality and alcohol consumption were either negative or non-significant for both women and men in models adjusting for other state-level factors. Findings do not support the hypothesis that higher levels of gender equality are associated with higher levels of alcohol consumption by women or by men. In fact, most significant findings suggest that higher levels of equality are associated with less alcohol consumption overall.

### Keywords

Alcohol consumption; Gender equality; Woman's role; United States

### Introduction

The relationship between gender equality and health, especially women's health, is generally assumed to be positive, with higher levels of gender equality leading to improved health. Recent research mostly supports this assumption and improving gender equality is a current

public health strategy to improve women's health (Chen, Subramanian, Acevedo-Garcia, & Kawachi, 2005; Jun, Subramanian, Gortmaker, & Kawachi, 2004; Kawachi, Kennedy, Gupta, & Prothrow-Stith, 1999; McAlister & Baskett, 2006; Sen, Östlin, & George, 2007, p. 127; Young, 2001). However, in regards to associations between gender equality and health behaviors, such as alcohol consumption, it is generally assumed that higher levels of gender equality are associated with higher levels of consumption, especially among women. In fact, recent public discussions of women's drinking describe increases in women's risky drinking and blame these changes on feminism and increased gender equality (Clark-Flory, 2008; Morris, 2008; Riddoch, 2009). The assumption that higher levels of gender equality lead to increases in alcohol consumption persists despite the lack of research examining the relationship between gender equality – especially at the macro-level – and women's alcohol consumption.

Skepticism is warranted in relation to the claim that increases in women's drinking are attributable to increases in gender equality. First, gender equality is often positively associated with health for women (Chen et al., 2005; Jun et al., 2004; Kawachi et al., 1999; Young, 2001). Second, claims about the negative influence of gender equality on women's alcohol consumption have been made since the early 20th century (Fillmore, 1984). These claims may partly reflect concern about women violating gender norms more than excess problems due to women's drinking (Eriksen, 1999; Fillmore, 1984). Further, findings from studies examining gender equality and alcohol do not consistently support the claim. Individual-level studies of gender equality and alcohol consumption have measured gender equality (or women's status) as social and gender roles and found mixed results (Gmel, Bloomfield, Ahlstrom, Choquet, & Lecomte, 2000; Kuntsche, Knibbe, & Gmel, 2009; Mansdotter, Backhans, & Hallqvist, 2008; Murphy, Connelly, Evens, & Stoep, 2000; Van Gundy, Schieman, Kelley, & Rebellon, 2005).

The three published studies examining the relationship between macro-level gender equality and alcohol consumption are also inconclusive (Bond et al., 2010; Kuntsche, Knibbe, Kuntsche, & Gmel, 2011; Rahav, Wilsnack, Bloomfield, Gmel, & Kuntsche, 2006). Macro-level place-based factors can be measured at any size geographic area, including neighborhood, city, county, state, or country and are used to distinguish contextual from individual-level effects. The three published macro-level studies examine the relationship across countries and are part of the multi-country Gender, Alcohol, and Culture: An International Study (GENACIS) project (Wilsnack & Wilsnack, 2006). In an ecologic study of 23 countries, Rahav et al. (2006) found that higher gender equality was associated with lower alcohol-related consequences among both women and men and not associated with alcohol dependence among women or men. In the second study, a multi-level study of 22 countries, Bond et al. (2010) found that higher gender equality was associated with smaller gender differences in frequency of drinking in public settings such as bars and restaurants, but not private settings such as homes and parties. As drinking in bars is associated with heavier drinking and numerous alcohol-related harms (Clark, 1981, 1991; Graham & Wells, 2001; Nusbaumer, Mauss, & Pearson, 1982; Perrine, Mundt, Searles, & Walter, 1997; Stall, Heurtin-Roberts, McKusick, Hoff, & Lang, 1990; Wells & Graham, 1999; Wells, Graham, Spechley, & Koval, 2005), these findings suggest that higher gender equality could be associated with smaller gender differences in heavier drinking and alcohol-related harms, a

topic in need of further study. However, smaller gender differences are not necessarily a proxy for higher levels of women's drinking (Rahav et al., 2006; Roberts, in press). The third study examines a more complex relationship between macro-level gender equality and women's drinking. In this study, Kuntsche et al., examine the relationship between mothers working for pay and usual quantity of alcohol consumption in 16 countries with varying levels of macro-level gender equality in income. In a cross-level interaction, they found that partnered mothers working for pay in countries with higher levels of gender equality had a lower usual quantity than partnered mothers not working for pay, but that partnered mothers working for pay in countries with lower equality had higher usual quantity than partnered mothers not working for pay (Kuntsche et al., 2011).

The lack of research supporting the assumption that gender equality is positively associated with women's alcohol consumption is not surprising, as conceptualizations suggest that macro-level gender equality could be associated with either higher or lower alcohol consumption. A recent paper drawing on research relating to macro-level gender equality and violence against women to identify lessons for research related to gender equality and alcohol identifies two relevant conceptually-driven hypotheses: amelioration and backlash (Roberts, 2011). In the literature on violence against women, amelioration suggests that increases in gender equality decrease violence against women and backlash suggests that increases in gender equality increase violence against women. In relation to alcohol, amelioration would mean that increased gender equality would be associated with decreased alcohol consumption, especially risky or harmful consumption. If, for example, in places that are more gender equal in economic participation, women are more fulfilled by having multiple roles (Mansdotter et al., 2008) and have more control over their own lives, they may drink less or less often to cope with stress. Amelioration is in line with the larger literature relating higher gender equality to higher levels of women's health. Backlash would mean that increased gender equality would be associated with increased alcohol consumption, especially risky or harmful consumption. If, for example, increased economic participation by women exposes women to workplace cultures that involve regular and heavy alcohol consumption and women have more resources to spend on alcohol, they may increase their drinking. Backlash is in line with the claims made in the popular press about the relationship between gender equality and women's alcohol consumption. Amelioration and backlash could also apply to men's drinking. For example, increased gender equality could also lead men to perform multiple roles. Like women, men's performance of multiple roles could increase satisfaction with their lives and thereby decrease drinking from stress. It could also decrease the time that men have available to drink, as time they would otherwise spend drinking would be spent performing additional roles (amelioration). On the other hand, if gender equality leads women to drink more, women might reduce their "nagging" of men about alcohol use (Eriksen, 1999). This could result in men drinking more (backlash). Further research, including at different levels of aggregation such as states within a single country, can help disentangle this relationship.

This study uses data from the Behavioral Risk Factor Surveillance System (BRFSS) to examine the relationship between state-level gender equality and women's and men's alcohol consumption in the U.S., where both gender equality and alcohol consumption vary across states (Kerr, 2010; Werschkul & Williams, 2004). Specifically, it seeks to determine

whether state-level gender equality is associated with higher or lower levels of alcohol consumption by women and men. It also examines cross-level interactions to assess whether state-level gender equality influences the relationship between individual-level status of women (i.e. college graduation and employment) and alcohol consumption. Based on findings from Kuntsche et al. (2011), the hypothesis is that women with higher individual status drink less in states with higher gender equality than states with lower gender equality and women with lower status drink more in states with higher gender equality than in states with lower gender equality.

## Methods

This study was determined to be exempt by the University of California, Berkeley Committee on the Protection of Human Subjects.

## Data sources

Data on state-level gender equality and state-level control variables come from the Institute for Women's Policy Research (IWPR), the National Women's Law Center and Oregon Health Sciences University Women's Health Report Card (Women's Health Report Card), the U.S. Census, the Pew Forum on Religion and Public Life (Pew Forum on Religion and Public Life, 2008) and Center for Budget & Policy Priorities and Economic Policy Institute (Bernstein, McNichol, & Nicholas, 2008). IWPR compiles data from each U.S. state regarding gender equality and women's status and uses these data to create and publish five indices: Employment and Earnings; Social and Economic Autonomy; Political Participation, Reproductive Rights; and Health and Well-being (Werschkul & Williams, 2004). IWPR indices have been used in other U.S. studies of gender equality and health (Chen et al., 2005; Jun et al., 2004; Kawachi et al., 1999; Koenen, Lincoln, & Appleton, 2006), although the domains differ from those used in multi-country gender equality and alcohol research (Bond et al., 2010). The Women's Health Report Card assesses each U.S. state and determines whether it meets benchmarks for women's health in 27 areas, including policies relating to violence against women (NWLC & OHSU, 2004).

The source for dependent (alcohol consumption) variables is the 2005 BRFSS. The 2005 BRFSS survey was used because it included all 50 U.S. states plus Washington D.C. and was close to the year (2004) that state-level gender equality data from IWPR were available. BRFSS is an annual telephone survey, conducted since 1984, that tracks health status and health behaviors of adults in U.S. states and territories, with the goal of providing both national and state-level estimates. Each year, more than 350,000 adults are interviewed (CDC, 2010). BRFSS data were selected because of the large sample size in each state, designed to be state-representative, providing estimates for each state of multiple gender-disaggregated alcohol measures. BRFSS also has been used by other researchers to examine the relationship between state-level gender equality and health (Jun et al., 2004). Cooperation rates for each state in 2005 ranged from 58.7% to 85.3% (CDC, 2010).

## Measures

**Dependent variables**—Dependent variables included drinker status, frequency of alcohol consumption, frequency of consuming five or more drinks, volume of alcohol consumption, and risky drinking in the past 30 days. Previous research has found that the gender gap in alcohol consumption increased with more extreme consumption patterns (Dawson & Archer, 1992) and that gender equality may have different relationships with different alcohol measures (Rahav et al., 2006). Thus, using more than one outcome made sense.

*Drinker status* was defined as having consumed one or more drinks of beer, wine, or liquor in the past 30 days. The question asked was: “During the past 30 days, have you had at least one drink of any alcoholic beverage such as beer, wine, a malt beverage or liquor?” Respondents who answered yes were considered past 30-day drinkers. The range of percent drinkers for women was 23% (Utah) – 62% (Wisconsin).

*Drinking frequency* was the number of days over the past 30 on which participants reported drinking one or more drinks containing alcohol. The question asked was: “During the past 30 days, how many days per week or per month did you have at least one drink of any alcoholic beverage?” Responses that reported frequency of drinking on a weekly basis were multiplied by 4.29 to obtain 30-day frequency. The range of mean frequency for women was 4.7 (Oklahoma) – 8.3 (Washington, D.C.).

*Fiveplus frequency* was the number of occasions over the past 30 days on which participants reported drinking five or more drinks containing alcohol. The question asked was, “Considering all types of alcoholic beverages, how many times during the past 30 days did you have 5 or more drinks on an occasion?” This is an indicator of heavy episodic drinking. The natural log of fiveplus frequency +1 was used for analysis. The range of mean fiveplus frequency for women was 0.3 (Connecticut) – 0.7 (Louisiana).

*Volume* was calculated for drinkers using a modified version of indexing (Armor & Polich, 1982), as developed and used in a recent study using BRFSS data (Stahre, Naimi, Brewer, & Holt, 2006). This involved 1) subtracting frequency of fiveplus from drinking frequency to get adjusted frequency, 2) multiplying adjusted frequency by usual quantity, 3) multiplying frequency of fiveplus by sex- and age-specific binge quantity, and 4) adding volumes from steps 2 and 3. Indexing improves upon traditional quantity-frequency measures by accounting for binge drinking days. The modified indexing method uses sex- and age-specific estimates of 5+ quantity obtained from the optional binge drinking module in the 2003 BRFSS, rather than population-average replacements for estimates of fiveplus quantity, which reduces undercoverage (Stahre et al., 2006). The reported usual quantity, used to create the volume variable, was capped at the maximum number of drinks for people reporting usual quantities greater than 24. Indexing was only completed for people reporting usual quantity less than five; volume for all others was calculated by multiplying usual quantity by frequency. The natural log of volume +1 was used for analyses. The range for mean volume for women was 10.4 (Oklahoma) – 17.6 (Utah).

*Risky drinking* was defined as both having one or more occasions of fiveplus in the past 30 days and having 30-day volume greater than 60 for men and 30 for women and was based

on NIAAA guidelines (NIAAA, 2009, p. 16). Risky drinking was a dichotomous variable. The range of percent of risky drinkers for women was 15% (New Mexico) – 26% (Louisiana).

**Independent variables**—New indicators were created for gender equality in socioeconomic status for two reasons. First, existing IWPR indices combine absolute and relative socioeconomic status. Absolute socioeconomic status might measure percentage of women participating in paid labor, whereas relative socioeconomic status might measure women's participation in paid labor relative to men's participation. These measures likely are highly correlated, but could look different. For example, in two countries (A and B), 40% of women work for wages. In country A, 80% of men work for wages, while in country B, 40% of men work for wages. Although women have the same absolute status in both, gender equality measures (2:1 in Country A v. 1:1 in Country B) differ (Roberts, 2011). Theoretical reasons to expect absolute and relative measures to behave differently have been described elsewhere. Research that includes both absolute and relative gender equality measures finds significance and/or direction of findings differs depending on whether the measure is absolute or relative, although there is no consistent pattern (Roberts, 2011). Second, IWPR indices combine state-level education and poverty rates with health insurance status rather than with other measures of economic participation and earnings. This differs from domains of gender equality considered in multi-country research, where most gender equality and alcohol research has been conducted (Bond et al., 2010; Kuntsche et al., 2011; Rahav et al., 2006). In studies of health behaviors such as alcohol consumption, health insurance might be more of an indicator of access to health care than of socioeconomic status. Thus, new scales that correspond to domains used in previous research were created.

**Women's socioeconomic status:** Data for each variable used to construct this measure were obtained from the Census and IWPR. State-specific Women's socioeconomic status scores (i.e. absolute socioeconomic status) were created through factor analysis using SPSS version 12 (SPSS Inc., 2003). The factor analysis included women's labor force participation, women in managerial/professional occupations, percent of women owning businesses, percent of women living above poverty, percent of women completing 4+ years of college, and percent of women completing high school, and women's median earnings (Cronbach's alpha of 0.475). Excluding women's median earnings increased alpha to 0.808. The range was -2.36–1.7, with a mean of 0 and a standard deviation of 0.94. Higher levels indicate higher state-level women's absolute socioeconomic status.

**Gender equality in socioeconomic status:** Data for each variable used to construct this measure were obtained from the Census and IWPR. State-specific Gender equality in socioeconomic status (i.e. relative socioeconomic status) scores were created through factor analysis of: Ratio of women to men participating in the labor force, ratio of women to men completing 4+ years of college, ratio of women to men in managerial/professional occupations, percent of businesses female owned, ratio of women to men living above poverty, and ratio of women to men graduating high school. These items would not load onto a single factor. A two-item factor of ratio of women to men participating in the labor force and ratio of women to men completing 4+ years of college had a Cronbach's alpha of

0.633 and was used in analyses. The range was  $-2.41$ – $2.5$ , with a mean of 0 and a standard deviation of 1. Higher levels indicate higher gender equality (or relative status) in state-level socioeconomic status.

**Reproductive rights:** Data for each variable used to construct this measure were obtained from IWPR. State-specific scores were created through factor analysis of: presence of laws requiring parental consent/notification for minors to receive an abortion, presence of laws requiring a waiting period for abortion, availability of public funding for abortion, percent of women living in counties with an abortion provider, laws requiring insurance coverage for contraceptives, pro-choice government in the state, laws requiring insurance coverage for infertility services, laws allowing second parent adoption for same-sex couples, and laws requiring mandatory sex education. Laws requiring mandatory sex education were dropped because they did not load on the same factor. Cronbach's alpha was 0.813. The range was  $-1.37$ – $1.99$ , with a mean of 0 and a standard deviation of 0.93. Higher levels indicate more reproductive rights.

**Violence against women policy:** State-specific scores were created through factor analysis of: presence of laws requiring domestic violence screening protocols, training, and screening for health care providers, laws requiring sexual assault training for police and prosecutors, laws prohibiting discrimination against victims of domestic violence, (NWLC & OHSU, 2004) and rape rates. Rape rates did not load onto the same factor as the other three items and thus were excluded. Cronbach's alpha for the three items was 0.477. The range was  $-0.69$ – $2.35$ , with a mean of 0 and a standard deviation of 0.82. Higher levels indicate better violence against women policy.

**Political participation:** Political participation included: proportion of women in statewide elected office, percent of women registered to vote, percent of women who voted, and number of institutional resources available to women. Number of institutional resources available to women is defined as the presence or absence of a commission for women and a women's legislative caucus. The score for this measure was the IWPR score. The range was  $-7.13$ – $9.64$ , with a mean of 0.83 and standard deviation of 4.2. Higher levels indicate more political participation by women.

**Contextual and individual covariates**—State-level controls included income inequality, defined as the ratio of the top 20% median income to the bottom 20% median income in the state (Bernstein et al., 2008), median income (Bernstein et al., 2008), and religion, defined as percent Evangelical Protestant/Mormon (Pew Forum on Religion and Public Life, 2008). Religion was included because religion predicts abstention as well as distinguishes moderate from heavy drinkers in individual-level analyses (Michalak, Trocki, & Bond, 2007). It was defined as percent Evangelical Protestant/Mormon because Evangelical Protestants and Mormons have proscriptions against drinking (Michalak et al., 2007).

Individual-level controls included: age (continuous), race (dummy variables for Black, Hispanic, other race, multiracial, missing race, with White as reference group), income (dummy variables for  $\$10K$ – $<\$15K$ ,  $\$15K$ – $<\$20K$ ,  $\$20K$ – $<\$25K$ ,  $\$25K$ – $<\$35K$ ,  $\$35K$ – $<$

\$50K, \$50K–<\$75K, \$75K, with <\$10K as reference group), marital status (married versus unmarried), education (dummy variables for high school graduation or General Equivalency Degree, some college, completed college, with less than high school as reference group), and employment (employed versus not employed for wages).

## Analysis

Hierarchical linear modeling (HLM) (Bryk & Raudenbush, 1992), using HLM 7 (Raudenbush, Bryk, & Congdon, 2010), was used to study the relationship between macro-level gender equality and alcohol consumption. Partially-adjusted random intercept models with only state-level gender equality variable controlled for individual-level age, race, income, marital status, education status, and employment status. These were estimated separately for each state-level gender equality indicator. Fully-adjusted random intercept models also controlled for each individual-level variable and included state-level income inequality, median income, and % Evangelical Protestant/Mormon along with the specified gender equality measure. These were estimated separately for each state-level gender equality indicator. Each variable was centered around its overall mean in order to obtain interpretable intercepts and coefficients from the HLM model. Sampling weights accounting for survey design were used for all analyses. Separate, multi-level logistic and linear regression models were estimated for women and men for each alcohol consumption measure, depending on whether the alcohol consumption measure was dichotomous or continuous.

The equation estimated for models including the main gender equality variable, level-2 controls, and level-1 controls was (here, the focus is on volume as alcohol outcome and reproductive rights as gender equality variable):

$$\begin{aligned} \ln(1 + VOL_{ij}) = & \gamma_{00} + \gamma_{01} * REPRI_j \\ & + \gamma_{02} * INCINQ_j \\ & + \gamma_{03} * EVMORM_j \\ & + \gamma_{04} * MEDINC_j + \gamma_{10} * AGE_{ij} + \gamma_{20} * BLACK_{ij} + \gamma_{30} * HISP_{ij} \\ & + \gamma_{40} * ORACE_{ij} \\ & + \gamma_{50} * MRACE_{ij} + \gamma_{60} * RACEMI_{ij} \\ & + \gamma_{70} * INC15_{ij} + \gamma_{80} * INC20_{ij} + \gamma_{90} * INC25_{ij} + \gamma_{100} * INC35_{ij} + \gamma_{110} * INC50_{ij} + \gamma_{120} * INC75_{ij} + \gamma_{130} * INCHI_{ij} \\ & + \gamma_{140} * INCMI_{ij} \\ & + \gamma_{150} * EMPL_{ij} + \gamma_{160} * MARRY_{ij} + \gamma_{170} * HIGHSCH_{ij} \\ & + \gamma_{180} * SOMECOLL_{ij} \\ & + \gamma_{190} * COLL_{ij} + u_{0j} + r_{ij} \end{aligned}$$

Cross-level interactions between state-level gender equality and individual-level women's employment and college graduation were assessed in random coefficient models in which slopes between employment (or college graduation) and alcohol consumption were allowed to vary across states. Interactions significant at  $p < 0.10$  were interpreted using graphical methods.



Partially-adjusted models included 51 states, except for Political Participation (50 states). Fully-adjusted models included 48 states due to lack of data for % Evangelical Protestant/Mormon for three states. Analyses of drinker status had samples of between 205,646 and 213,114 for women and 127,749 and 133,080 for men. For analyses for other alcohol measures that included only current drinkers, models included samples of between 86,961 and 92,257 for women and 72,221 and 77,620 for men. There were minimums of 478 (for women) and 454 (for men) drinkers in states with the smallest number of drinkers.

## Results

Table 1 lists the top and bottom five states for each state-level gender equality measure. Table 2 provides Pearson correlation coefficients among state-level variables. The correlation between state-level gender equality measures ranged from  $-0.02$  to  $0.52$ . The  $0.52$  was between women's socioeconomic status and gender equality in socioeconomic status. The  $-0.02$  was between violence policy and political participation. No correlations between violence policy and other gender equality measures were statistically significant.

Intercepts for each drinking measure varied across state  $p < 0.001$ . In partially-adjusted models that controlled for individual-level variables, all gender equality indicators were positively associated with female and male current drinking (ORs between 1.03 and 1.30). [See Table 3.] In fully-adjusted models, which controlled for both individual-level variables and state-level income inequality, median income, and % Evangelical/Mormon, only women's socioeconomic status and women's political participation were still positively associated with female current drinking. [See Table 4.] However, these associations were reduced to marginal significance. None of the associations between gender equality and male current drinking in fully-adjusted models were significant.

In partially-adjusted models examining monthly frequency as an outcome, only gender equality in socioeconomic status and reproductive rights were associated with monthly frequency. However, gender equality in socioeconomic status was negatively associated with monthly frequency for both women and men while reproductive rights were positively associated with monthly frequency for women. In fully-adjusted models, only gender equality in socioeconomic status was still significant for both women and men ( $\beta = -0.31$  and  $-0.29$  for women and men respectively,  $p < 0.05$ ), while the association with reproductive rights was marginally significant for women ( $\beta = 0.30$ ,  $p < 0.10$ ).

For fiveplus frequency, associations in partially-adjusted models differed for women and men. For women, there was a marginally significant positive association with gender equality in socioeconomic status and negative associations with reproductive rights and violence policy. Only reproductive rights were significant (marginally) for men. In fully-adjusted models for women, the same pattern of significant associations was found for reproductive rights and violence policy ( $\beta = -0.02$  and  $-0.01$ ,  $p < 0.05$  and  $p < 0.01$  respectively). The association with gender equality in socioeconomic status was no longer significant. In fully-adjusted models for men, reproductive rights were negatively associated with fiveplus frequency, although the association was only marginally significant ( $\beta = -0.02$ ,  $p < 0.10$ ).

Other than marginally significant associations between political participation and volume for women in the partially- and fully-adjusted models and a significant negative association between gender equality in socioeconomic status and volume for men in the fully-adjusted model, there were no significant associations between state-level gender equality and volume for either women or men.

In partially-adjusted models considering risky drinking, violence policy was negatively associated for women and reproductive rights was negatively associated for men. In fully-adjusted models, violence policy was negatively associated for women (OR = 0.96,  $p < 0.05$ ) and reproductive rights was negatively associated for men (OR = 0.92,  $p < 0.05$ ).

Cross-level interactions significant at  $p < 0.10$  are shown in Table 5. Patterns of significant cross-level interactions of state-level gender equality and college graduation (versus less than college) are described in Table 6. Graphical depictions for examples of Reproductive Rights and monthly frequency and Reproductive Rights and volume can be seen in Figs. 1 and 2. Overall, women who graduated from college drink more in high than low gender equality states. Other than for monthly frequency, women with less than college education drink more in low than high gender equality states. Further, for fiveplus, volume, and risky drinking, women with less than college education drink more than women with college education in low gender equality states, while women with college education tend to drink more than women with less than college education in high gender equality states. Violence policy is the only gender equality indicator that appears to affect women with less than college more than women with college education.

Patterns of significant cross-level interactions of state-level gender equality and employment are described in Table 7. Both employed and unemployed women drink more in low than high gender equality states. However, employed women's drinking is affected more by state-level gender equality than unemployed women's drinking. Other than for drinking at all and the interaction of gender equality in socioeconomic status and risky drinking, unemployed women drink more than employed women in high gender equality states.

## Discussion

All measures of state-level gender equality were positively associated with men's and women's current drinking in partially-adjusted, but not fully-adjusted models that controlled for other state-level economic factors and state-level % Evangelical/Mormon. % Evangelical/Mormon appears to confound the relationship between gender equality and any drinking. With the exception of reproductive rights and monthly frequency, all other associations between gender equality and alcohol consumption were either negative or non-significant. Findings do not support the hypothesis that higher gender equality or women's status is associated with higher alcohol consumption among women overall. In fact, to the extent that findings were significant, they suggest that higher gender equality is associated with less drinking, especially riskier drinking, among both female and male drinkers overall. Such findings are consistent with the larger research on gender equality and health that generally finds better health in areas with higher levels of gender equality (Chen et al., 2005; Kawachi et al., 1999; McAlister & Baskett, 2006; Young, 2001). It is also in line with

findings from the Rahav et al. multi-national study (2006) that found fewer alcohol consequences among women and men in countries with higher gender equality. It contradicts widespread assumptions about the negative impact of gender equality on women's alcohol consumption and suggests that gender equality may, in fact, ameliorate (riskier) alcohol consumption among both women and men.

It is worth noting that the absolute and relative socioeconomic status measures mostly performed similarly. However, there were a few instances where absolute status was not significantly associated with the alcohol measure, but relative status was (e.g. monthly frequency for men and women and volume for men). Because the measures perform differently, future research should include both absolute and relative socioeconomic status measures.

In terms of significant cross-level interactions, contrary to the hypothesis, women college graduates generally drank more in high than low equality states, and women without college graduation generally drank more in low than high equality states. These findings could reflect associations between college and drinking more generally (O'Malley & Johnston, 2002) and well as the possibility that female college graduates in high equality states face fewer restrictions on drinking (backlash). On the other hand and consistent with Kuntsche et al.'s (2011) findings, employed women drank more in low than high equality states. Unemployed women also drink more in low than high equality states, although their drinking was impacted less than employed women's drinking. Employment might be less stressful and more fulfilling in high equality states (amelioration). The inconsistency in cross-level interaction findings is consistent with mixed findings from other studies of individual-level women's status and alcohol (Gmel et al., 2000; Kuntsche et al., 2009; Mansdotter et al., 2008; Murphy et al., 2000; Van Gundy et al., 2005). It is also worth noting that other than for violence policy, state-level gender equality appears to affect drinking of higher more than lower status women. This suggests that these measures may be more relevant for health of women of higher than lower status.

The results of this study should be interpreted in light of limitations. First, the study is cross-sectional and thus cannot assess temporal aspects of gender equality and alcohol associations. While it is unlikely that increases in alcohol consumption would cause increases in gender equality, longitudinal or trend studies that examine the relationship between changes in gender equality and changes in alcohol consumption would provide stronger evidence that state-level gender equality and not some other social or cultural factor causes alcohol consumption changes. Second, this study uses measures of fiveplus as an indicator of heavy episodic drinking for both men and women. This influences not only frequency of heavy episodic drinking, but also volume and risky drinking measures. Different heavy episodic drinking cut-offs are currently recommended for men and women (NIAAA, 2004; Wechsler, Dowdall, Davenport, & Rimm, 1995). Unfortunately, the 2005 BRFSS only included questions assessing frequency of consuming five or more drinks. Thus, calculations may underestimate frequency of heavy episodic drinking for women and, therefore, volume and risky drinking. Using age and sex specific replacements for fiveplus occasions in volume calculations and using a lower threshold of drinking frequency for women than men in risky drinking calculations partially addresses this concern. It is worth

noting that others argue that evidence regarding gender differences in alcohol metabolism and how these differences are moderated by behaviors such as pace of drinking and drinking with meals is insufficient to recommend such gender adjustments (Graham, Wilsnack, Dawson, & Vogeltanz, 1998). Third, this study measured alcohol consumption over the past 30 days. Questions about past 30 days may exclude infrequent light and intermittent heavy or binge drinkers (Greenfield & Kerr, 2008). Frequency or volume, when asked about for 30 versus 28 days, may also be affected by number of weekends in the referenced 30-day period (Greenfield & Kerr, 2008). Fourth, BRFSS has a modest response rate that varies by state. If any bias toward exclusion of heavy drinkers differs across states, this also could influence findings. Fifth, the dataset did not include a measure of individual-level religion. It is possible that some variation explained by state-level %Evangelical/Protestant is compositional rather than contextual. Finally, the violence policy indicator has low reliability and thus may not be a good measure of violence against women policy. Further work to develop such a measure is necessary.

This study also has a number of strengths. While there has been some multi-national research examining the relationship between macro-level gender equality and alcohol consumption, it is the first study in the U.S. to examine this often discussed, but rarely researched, relationship. Second, it has strong conceptualizations and measures of state-level women's status and gender equality.

Importantly, findings suggest the possibility of increased alcohol consumption among women should not be used as a reason to oppose policies that increase women's status or gender equality. Importantly, if future research is consistent with these findings, increasing women's status or gender equality may be a policy strategy for reducing risky drinking, as it is for other areas of women's health, such as depression and maternal mortality (Chen et al., 2005; McAlister & Baskett, 2006).

## Acknowledgments

National Institute on Alcohol Abuse and Alcoholism provided funding for post-doctoral research fellowship that supported this study (T32 AA00724, L. Kaskutas, PI). The author thanks Tom Greenfield, Jason Bond, Kate Karriker-Jaffe, and Lee Kaskutas for feedback throughout this study. The content presented here is solely the responsibility of the author and does not necessarily represent the official views of the National Institute on Alcohol Abuse and Alcoholism or the National Institutes of Health.

## References

- Armor, DJ.; Polich, JM. Measurement of alcohol consumption. In: Pattison, EM.; Kaufman, E., editors. *Encyclopedic handbook of alcoholism*. New York: Gardner Press; 1982. p. 72-80.
- Bernstein J, McNichol E, Nicholas A. Pulling apart: A state-by-state analysis of income trends. Center on Budget and Policy Priorities and Economic Policy Institute. 2008 <http://www.cbpp.org/files/4-9-08sfp.pdf>.
- Bond JC, Roberts SCM, Greenfield TK, Korcha R, Ye Y, Nayak MB. Gender differences in public and private drinking contexts: a multi-level GENACIS analysis. *International Journal of Environmental Research in Public Health*. 2010; 7:2136–2160.
- Bryk, AS.; Raudenbush, SW. *Hierarchical linear models: Applications and data analysis methods*. Newbury Park, CA: SAGE Publications; 1992.
- CDC. [Accessed 11.02.10] Behavioral risk factor surveillance system. 2010. <http://www.cdc.gov/brfss>

- Chen Y-Y, Subramanian SV, Acevedo-Garcia D, Kawachi I. Women's status and depressive symptoms: a multilevel analysis. *Social Science & Medicine*. 2005; 60:49–60. [PubMed: 15482866]
- Clark, WB. Public drinking contexts: bars and taverns. In: Harford, TC.; Gaines, LS., editors. *Social drinking contexts*. Rockville, MD: National Institute on Alcohol Abuse and Alcoholism, National Institutes of Health; 1981. p. 8-33. Research Monograph No. 7, DHHS Publication No. (ADM 81–1097).
- Clark, WB. Introduction to drinking contexts. In: Clark, WB.; Hilton, ME., editors. *Alcohol in America*. Albany, NY: State University of New York Press; 1991. p. 249-255.
- Clark-Flory T. I'm sooo wasted off feminism. 2008 *Salon.com*. [http://www.salon.com/mwt/broadsheet/feature/2008/12/09/gender\\_benders](http://www.salon.com/mwt/broadsheet/feature/2008/12/09/gender_benders).
- Dawson DA, Archer LD. Gender differences in alcohol consumption: effects of measurement. *British Journal of Addiction*. 1992; 87:119–123. [PubMed: 1543934]
- Eriksen S. Alcohol as a gender symbol. *Scandinavian Journal of History*. 1999; 24:45–73. [PubMed: 22256385]
- Fillmore, KM. 'When angels fall...': women's drinking as cultural preoccupation and as a reality. In: Wilsnack, SC.; Beckman, LJ., editors. *Alcohol problems in women*. New York/London: The Guilford Press; 1984. p. 7-36.
- Gmel G, Bloomfield K, Ahlstrom S, Choquet M, Lecomte T. Women's roles and women's drinking: a comparative study in four European countries. *Substance Abuse*. 2000; 21:249–264. [PubMed: 12466663]
- Graham K, Wells S. Aggression among young adults in the social context of the bar. *Addiction Research*. 2001; 9:193–219.
- Graham K, Wilsnack RW, Dawson DA, Vogeltanz ND. Should alcohol consumption measures be adjusted for gender differences. *Addiction*. 1998; 93:1137–1147. [PubMed: 9813895]
- Greenfield TK, Kerr WC. Alcohol measurement methodology in epidemiology: recent advances and opportunities. *Addiction*. 2008; 103:1082–1099. [PubMed: 18422826]
- Jun HJ, Subramanian SV, Gortmaker S, Kawachi I. A multilevel analysis of women's status and self-rated health in the United States. *Journal of the American Medical Women's Association*. 2004; 59:172–180.
- Kawachi I, Kennedy BP, Gupta V, Prothrow-Stith D. Women's status and the health of women and men: a view from the States. *Social Science & Medicine*. 1999; 48:21–32. [PubMed: 10048835]
- Kerr WC. Categorizing US state drinking practices and consumption trends. *International Journal of Environmental Research in Public Health*. 2010; 7:269–283.
- Koenen KC, Lincoln A, Appleton A. Women's status and child well-being: a state-level analysis. *Social Science & Medicine*. 2006; 63:2999–3012. [PubMed: 16962693]
- Kuntsche S, Knibbe RA, Gmel G. Social roles and alcohol consumption: a study of 10 industrialised countries. *Social Science & Medicine*. 2009; 68:1263–1270. [PubMed: 19232807]
- Kuntsche S, Knibbe RA, Kuntsche E, Gmel G. Housewife or working mum – each to her own? The relevance of societal factors in the association between social roles and alcohol use among mothers in 16 industrialised countries. *Addiction*. 2011; 106(11):1925–1932. [PubMed: 21615581]
- Mansdotter A, Backhans M, Hallqvist J. The relationship between a less gender-stereotypical parenthood and alcohol-related care and death: a registry study of Swedish mothers and fathers. *BMC Public Health*. 2008; 8
- McAlister C, Baskett TF. Female education and maternal mortality: a worldwide survey. *Journal of Obstetrics & Gynaecology Canada*. 2006; 28:983–990. [PubMed: 17169224]
- Michalak L, Trocki KF, Bond J. Religion and alcohol in the U.S. National Alcohol Survey: how important is religion for abstinence and drinking? *Drug and Alcohol Dependence*. 2007; 87:268–280. [PubMed: 16987610]
- Morris, A. Gender bender: More women are drinking, and the women who drink are drinking more, in some cases matching their male peers. This is the kind of equality nobody was fighting for. *New York: New York Magazine*; 2008. <http://nymag.com/news/features/52758/index1.html> 11.02.10
- Murphy SA, Connelly CD, Evens C, Stoep AV. Roles, lifestyles, and well-being as predictors of alcohol consumption among young and midlife women. *Health Care for Women International*. 2000; 21:677–699. [PubMed: 11813761]

- NIAAA. Binge drinking defined. NIAAA Newsletter. 2004; 3:3.
- NIAAA. Rethinking drinking: Alcohol and your health. Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism; 2009. Archived by WebCite® at. <http://www.webcitation.org/5wtRANIQ7>. [Accessed 02.03.11]
- Nusbaumer MR, Mauss AL, Pearson DC. Draughts and drunks: the contributions of taverns and bars to excessive drinking in America. *Deviant Behavior*. 1982; 3:329–358.
- NWLC, & OHSU. Making the grade on women’s health: A national and state-by-state report card. 2004 [www.nwlc.org/details.cfm?id=1861&section=health](http://www.nwlc.org/details.cfm?id=1861&section=health).
- O’Malley PM, Johnston LD. Epidemiology of alcohol and other drug use among American college students. *Journal of Studies on Alcohol Supplement*. 2002; 2002(14):23–39. [PubMed: 12022728]
- Perrine, MW.; Mundt, JC.; Searles, JS.; Walter, D. I only had a couple of beers: validation of drivers’ self-reported drinking in bars. *Proceedings of the 10th International Conference on Alcohol, Drugs, and Traffic Safety*; September 21–26; Annecy, France. 1997. p. 769–776.
- Pew Forum on Religion and Public Life. U.S. religious landscape survey. Religious affiliation: Diverse and dynamic. 2008 <http://religions.pewforum.org/pdf/report-religious-landscape-study-full.pdf>.
- Rahav G, Wilsnack R, Bloomfield K, Gmel G, Kuntsche S. The influence of societal level factors on men’s and women’s alcohol consumption and alcohol problems. *Alcohol and Alcoholism Supplement*. 2006; 41:i47–i55.
- Raudenbush, SW.; Bryk, AS.; Congdon, RT, Jr. Hierarchical linear and nonlinear modeling. Lincolnwood, IL: Scientific Software International; 2010. HLM 7.
- Riddoch L. We’re paying price of 70s and 80s deprivation. Edinburgh: The Scotsman. 2009 [http://www.scotsman.com/news/lesley\\_riddoch\\_we\\_re\\_paying\\_price\\_of\\_70s\\_and\\_80s\\_deprivation\\_1\\_783130](http://www.scotsman.com/news/lesley_riddoch_we_re_paying_price_of_70s_and_80s_deprivation_1_783130).
- Roberts SCM. What can alcohol researchers learn from research about the relationship between macro-level gender equality and violence against women? *Alcohol and Alcoholism*. 2011; 46:95–104. [PubMed: 21239417]
- Roberts S. Whether men or women are responsible for size of gender gap in alcohol consumption depends on alcohol measure: a study across U.S. states. *Contemporary Drug Problems*. in press.
- Sen G, Östlin P, George A. Unequal, unfair, ineffective and inefficient. Gender inequity in health: Why it exists and how we can change it. Final report to the WHO Commission on Social Determinants of Health. Women and Gender Equity Knowledge Network. 2007 [http://www.who.int/social\\_determinants/resources/csdh\\_media/wgekn\\_final\\_report\\_07.pdf](http://www.who.int/social_determinants/resources/csdh_media/wgekn_final_report_07.pdf).
- SPSS Inc. Base 12.0. Chicago, IL: SPSS Inc; 2003.
- Stahre M, Naimi T, Brewer R, Holt J. Measuring average alcohol consumption: the impact of including binge drinks in quantity-frequency calculations. *Addiction*. 2006; 101:1711–1718. [PubMed: 17156170]
- Stall R, Heurtin-Roberts S, McKusick L, Hoff C, Lang SW. Sexual risk for HIV transmission among singles-bar patrons in San Francisco. *Medical Anthropology Quarterly*. 1990; 4:115–128.
- Van Gundy K, Schieman S, Kelley MS, Rebellon CJ. Gender role orientations and alcohol use among Moscow and Toronto adults. *Social Science & Medicine*. 2005; 61:2317–2330. [PubMed: 16139405]
- Wechsler H, Dowdall GW, Davenport A, Rimm EB. A gender-specific measure of binge drinking among college students. *American Journal of Public Health*. 1995; 85:982–985. [PubMed: 7604925]
- Wells S, Graham K. Frequency of third-party involvement in incidents of barroom aggression. *Contemporary Drug Problems*. 1999; 26:457–480.
- Wells S, Graham K, Speechley M, Koval J. Drinking patterns, drinking contexts and alcohol-related aggression among late adolescent and young adult drinkers. *Addiction*. 2005; 100:933–945. [PubMed: 15955009]
- Werschkul, M.; Williams, E. The status of women in the states. Caiazza, AB.; Shaw, A., editors. Washington, DC: Institute for Women’s Policy Research; 2004. <http://www.iwpr.org/publications/resources/femstats/status-of-women-in-the-states> [Accessed 02.10.12]

- Wilsnack RW, Wilsnack SC. GENACIS (Gender, Alcohol, and Culture: An International Study): background, methods, and cross-national variations in drinking patterns. *Alcoholism: Clinical and Experimental Research*. 2006; 30:82A.
- Young FW. Structural pluralism and life expectancy in less-developed countries: the role of women's status. *Social Indicators Research*. 2001; 55:223–240.

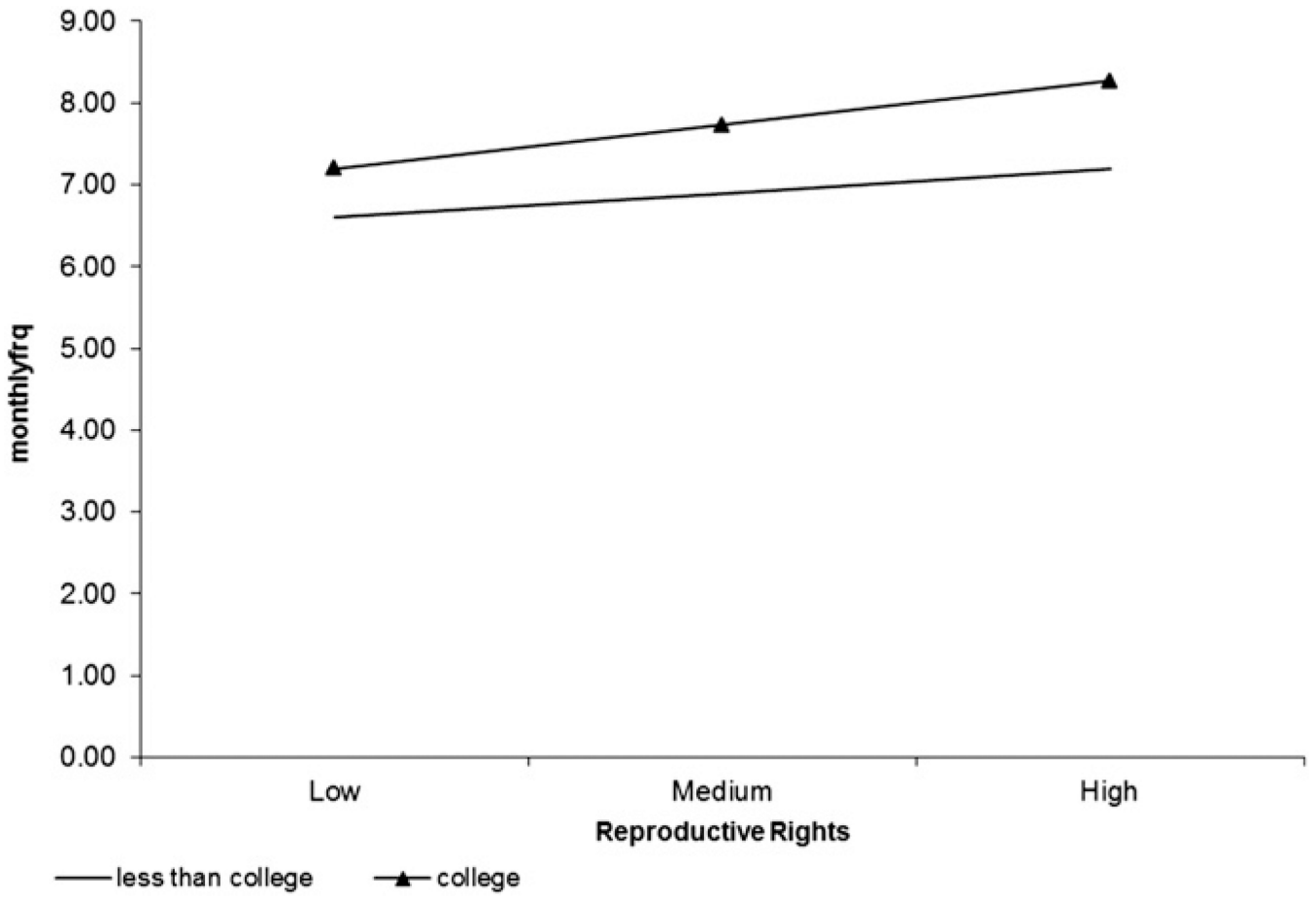


Fig. 1.  
Interaction of reproductive rights and college graduation.



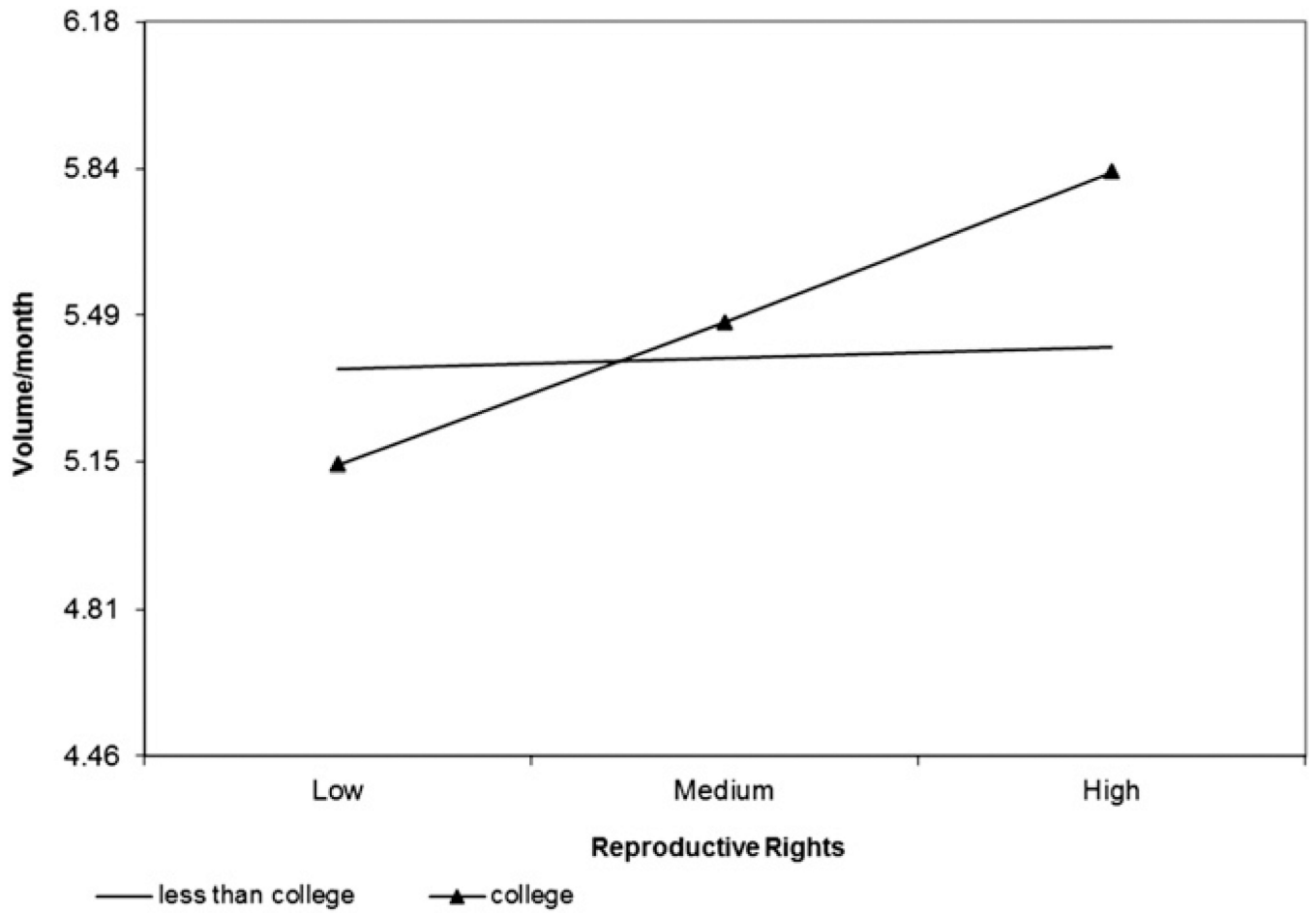


Fig. 2.  
Interaction of reproductive rights and college graduation.

**Table 1**

Top and bottom states for each gender equality measure.

	<b>SocioEd Status</b>	<b>GE SocioEd</b>	<b>Repro Rights</b>	<b>Violence Pol</b>	<b>Political Part</b>
Top 5	Vermont	Alaska	Connecticut	California	Washington
	Minnesota	Vermont	California	New York	Michigan
	Colorado	North Dakota	New York	Pennsylvania	California
	Massachusetts	Maine	Hawaii	Alaska	Connecticut
	Alaska	Minnesota	Vermont	Ohio	Maine
Bottom 5	Louisiana	Idaho	Ohio	Alaska <sup>a</sup>	West Virginia
	Arkansas	Florida	South Carolina	Idaho <sup>a</sup>	Pennsylvania
	Kentucky	Texas	North Dakota	Mississippi <sup>a</sup>	South Dakota
	Mississippi	Arizona	South Dakota	North Carolina <sup>a</sup>	Tennessee
	West Virginia	Utah	Mississippi	South Carolina <sup>a</sup>	New Jersey
				South Dakota <sup>a</sup>	
				Vermont <sup>a</sup>	
				Washington DC <sup>a</sup>	
				Wyoming <sup>a</sup>	

<sup>a</sup> All have same value, thus 9 are listed here.

Table 2

Correlations between state-level measures.

	SocioEd Status	GE SocioEd	Repro Rights	Violence Pol	Political Part	Inc Inequality	Med Income
GE SocioEd	0.52***						
Repro Rights	0.39**	0.04					
Violence Pol	-0.07	-0.13	0.28				
Political Part	0.40**	0.31*	0.41**	-0.02			
Inc Inequality	-0.20	-0.19	0.29*	0.09	-0.09		
Med Income	0.67***	0.13	0.64***	0.20	0.24	-0.04	
% Ev/Morm	-0.58***	-0.37**	-0.64***	-0.27	-0.38**	-0.10	-0.67***

\*  $p < 0.05$ ,\*\*  $p < 0.01$ ,\*\*\*  $p < 0.001$ .

**Table 3**

Partially-adjusted models.

	Current drinker (OR)		Frequency		5+ frequency		Volume		Risky drinking (OR)		
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	
SocioEd Status	1.30***	1.26***	0.03	0.03	0.00	0.01	0.00	0.00	-0.00	0.98	1.01
GE SocioEd	1.12+	1.12+	-0.27*	-0.22*	0.01+	0.01	-0.02	-0.02	-0.02	1.01	1.02
Repro Rights	1.21***	1.16***	0.23*	0.16	-0.01*	-0.01+	0.01	-0.00	0.97	0.95*	0.99
Violence Pol	1.10*	1.09**	0.05	0.07	-0.01*	-0.00	-0.01	0.00	0.97*	0.99	1.00
Political Part	1.04***	1.03***	0.03	0.03	-0.00	0.00	0.00+	0.00	1.00	1.00	1.00

\*  $p < 0.05$ ,

\*\*  $p < 0.01$ ,

\*\*\*  $p < 0.001$ .

Each gender equality indicator is included in a separate model.

Models adjust for individual-level age, race, income, marital status, education, employment.

Table 4

Fully-adjusted models.

	Current drinker (OR)		Frequency		5+frequency		Volume		Risky drinking (OR)	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
SocioEd Status	1.10+	1.08	-0.12	-0.01	0.01	-0.01	0.00	-0.01	1.02	1.02
Inc Inequality	0.98	0.96	0.11	0.11	-0.01+	-0.03**	0.01	-0.01	0.99	0.95*
Med Income	1.00	0.99	0.00	0.01	-0.00**	-0.00**	0.00	-0.00	0.99**	0.99***
%Ev/Mor	0.98***	0.98***	0.00	-0.00	-0.00*	-0.00**	-0.00	-0.00	1.00	0.99***
GESocioEd	1.02	1.02	-0.31*	-0.29*	0.01	-0.01	-0.02	-0.04*	1.00	1.00
Inc Inequality	0.95+	0.94	0.03	-0.00	-0.01*	-0.03***	0.00	-0.02	0.98	0.94***
Med Income	1.00	1.00	0.00	0.01	-0.00**	-0.00***	0.00	-0.00	0.99**	0.99**
%Ev/Mor	0.98***	0.98***	-0.00	-0.00	-0.00	-0.00***	-0.00	-0.00	1.00	0.99***
Repro Rights	0.99	0.96	0.30+	0.22	-0.02*	-0.02+	0.01	-0.02	0.97	0.92**
Inc Inequality	0.94+	0.95	0.01	0.01	-0.01	-0.02+	0.01	0.00	1.00	0.98
Med Income	1.00	1.00	0.00	-0.00	-0.00*	-0.00+	-0.00	-0.00	1.00	0.99
%Ev/Mor	0.98***	0.98***	0.01	0.01	-0.00**	-0.00***	-0.00	-0.00	0.99+	0.99***
Violence Pol	0.97	0.99	-0.01	0.04	-0.01**	-0.00	-0.02	0.00	0.96*	0.99
Inc Inequality	0.95	0.94	-0.16	0.09	-0.01	-0.03**	0.02	-0.01	1.01	0.97**
Med Income	1.00	1.00	0.00	0.01	-0.00***	-0.00***	0.00	-0.00	0.99*	0.99**
%Ev/Mor	0.97***	0.97***	0.00	0.00	-0.00**	-0.00**	-0.00	-0.00	0.99*	0.99**
Political Part	1.01+	1.01	0.02	0.03	-0.00	0.00	0.00+	0.00	1.01	0.99
Inc Inequality	0.94*	0.93+	0.15	0.11	-0.01*	-0.03**	0.01	-0.00	0.99	0.94**
Med Income	1.00	1.00	0.00	0.01	-0.00**	-0.00**	-0.00	-0.00	0.99**	0.99**
%Ev/Mor	0.98**	0.98***	0.01	0.00	-0.00*	-0.00**	0.00	-0.00	1.00	0.99***

\*  $p < 0.05$ ,

\*\*  $p < 0.01$ ,

\*\*\*  
 $p < 0.001$ .

Each gender equality indicator is included in a separate model.

Models adjust for individual-level age, race, income, marital status, education, employment.

Table 5

Interaction findings for women.

	Current drinker (OR)		Frequency		5+frequency		Volume		Risky drinking (OR)	
	College	Employed	College	Employed	College	Employed	College	Employed	College	Employed
Intercept	-	-	6.86***	-	-	-	1.85***	-	-	-
SocioEd Status	-	-	0.11	-	-	-	0.00	-	-	-
College	-	-	0.93***	-	-	-	0.03	-	-	-
Coll × SocioEd	-	-	0.30*	-	-	-	0.69**	-	-	-
Employed	-	-	-	-	-	-	-	-	-	-
Empl × SocioEd Status	-	-	-	-	-	-	-	-	-	-
Intercept	-	-	-	6.84***	-	-	-	-	-	0.23***
GE SocioEd	-	-	-	-0.31*	-	-	-	-	-	0.99
College	-	-	-	-	-	-	-	-	-	-
Coll × Violence Pol	-	-	-	-	-	-	-	-	-	-
Employed	-	-	-	-0.18+	-	-	-	-	-	0.95
Empl × GE SocioEd	-	-	-	-0.61***	-	-	-	-	-	1.09*
Intercept	-	0.79***	6.89***	-	-	0.17***	1.85***	1.85***	0.24***	0.24***
Repro Rights	-	0.99	0.32+	-	-	-0.02*	0.00	0.01	0.97	0.97
College	-	-	0.83***	-	-	-	0.01	-	0.77***	-
Coll × Political Part	-	-	0.26**	-	-	-	0.05**	-	1.06*	-
Employed	-	1.29***	-	-	-	-0.00	-	-0.04*	-	0.94+
Empl × Repro Rights	-	0.95**	-	-	-	-0.01+	-	-0.03**	-	0.93+
Intercept	-	-	6.87***	-	0.17***	-	1.86***	-	0.24***	-
Violence Pol	-	-	-0.01	-	-0.15***	-	-0.02+	-	0.96*	-
College	-	-	0.81***	-	-0.07***	-	0.01	-	0.76***	-
Coll × Violence Pol	-	-	0.19**	-	0.01+	-	0.03**	-	1.06*	-
Employed	-	-	-	-	-	-	-	-	-	-

	Current drinker (OR)		Frequency		5+frequency		Volume		Risky drinking (OR)	
	College	Employed	College	Employed	College	Employed	College	Employed	College	Employed
Empl × Violence Pol	-	-	-	-	-	-	-	-	-	-
Intercept	-	0.79***	6.86***	-	-	-	-	-	-	-
Political Part	-	1.01*	0.03	-	-	-	-	-	-	-
College	-	-	0.88***	-	-	-	-	-	-	-
Coll × Violence Pol	-	-	0.4+	-	-	-	-	-	-	-
Employed	-	1.28***	-	-	-	-	-	-	-	-
Empl × Political Part	-	0.99*	-	-	-	-	-	-	-	-

\*  $p < 0.05$ ,

\*\*  $p < 0.01$ ,

\*\*\*  $p < 0.001$ .

Each gender equality indicator is included in a separate model.

Models adjust for individual-level age, race, income, marital status, college graduation, employment, and state-level median income, income inequality, and % Evangelical/Mormon.



**Table 6**

State-level gender equality and college graduation interactions.

Gender equality measure	Alcohol measure	Do women drink more in high or low gender equality states?		Which group of women are affected more by gender equality?	Which group of women drinks more?
		Less than college	College graduate		
SocioEd Status	Monthly freq	Low	High	College	College
Repro Rights	Monthly freq	High	High	College	College
Violence Pol	Monthly freq	No diff	High	College	College
Political Part	Monthly freq	High	High	College	College
Violence Pol	Fiveplus freq	Low	No diff	Less than college	Less than college
SocioEd Status	Volume	No diff	High	College	Crossover – in low, less than college; in high, college.
Repro Rights	Volume	No diff	High	College	Crossover – in low, less than college, in high, college
Violence Pol	Volume	Low	High	Less than college	Crossover – in low, less than college, in high, college
Repro Rights	Risky drinking	Low	High	College	Crossover – in low, less than college, in high, college
Violence Pol	Risky drinking	Low	High	Less than college	Less than college

Table 7

State-level gender equality and employment interactions.

Gender equality measure	Alcohol measure	Do women drink more in high or low gender equality states?		Which group of women are affected more by gender equality?	Which group of women drinks more?
		Unemployed	Employed		
Repro Rights	Drinking	No diff	Low	Employed	Employed
Political Part	Drinking	High	No diff	Unemployed	Employed
GE SocioEd	Monthly freq	Low	Low	Employed	Crossover – in low, employed; in high, unemployed
Repro Rights	Fiveplus	Low	Low	Employed	Crossover – in low, employed; in high, unemployed
Repro Rights	Volume	High	Low	Employed	Unemployed
GE SocioEd	Risky drinking	Low	High	Employed	Crossover – in low, unemployed; in high, employed
Repro Rights	Risky drinking	Low	Low	Employed	Same at low; in high, unemployed