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Gender Equality Mood across States and over Time

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Abstract

This article provides a new measure of state-level attitudes toward gender roles. Our series, gender equality mood, spans from 1972 to 2010 and is the first measure to capture variation in gender-role attitudes across states *and* over time. The series is created using two leading techniques for opinion estimation: multilevel regression and poststratification and survey aggregation. We conclude by discussing several research areas in which our measure of gender equality mood may be especially useful.

Keywords

gender politics, public opinion, methodology, issue preferences, political culture

Public opinion has long been at the forefront in studies of political representation. The degree to which policy outcomes are responsive to the preferences of the American public has been interpreted as a basic marker of the quality of democratic representation (e.g., Bartels 2008; Erikson, MacKuen, and Stimson 2002; Gilens 2005). However, gender scholars have largely overlooked how public opinion matters for a host of questions in the women and politics literature, such as why the representation of women in elected office varies dramatically across states, for example, or why women's health policies pass in some contexts but not others. We believe this decision is in part due to the lack of available measures. This article provides a new measure of state-level attitudes toward gender roles. Our series, gender equality mood, spans from 1972 to 2010 and is the first measure to capture variation in gender-role attitudes across states *and* over time. The series is created using two leading techniques for opinion estimation: multilevel regression and poststratification and survey aggregation. The main contribution here is to

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introduce our measure of gender equality mood, but we conclude by discussing several research areas in which it may be especially useful.

Methods: Creating State-Level Gender Equality Mood

Although there is sufficient national-level data on gender-role attitudes that extend to the mid-twentieth century, it is difficult to disaggregate these estimates by state due to small sample sizes. Arceneaux (2001) is the only scholar to date to create a state-level measure of gender attitudes. He draws on data from the General Social Survey (GSS) and deals with the small N problem by pooling across years (1974–1996) and constructing a cross-sectional measure. As a result, the measure resembles a snapshot of public opinion during this period and masks any historical variation. Arceneaux (2001) provided a first and important step toward measuring gender-role attitudes, but given the dramatic changes in public opinion over the last few decades, it would be helpful to have measures that vary across all states as well as over time.

We create new measures of gender equality mood from 1972 to 2010 by combining two methods. First, we use multilevel regression and poststratification (MRP) to estimate state-level responses for an index of survey questions. Second, we combined those responses into an over-time aggregate series for each state using Stimson's dyad ratios algorithm (WCalc). In combining MRP with aggregation, we follow Enns and Koch (2013) who used this procedure to create over-time measures of public policy mood, partisanship, and ideology for the states from 1956 to 2010. This combined approach reduces both measurement and sampling error and recovers valid state-level opinion estimates (Enns and Koch 2013).

MRP involves modeling survey responses based on demographic and geographic variables and then weighting (poststratifying) those estimates by the demographic composition of actual state populations with census data (Kastellec, Lax, and Phillips 2010; 2016; Lax and Phillips 2009b; Pacheco 2011; Park, Gelman, and Bafumi 2004; 2006). This technique allows us to estimate public opinion where polling data are unavailable, which is often the case for states. MRP has several advantages over the other primary state opinion method, disaggregation (Arceneaux 2001; Brace et al. 2002; Erikson, Wright, and McIver 1993; Norrander 2001; Wright, Erikson, and McIver 1985), which pools responses across years to achieve adequate state samples and then disaggregates responses by state. First, with MRP, we can produce year-specific estimates of opinion, as there is no need to combine surveys from different years. Over-time series of opinion can be created by repeating this process for multiple years. Second, MRP can produce valid estimates with just 1,000 observations, the typical sample size of a survey, and it does so with smaller errors than disaggregation (Lax and Phillips 2009b). Lastly, it also allows us to estimate opinion for smaller states, which may not have enough observations even by pooling across years, and for Alaska and Hawaii, which are often excluded from national surveys (Lax and Phillips 2009b, 109). Other studies exploit the benefits of MRP to create state-level opinion measures on gay rights (Lax and Phillips 2009a), Supreme Court nominees (Kastellec, Lax, and Phillips 2010), the death penalty, abortion, education spending, welfare spending,

smoking bans (Pacheco 2010), and party identification and ideology (Enns and Koch 2013; Pacheco 2011).

Our first step for MRP was to identify and collect national-level opinion data on gender-role attitudes. Because we are creating over-time measures, we limited our search to questions that were repeated over several years. Twenty-one such questions were selected from the American National Election Studies (ANES), the GSS, and CBS and Gallup surveys accessed through Cornell University's iPoll Databank. These questions were asked an average of 10 times during the period of interest and provide us with more than 80,000 observations on which to base our estimates. We rely on the ANES and GSS because they are long-running studies containing many questions repeated in identical form in multiple years. In addition, they include all of the relevant individual-level indicators needed to model the survey responses, including sex, age, race, education, and state.[1] Similarly, additional Gallup and CBS surveys were selected because they repeated identical questions in multiple surveys and years. Each individual survey question was recoded into a binary variable where "1" indicates support for equal gender roles—including women's participation in politics and the public sphere—and "0" indicating all other responses.[2] A full list of questions is provided in Table A1 in the online appendix.

After gathering the requisite data, we estimated a multilevel model of individual-level survey response. Following Kastellec, Lax, and Phillips (2016), we fit a linear mixed effects in R (LMER) regression model in which each individual's response is a function of his or her gender-race category, age category, education category, region, state, and an interaction of age and education (Kastellec, Lax, and Phillips 2016, 7).[3] This model provided the probability of a "pro-gender equality" ("1") response to the question for each demographic-state category, for example, the probability that a white male, aged 45 to 64, with a high school education, living in Illinois would respond "yes" to voting for a female presidential candidate (Kastellec, Lax, and Phillips 2016, 10). We then weighted these predictions by the actual number of people in each demographic-state category using census data and calculated the weighted average for each state (Kastellec, Lax, and Phillips 2016, 11).[4] Continuing with the previous example, this last step would produce the percent of Ohio residents who said they would vote for a female presidential candidate in a given year. We repeated these steps for every survey question for each year it was asked. This iterative process yielded more than 200 opinion estimates for each state.

The final step was to aggregate these individual question estimates into the overall gender-role mood series with Stimson's (1991) WCalc program.[5] The WCalc program calculates the over-time change for each survey question and then extracts the latent dimension underlying these changes to produce a single aggregate series of public opinion (Baumgartner, De Boef, and Boydstun 2008). WCalc is used to create Stimson's (1991) measure of national policy mood as well as other series for state public policy mood (Enns and Koch 2013) and presidential evaluations (McAvoy and Enns 2010). Although we have survey data in both odd and even-numbered years, we have fewer odd-year estimates after the mid-1990s when the GSS changed to a biannual format. As a result, though WCalc continues to draw on estimates for all years

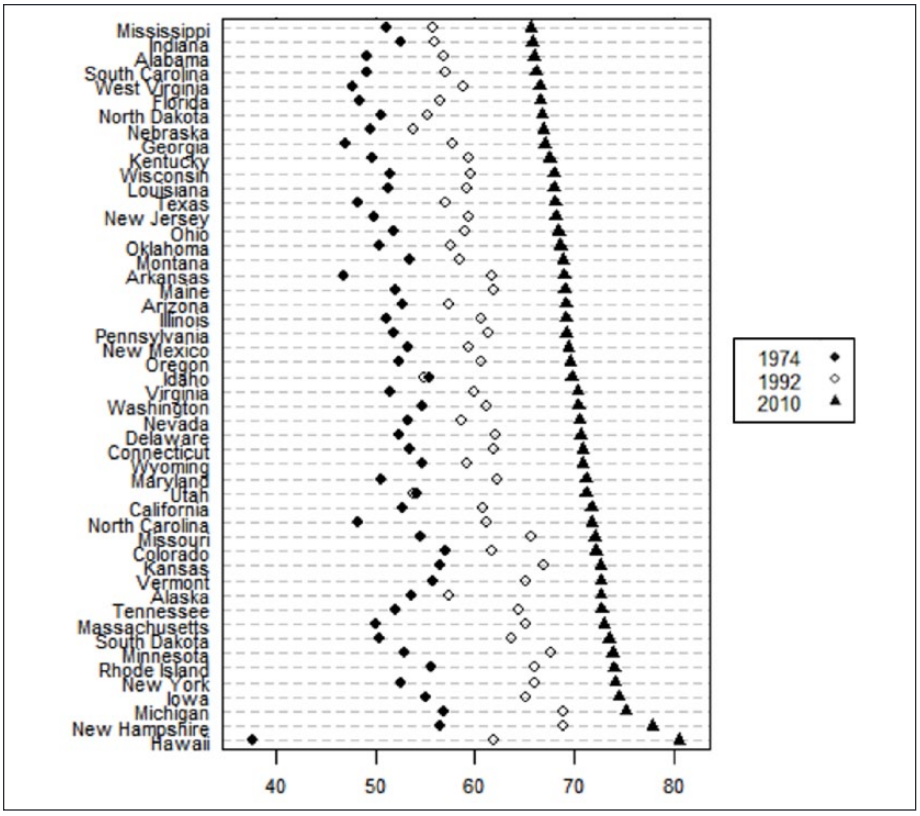

Figure 1. State gender equality mood over time.

available, we chose to create a series with values for every two years.[6] This complete process left us with a biannual series of gender equality mood for every state from 1972 to 2010. Gender equality mood is the first measure to capture both cross-sectional and historical variation in gender-role attitudes at the state level.

Variation in Gender Equality Mood across States and Time

Figure 1 plots the average gender equality mood for each state for 1974, 1992, and 2010. The states are ordered from the lowest score in 2010 to the highest.[7] Higher values of gender equality mood denote greater support for equal gender roles, or lower support for traditional gender roles. We can see that support for equal gender roles has increased over time in all states, which is consistent with changing norms and patterns in national survey data. For instance, if we simply look at the full GSS national sample, the percent who disagreed that women were not suited for politics increased from

53% in 1974 to 78% by 2010. As an additional check on the over-time pattern of our state series, we compared it with a national-level version created with the same set of survey questions and aggregated with WCalc. If our state-level estimates are valid, then the population-weighted aggregate of these estimates should be comparable with this national series. Indeed, our aggregated state series and the national series are strongly correlated at 0.74.[8]

Although support for equal gender roles increases for each state over time, we also observe considerable variation between states. Across all years and states, gender equality mood ranges from 38 to 81 on a 100-point scale, and state averages for the full time period range from about 55 in Alabama to 67 in Michigan. In the most recent year, 2010, there was about a 15-point difference between the lowest and highest state score (Mississippi and Hawaii, respectively). The significance of this range is clear when we consider that it is comparable with the difference between the average gender equality mood in 1972 and 1992. The positions of the states also provide face validity for our measures, as they line up much as we would expect. At the top of the figure, states with the lowest support for equal gender roles are mainly Southern states and some Midwestern states. Indeed, previous findings show that gender-role attitudes are significantly and consistently more traditional in the South than in other regions (Rice and Coates 1995). At the bottom of the figure, northeastern and some western states have the highest average support for equal gender roles.

As discussed above, Arceneaux's (2001) measure of state-level gender-role attitudes, which was created through disaggregation, is the most similar existing series to ours. We compared this series, which pools responses from 1974 to 1996, with our state averages for the same time period for the 38 states available in Arceneaux's data. The correlation between the two is fairly high at 0.54. This suggests we have captured a similar cross-sectional pattern; however, our series includes measures for all 50 states and captures important variation across time as well. It also draws on more survey questions, 21 in comparison with 2.[9] In light of previous research that shows that MRP (Lax and Phillips 2009b) and the use of multiple questions (Ansolabehere, Rodden, and Snyder 2008) reduce sampling and measurement error, we have good reason to believe our measures are valid and an improvement.

We also examined how our measure of gender equality mood is related to a variety of other indicators of gender equality. For example, our measure is correlated with state ratification of the Equal Rights Amendment (ERA) and the timing of ERA ratification at 0.43 and 0.44, respectively. It is correlated with Windett's (2011) measure of female sociopolitical subculture at 0.51 and with Elazar's (1972) measure of traditionalistic political culture at −0.55.[10] We also provide correlation coefficients between our measure and NARAL Pro-Choice America's (2016) rating of state reproductive rights and the state gender wage gap (NWLC 2015; see Table A3 in the online appendix). Higher values of gender equality mood are positively associated with state reproductive rights and smaller wage gaps between men and women. Our measure is positively associated with the state minimum wage as well (U.S. DOL 1988-2010), which is a seemingly gender-neutral policy but it has a disproportionate effect on women. In short, there is evidence that our measure is related to these other indicators of gender

equality in the direction we would expect. However, for the variables that do not vary over time, our measure is treated as cross-sectional, averaging gender equality mood across years to examine cross-state differences, but thereby obscuring any changes in attitudes over time.[11] This compromise is important to note as the over-time dynamic of measures such as ours is equally if not more important than the cross-sectional dimension (Enns and Koch 2015).

We also present correlation coefficients between Arceneaux's measure and the above indicators of gender equality (see Table A4 in the online appendix). In some cases, Arceneaux's measure is more highly correlated with these indicators than our measure, but the coefficients are largely similar. Furthermore, the number of observations is significantly lower due to previous data limitations, and we are not able to use Arceneaux's measure to examine historical changes in gender-role attitudes. Again, one of the main strengths of gender equality mood is that we can capture variation in gender-role attitudes across all 50 states and over time. Our measure opens up new avenues for cross-sectional and especially historical analyses of gender-role attitudes as both an independent and a dependent variable.

There are many research areas in which our measure could be utilized, but one potential application is to the topic of women's descriptive representation. The number of women in elected office has and continues to vary dramatically both across states and over time. For example, women held 18% of Colorado's state legislative seats in 1976, but they now constitute 39% of the legislature. By comparison, women currently make up 15% of the Louisiana state legislature, but this too is up from the strikingly low figure of 2% in the 1970s (CAWP 2017). Although the main purpose of this article is to introduce our measure of gender equality mood, we briefly examined how it tracks with the percentage of women in state legislative office (see Figure A1 in the online appendix). Our measure is moderately correlated with the percentage of women in the state House of Representatives at 0.46. The correlation changes over time, and the dip in the 1990s may be a function of the increased state-level heterogeneity in gender equality mood at that time. The correlation is higher earlier in the time period and in more recent years as well. Some avenues for future research could be to examine why gender-role attitudes map more closely onto women's representation at some points or in some states and not others, for example, or whether gender-role attitudes are positively related to the representation of women in state legislative as well as state executive office. A variety of structural, institutional, and cultural factors influence patterns of women's representation, but our measure can be used to learn more about the impact of gender-role attitudes on the dearth of women in politics as well.

Conclusion

This article provides a new measure of state-level attitudes toward the role of women in politics and society. Gender equality mood is the first such measure to take into account both historical and cross-state patterns in opinion. Our measure of gender equality mood will enable scholars to pursue a variety of unresolved questions in gender and politics research. For example, our series of gender-role attitudes can shed

light on the timing and scope of policy change. Because gender equality mood is domain specific, the measures can be used to examine changes in women's policies in particular, such as state paid family leave, breast cancer screening, and reproductive health issues. Future research can analyze the relationship between attitudes for gender equality and abortion policy, such as mandatory delay laws, funding for crisis pregnancy centers, and protections for abortion clinics. From a different angle, we can also study the underlying causes and timing of shifts in support for equal gender roles, such as when and why people become more supportive of equal gender roles.

In addition, this rich variation in gender-role attitudes may have important implications for the representation of women in elected office. Political scientists have given less attention to how gender-role attitudes shape patterns of women's representation, but they may help to explain why some states have much higher percentages of women in political office than others and also why the representation of women in politics has increased across virtually all states over the past few decades. Scholars could also explore whether women are more likely to run for office and whether party leaders are more likely to recruit women candidates when gender-role attitudes are more favorable to the participation of women in politics. More generally, there are many ways in which our measure of gender equality mood can be incorporated in political science research. At the very least, we hope the methodological contribution of this article will spark a renewed exploration of how public opinion matters for broad questions in gender and politics.

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Supplemental Material

Supplementary Material for this article is available online.

Notes

1. General Social Survey (GSS) sensitive data were acquired from the National Opinion Research Center to get the state indicator variable.
2. The variables are constructed as binary to create an internally consistent master dataset of all variables where 1 is the "liberal" response, which can then be predicted by the model. This follows previous research and the general MRP approach (i.e., Enns and Koch 2013; Lax and Phillips 2009b).
3. We follow previous MRP work by also using the state-level percentage of votes for the Democratic presidential candidate of the two-party vote, interpolated between election years, to estimate our models (Kastellec, Lax, and Phillips 2016; Lax and Phillips 2009a; 2009b; Park, Gelman, and Bafumi 2006).

4. Census data to poststratify the estimates are from the Integrated Public Use Microdata Series at the University of Minnesota. These included 1% census samples for 1970; 5% samples for 1980, 1990, and 2000; and 1% American Community Survey samples for 2005 to 2008. We relied on 1% samples when those were the only ones available. Between census years, we used linear interpolation so that we had individual poststratification files for each year.
5. Details about WCalc software are available at http://www.unc.edu/~jstimson/Software.html.
6. WCalc uses data from previous years in its estimation, so, for example, although we will not have a value in our final series for 1999, the opinion estimates produced with MRP for 1991 will be taken into account for 1992.
7. The estimates and confidence intervals are provided in Table A2 of the online appendix. They will be publicly available at the dataverse site of the authors on publication of the article.
8. Between 1972 and 1990, the correlation between the two series is nearly perfect at 0.99, but the relationship is weaker in the mid- to late-1990s where our series decreases more noticeably. The decline could be a function of greater state-level heterogeneity in gender equality mood later in the series. In fact, the average standard deviation of our measure is 3.41 from 1972 to 1990 and 3.28 from 2000 to 2010, compared with 4.03 from 1992 to 1998. This pattern is consistent with the culture wars politics and family values rhetoric that emerged in the 1990s and complicated attitudes about gender roles.
9. Arceneaux (2001) uses the following two questions from the GSS: (1) "Do you agree or disagree with this statement? Women should take care of running their homes and leave running the country up to men," and (2) Tell me if you agree or disagree with this statement: Most men are better suited emotionally for politics than are most women. We use both of these questions and an additional 19 from the GSS, American National Election Studies, Gallup, and CBS (see Table A1 in the online appendix).
10. Windett's (2011) measure consists of a host of political and social indicators of gender equality, including the percentage of women in the workforce, higher education, and statewide elective offices. Elazar's (1972) measure of traditionalistic political culture is associated with social and economic conservatism and maintenance of the existing social order.
11. As shown in Table A3 of the online appendix, timing and ratification of the Equal Rights Amendment and traditionalistic and moralistic state political culture do not vary over time. In addition, we do not have over-time data on NARAL's reproductive rights letter rating or the state gender wage gap.

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