State Politics & Policy Quarterly (2022), **22**: 3, 344–370
doi:10.1017/spq.2021.30

CAMBRIDGE UNIVERSITY PRESS

ORIGINAL ARTICLE

Gender and the State Politics of Policy Implementation in Education: The Interaction of Bureaucratic and Legislative Representation in India

Kenneth J. Meier[1,2,3] and Anita Dhillon[1]

[1]Department of Public Administration and Policy, School of Public Affairs, American University, Washington, DC, USA
[2]Cardiff School of Business, Cardiff University, Cardiff, UK
[3]Institute of Public Administration, Leiden University, Leiden, The Netherlands
Corresponding author: Kenneth J. Meier, email: kmeier@american.edu

(Received 28 April 2021; Revised 08 September 2021; Accepted 15 December 2021)

Abstract

Representation frequently links state politics to policy. Current research, however, overlooks the interplay between bureaucratic and legislative representation and how local representation may be influenced by state policy environments. There is also a need to test current theories of state politics and policy, driven by the study of US federalism, in different national contexts to indicate how general such theories might be and to provide new insights into the study of US politics and policy. This article studies how gender representation and local policy implementation interacts with state environment factors to affect representation outcomes in K–12 education across 28 states in India. The research points to the generalizability of current theories of representation and state politics across national federal contexts, the conditional nature of the influence of bureaucratic representation on state policy implementation, and the need to better understand the interdependence of representation across political institutions.

Keywords: representation; gender; education; India; policy outcomes; implementation

The literature on state politics and policy has influenced the study of public policy in numerous policy areas including regulation (Barrilleaux 2015; Konisky 2009; Woods 2015), education (Kitchens 2021; Manna and Harwood 2011; Ross, Rouse, and Bratton 2010), immigration (Jaeger 2016; Ybarra, Sanchez, and Sanchez 2016), healthcare (Yackee 2015; Zhu and Clark 2015), welfare (Xu, Garand, and Zhu 2016), and morality politics (Beer and Cruz-Aceves 2018; Kreitzer 2015), among others. Central to the link between politics and policy is how representation (Burden 2005;

© The Author(s), 2022. Published by Cambridge University Press on behalf of the State Politics and Policy Section of the American Political Science Association. This is an Open Access article, distributed under the terms of the Creative Commons Attribution licence (http://creativecommons.org/licenses/by/4.0), which permits unrestricted re-use, distribution and reproduction, provided the original article is properly cited.

https://doi.org/10.1017/spq.2021.30 Published online by Cambridge University Press

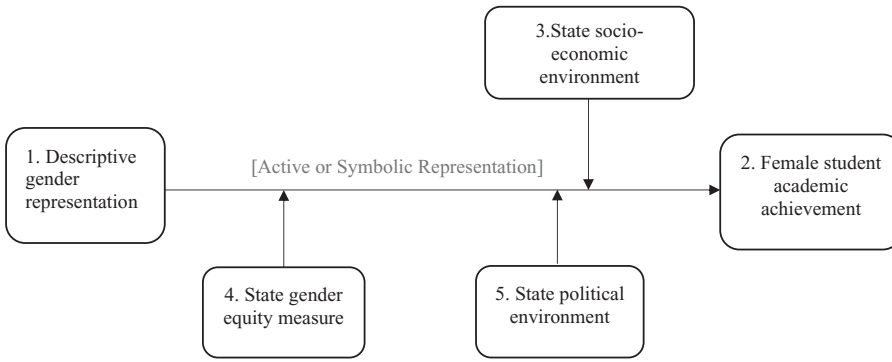

Figure 1. Interaction of policy and environment and political representation with the bureaucratic representation-academic achievement relationship.

Kastellec 2018; Robinson 2002), including gender representation, can influence public policy to benefit the individuals being represented (Kreitzer 2015; Uhlaner and Scola 2016). An extensive literature focused on US states examines the influence of female legislators on policy issues that link to women's interests (Caiazza 2004; McBride and Mazur 2010) including reproductive health (Kreitzer 2015; Norrander and Wilcox 1999), violence against women (Htun and Weldon 2012; Weldon 2002), healthcare spending for the poor (Courtemanche and Green 2017), elder care policy (Giles-Sims, Green, and Lockhart 2012), gun control laws (Thomas, Miller, and Murphy 2008), and voter registration laws (Hicks, McKee, and Smith 2016) among others.[1]

This study addresses three gaps in the state politics literature on gender representation. First, despite the numerous studies on gender representation in the US states, studies on how representation matters in the policy *implementation* process are relatively rare (see Jaeger 2016; Keiser 2001; Kim and Fording 2010; Robinson 2002 ; Ross, Rouse, and Bratton 2010). Second, although local governments are often used to implement state-level policy, only a limited number of studies incorporate local bureaucratic representation (Jaeger 2016; Robinson 2002; Ross, Rouse, and Bratton 2010) and none seek to integrate local representation with state-level factors and legislative representation. Third, even though federal systems and autonomous subnational governments exist in many nations, the state politics literature is overwhelmingly focused on the US.

We seek to contribute to the state politics and policy literature with a study positioned within these three literature gaps by focusing on bureaucratic gender representation and policy implementation at the local school level as it interacts with more macro state-level political factors in India. Specifically, as Figure 1 depicts, the study addresses how female teachers as street-level bureaucrats (descriptive gender representation) at the local school level through active or symbolic representation can influence the education performance of female students within the political and economic contexts of state politics in 28 Indian states

[1]Although our focus is on gender representation at the state and local levels, there is an extensive literature on gender representation in a wide variety of political institutions that is both nation specific and cross-national in approach (see Dahlerup 1988; Gray 2006; Htun and Weldon 2012; Mansbridge 1999).

https://doi.org/10.1017/spq.2021.30 Published online by Cambridge University Press

(see Figure 1). We show how policy environments (state gender equity and the socioeconomic environment) and political representation at one level (the state political environment) interact with teacher/bureaucratic representation at a lower level in ways that can enhance or impede the substantive outcomes of representation. Our objectives are both to show how the work in US state politics and policy might be generalized and also to illustrate the potential interplay of representation in various institutions (legislatures and schools) within different environmental contexts.

Policy Theory and Representation

Although the study of state politics and policy has evolved to incorporate numerous theories applied to a wide variety of processes and outcomes, it generally retains the generic open systems logic expressed in early work (Dye 1969; Sharkansky and Hofferbert 1969). A variety of economic, social, and political factors serve as inputs to political processes and institutions that generate a set of outcomes including public policy. These policies then feed back into the system to affect the original inputs and thus future politics and policy (Pierson 1993). The literature frequently examines whether a political factor such as representation might influence public policy. Representation studies including those focused on gender examine not just its direct effects, but also how representation might be influenced by other factors such as partisanship (Courtemanche and Green 2017; Kreitzer 2015), professionalism (Cammisa and Reingold 2004), alliances (McBride and Mazur 2010), critical mass (Bratton 2005; Dahlerup 2006), institutional structures (Hicklin and Meier 2008; Weldon 2002), and intersectionality (Fay et al. 2021; Orey et al. 2007; Reingold and Smith 2012).

Notwithstanding the extensive literature on representation in the state politics and policy literature, three gaps are apparent. First, despite calls for including bureaucratic representation in studies of gender representation (Meier and Funk 2016; Spary 2020; Vickers 2020), bureaucratic representation is only rarely examined and then often at an aggregate level that combines many individual bureaucracies (Zhu and Walker 2013) or only within a single state (Atkins and Wilkins 2013; Wilkins 2007). This gap in the literature is surprising given that federalist countries adopt many policies in education, welfare, public health, and law enforcement that are implemented by local bureaucracies that have discretion to apply policies to individual cases. Bureaucratic representation at the local level is likely to be more influential than bureaucratic representation at the state level given that local bureaucrats will interact directly with clientele and thus have more opportunities to engage in active representation. Similarly, in terms of symbolic representation, individuals have far more opportunities to interact with local bureaucrats than with those at the state level.

Second, studies of representation in the states generally treat environmental factors, whether social or economic, as controls rather than as contexts that might interact with the level of representation to augment or diminish its influence. This is surprising given the logic that representation as a political process seeks to translate inputs into outputs to benefit constituents and that such a process should be enhanced in situations with more available resources or more amenable social environments (Dhillon and Meier 2022). Clearly, a state with ample economic

https://doi.org/10.1017/spq.2021.30 Published online by Cambridge University Press

resources or a political and social culture that favors government action should provide greater leverage for representatives who seek to use policy instruments to benefit the individuals that they represent.

Among the environmental aspects of representation not systematically addressed is the interaction of representation across institutions. The objectives of legislative and bureaucratic representation often coincide, and this suggests that there are synergies or even the potential for coalitions (Meier and Funk 2016; Vickers 2020, 26). Legislators seeing compatible bureaucratic representation might be more likely to delegate policy discretion to the bureaucracy (Krause 2010). Similarly, bureaucrats could see representative legislators as both potential allies and as role models for aggressive action (Meier and Rutherford 2017).

Third, despite the extensive literature in US state politics and policy, the United States is only one of many federal systems; and such systems vary dramatically in terms of how they are structured. In some cases such as Canada and Switzerland, the subnational governments have substantially more formal power than the US states (Hueglin and Fenna 2015). Federal systems vary in how they reflect "constitutional, political, social, economic, cultural, legal, philosophical, and ideological" factors within the country (Burgess 2006, 1). Pushing US theories of state politics and policy into different national contexts, as a result, can indicate how general such theories might be, contribute to a comparative federalism literature, and perhaps also provide insights into new approaches to the study of politics and policy in the US. In the present case, an extensive database in India that permits comparison across local units within and across states allows testing some important theoretical relationships that might be difficult to assess in the US.

Representation: Bureaucratic and Political

Although representation can occur in both political and bureaucratic institutions, the academic study of bureaucratic representation uses somewhat different definitions and terminology despite similar theoretical processes. Both distinguish between a representative "standing for" versus "acting for" the represented (Pitkin 1967). The political representation literature terms the first action "descriptive representation" and the second "substantive representation." In contrast, the bureaucratic literature (Mosher 1968) defines the first as "passive representation" but divides the second concept into "active representation" when outcomes change as the result of the action of the representative and "symbolic representation" when the outcomes change because of something the represented does (or in bureaucratic terms the "client").

The micro theory of substantive representation by the bureaucracy is well established for both active representation (Bishu and Kennedy 2020; Kennedy 2013; Meier 2019) and symbolic representation (Riccucci and Van Ryzin 2017). The literature links descriptive representation (that is, the match up of bureaucrats and clients on various demographic characteristics) to outcomes that benefit the represented clients. Active representation is more likely to occur when a shared identity (race, gender, social class, etc.) is salient to the bureaucrat in a policy area where the bureaucrat has discretion (Keiser et al. 2002). Outcomes that benefit clients can also occur by symbolic representation. When clients see bureaucrats who look like them,

https://doi.org/10.1017/spq.2021.30 Published online by Cambridge University Press

they sometimes change behavior to either be more cooperative or to coproduce a policy outcome with the end result being some benefit to the client (Riccucci and Van Ryzin 2017).[2]

The specifics of how representation works in practice can be illustrated in the area of education policy, a topic that has generated multiple studies of representation in a wide range of settings including Ghana (Agyapong 2018), Korea (Song 2018), China (Zhang 2019), and India (Dhillon and Meier 2020), in addition to multiple studies in the US (Atkins and Wilkins 2013; Keiser et al. 2002; Meier 1984). As indicated in Figure 1, the influence of female teachers on the performance of female students in classes has been demonstrated with a positive correlation between (a) descriptive representation and (b) education outcomes; this can result from either of two processes. Female teachers are likely to be aware of the pervasive stereotypes in regard to gender and spend more time encouraging female students, changing instructional patterns (see Carlana 2019; Keiser et al. 2002; Song 2018) or recommending students for more advanced classes or other opportunities for higher quality education (Grissom, Kern, and Rodriguez 2015). The bureaucratic literature would consider this as an active representation. At the same time, the teacher might not act to represent female students at all, but rather simply the presence of a female teacher might motivate a female student to try harder in class, be more cooperative in the learning process (coproduction in public administration terms), or adopt the teacher as a role model (Keiser et al. 2002; Marx and Roman 2002). A positive relationship between girls' performance in schools and female teachers could result from either of these processes or a combination of the two (see Figure 1).[3]

H1: More female teachers will be associated with better school performance by girls.

Given the specification that bureaucratic representation is more likely to occur when issues are salient and bureaucrats have the relevant discretion (Keiser et al. 2002), the theory has always recognized that context affects the representation relationship. Originally the theory included elements within the organization (hierarchy, critical mass, and centralization) as well as factors outside the organization that could affect salience or discretion (variation by time and place; see Bishu and Kennedy 2020). Meier (2019) sought to integrate these contextual factors by arguing that representation would be more likely to occur in situations when the benefits of representation to the bureaucrat or the client exceeded the costs.

Three potential contextual factors measured at the state level could affect the relative benefits of representation; all link to the traditional state politics concern with politics and economics—(a) the level of socioeconomic development, (b) the status of women in society, and (c) the political representation of women (see Figure 1). Each contextual variable merits discussion in turn.

For both bureaucrats and clients, representation requires some effort, doing something over and above what they would normally do. Actions include spending

[2]Passive descriptive representation can also result in the client perceiving the bureaucrat's action as more legitimate and generating diffuse support for the bureaucracy. This is similar to the literature that shows same race and gender candidates for office influencing the attitudes of individuals about the political system or willingness to participate (Barreto 2007; Gilliam 1996; Uhlaner and Scola 2016).

[3]Most datasets simply do not have sufficient information on both the individual actions of the bureaucrats and the clients to distinguish between the two processes. Guul (2018) is able to get leverage on this question in the case of employment counseling and finds both processes at work.

https://doi.org/10.1017/spq.2021.30 Published online by Cambridge University Press

more time with students, advocating for a student's interest, spending more time on homework, and seeking out extra credit or more challenging assignments. Logic suggests that both teachers and students would be more motivated to take this effort when the payoffs to such efforts would be larger. In more direct terms the payoffs to girls staying in school and performing better would be higher in contexts with greater economic development, less poverty, more labor force participation, better health, and other opportunities (see Figure 1: state socioeconomic environment). Teachers would be more likely to see a higher payoff to working more with female students, and students should perceive similar opportunities.

H2: The relationship between female teachers and girls' school performance will increase as the socioeconomic status of the state increases.

Countries vary substantially in terms of how equally women share in the benefits of society (Ertan 2016; World Economic Forum 2019). In some countries, women still lack fundamental political and economic rights and face strong cultural preferences for male children (Edlund 1999). Evidence of gender-based inequalities in sex ratios, female labor force participation, female literacy, female education attainment, and voter participation can indicate whether either active or symbolic representation might generate future benefits for female students.

The case of gender equity might have different effects depending on whether the teacher engaged in active representation or the student responded to symbolic representation. For active representation, the relative gains from gender equity should outweigh the burden of representation and encourage bureaucrats to invest more time in female students, suggesting a positive relationship.[4] For symbolic representation, the relationship might actually be reversed. In a situation where women have few economic opportunities, and there are high levels of gender-based violence and restrictive customs, a female teacher might be the only nontraditional role model available to a student, and thus symbolic representation might be enhanced (see Figure 1: state gender equity).

H3: The relationship between female teachers and girls' school performance will be moderated by the degree of gender equity in the state, and either increase the relationship if active representation occurs or decrease it if the representation is only symbolic.

Bureaucracies are open systems that operate within environments that both constrain and facilitate their actions. Favorable political representation is a potential resource for the representative bureaucrat. In a study of racial representation in US school systems, Meier and Rutherford (2017) show that African American teachers have substantially greater influence on the outcomes of African American students in school districts with favorable political environments using both partisanship and representation as indicators of a favorable environment. Political representation at higher levels might augment the potential for bureaucratic representation in two ways. If political representatives attain a critical mass (Bratton 2005), they could adopt policies that directly address questions of gender equality including access to education. Even without a critical mass, they could serve as highly visible symbols and role models to female teachers and school children (Beaman et al. 2012). Although female representation in Indian legislative bodies is low, averaging 10.9% in the lower

[4]Recent theory (Meier 2019) argues that bureaucratic representation responds to the level of inequality which suggests that there might be nonlinearities in the linkage between representation and the environment.

https://doi.org/10.1017/spq.2021.30 Published online by Cambridge University Press

house of the parliament of India (Lok Sabha) and 9.4% in the state legislative assemblies (Vidhan Sabhas), existing legislation (see below) recognizes the need to improve female educational opportunities so political representation is more likely to be symbolic than reflecting the ability to enact legislation (see also Jacob 2014; see Figure 1: state political environment).

H4: The relationship between female teachers and girls' school performance will increase in states with more favorable political environments including greater representation of women legislators.

The Indian Context

India is an important case to study both gender representation and how it is affected by differences in state politics and policy given its political and governance system. Substantively, it is the world's largest functioning democracy with nearly 1.4 billion people governed in a federalist system with lawmaking powers shared between the central government, 29 states, and 7 union territories. The Indian Constitution distributes powers between the central and state governments, with a Union List containing subjects regulated by the Center (examples include defense, foreign affairs, banking, and insurance), and a State List where states have exclusive power (examples include policing, public health, prisons, and local government). A concurrent list of subjects also exists over which both the central and state government have legislative powers and this list includes education, labor welfare, and criminal procedure among others (The Constitution of India, 7th Schedule). Unlike the US, residual lawmaking powers in India rest with the central government, but states have considerable power to create and implement policy in certain areas that could greatly affect gender outcomes, particularly in social policy, public health, education, and law enforcement.

Because the Indian states are mainly divided along linguistic and ethnic lines, federalism and the division of powers creates substantial variation in how political issues are gendered within the subnational units based on how the states use their policy discretion (Vickers 2011; 2013). As a result, the country has high levels of gender and socioeconomic disparities that vary significantly across its states and regions (Spary 2020, 279; Vickers 2020, 23). Overall, gender is a salient identity in the country. India ranked 127 out of 160 countries on UNDP's 2018 Gender Inequality Index (United Nations Development Programme 2018) and 112 out of 163 countries on the 2020 Global Gender Gap Report (World Economic Forum 2019).[5] India underperformed on a variety of measures including economic participation and opportunity, educational attainment, political empowerment, and health outcomes. Gender disparities begin early with a child sex ratio of 111 male to 100 female births compared to 105 male to 100 female births in the US (World Bank 2018). Women are three times less likely to be a part of the labor force (Jayachandran 2015), and the gap between male and female labor force participation has been growing over the years (Das et al. 2015). Female children are also allowed little control over personal decisions; and parents, especially mothers, exhibit strong preferences for male children, among other negative gender attitudes (Dhar, Jain, and Jayachandran 2018; Jayachandran 2015).

[5]The US ranks 17th and 53rd on these respective indexes.

https://doi.org/10.1017/spq.2021.30 Published online by Cambridge University Press

In terms of educational outcomes, women's literacy levels are 16 percentage points below men's, according to the 2011 Indian Census. Girl students between the ages 8–11 underperform boy students on reading and math achievement tests (White et al. 2016), and they are less likely to continue into secondary schooling (Ministry of Human Resource Development 2018). Finally, while India has had a female Prime Minister, political representation in legislative bodies at the Central Government and State Governments and women in ministerial positions tends to be low (World Economic Forum 2019). Only 14% of elected members of parliament and only 9% of the political candidates in the 2019 General Elections were women (Iyer 2019; Jensenius and Verniers 2019).

Gender politics and gender disparities do not manifest equally across the 29 states and 7 Union Territories. As Spary (2020, 279) contends, "regional differences across India's 29 regional governments and seven union territories also create different life opportunities, experiences of citizenship, and women's relationship with central and regional governments." In the context of health systems and health outcomes including maternal mortality, sex ratio at birth, and neonatal mortality, a 2019 government report found that the best-performing state in the country (Kerala) scored two and a half times higher on a composite health index than the worst-performing state (Uttar Pradesh) (NITI Aayog 2019). A gender parity index using 15 indicators such as labor force participation, child marriage, gender-based violence, and female representation in leadership roles and professional jobs, with a score of 1.0 equaling gender parity, also found wide differences among states ranging from 0.7 in Mizoram to 0.42 in Bihar (Woetzel et al. 2015). Multiple studies further highlight the economic disparities across states, in terms of income per capita, educational attainment, and overall human development (Bandhyopadhyay 2013; Suryanarayana, Agarwal, and Prabhu 2011).

The Indian Education System

Indian K–12 education is delivered through nearly 1.5 million government-recognized schools with instruction offered in 31 different languages (Meganathan 2011). Education policy is a concurrent subject, jointly governed by both the central and state governments, with states allowed certain autonomy over subject curricula and high school certificate examinations. The role of the central government in education policy and implementation has led to the creation of a national database of all recognized schools in the country, with annual information collected on school organizational and environmental factors, as well as student academic performance (National Institute of Educational Planning and Administration 2016).

From a policy environment perspective, the desire to reform the education system led the central government to pass the Right to Free and Compulsory Education (RTE) Act in 2009. The RTE Act is the legislative manifestation of an amendment to the Indian Constitution that grants every child the fundamental right to free, compulsory, and full-time education between the ages 6–14. It establishes norms for basic school infrastructure, student–teacher ratios, teacher training requirements, and prohibits corporal punishment among other things (Ministry of Human Resource Development 2019). Beyond the RTE Act, and to specifically tackle the gender inequalities in education, a national campaign called "*Beti Bachao, Beti Padhao*" (save the girl child, educate the girl child) was also launched in 2014.

https://doi.org/10.1017/spq.2021.30 Published online by Cambridge University Press

It aims to coordinate action between ministries to improve the sex ratio as well as ensure the survival and education of the girl child (Ministry of Women and Child Development 2018). Both the RTE Act and the national campaign, however, are plagued by implementation issues and variations across states including poor funding, inadequate monitoring and evaluation systems, and unfocused expenditures (Nikore 2019; The Hindu BusinessLine 2017).

The variation in the policy environments and political representation across states and the salience of gender representation especially in the K–12 educational context, therefore, make India an important context in which to study how the two interact to either enhance or impede the outcomes for female students. The greater variation permits analyzing the impact of representation over a wider range of contexts than studies focused on other countries. At the same time, there are theoretical reasons to think that a study of state representation in India might generalize to other federal systems including the US and suggest similar studies in those contexts. Both India and US, for example, are federal systems that enumerate separate powers for the national and state governments as well as a set of shared powers. Although the Indian Constitution and experience vests greater powers in the national government, it is important to note that the relative power of state and national governments varies over time in both countries (Vickers 2020, 18). Since 1950 the US system has clearly become more centralized with federal mandates affecting law enforcement policy (Nicholson-Crotty and Meier 2003), voting rights (Weinstein-Tull 2016), minimum drinking ages (Zimmerman 2001), welfare policy (Ojeda et al. 2019), the ability to tax (Tax Cut and Jobs Act of 2017), and many other areas. Similarly, with a 1994 Supreme Court case (S.R. Bommai v. Union of India) restricting the central government's ability to intervene in state affairs, Indian federalism (at least until Narendra Modi became the Prime Minister) was moving toward less centralization (Spary 2020; Vickers 2020).

A second argument for application is that the representation theory presented here is general and not country specific. The logic that representation at one level could relate to and interact with representation at another level of government or across institutions is not context-dependent at least among democracies. In the same manner, the idea that representation depends on the relative resources available is inherent in the basic systems notions that underlie much of state policy research. While the US states are far more developed economically than the Indian states, at times the differences are not so extreme as to render the findings completely incomparable. For example, in 2018 five Indian states had lower infant mortality rates than Mississippi; the highest female labor force participation rate in India (53.8%) was not dramatically lower than that for West Virginia (62.9%). Women's representation in India is lower but the ranges overlap. As an example, state female representation in the US House of Representatives in our time period averaged 19.3% with a range of 0 to 100; the mean for the percentage of women that were elected to each Indian state's delegation to the Lok Sabha was 10.9% with a range of 0% to 28.6%. In terms of representation in the lower house of the state legislature, West Bengal had better female representation (14%) than three US states (Oklahoma, Louisiana, and Utah). While Indian states are far more diverse in terms of ethnicity, language, and culture than the US states, demographic changes as the result of immigration and differing birth rates among subpopulations, indicate that US states are moving in the direction of greater diversity.

The US and Indian state politics and policy contexts, as a result, are similar enough that analysis in one could be used as a proof of concept for hypotheses in the other.

https://doi.org/10.1017/spq.2021.30 Published online by Cambridge University Press

Such an interchange of theory and analysis across federal systems holds potential benefits for the study of subnational politics and federalism.

Data

To analyze the hypotheses in this article, we compiled a dataset containing annual K–12 school organizational data and state-level environmental data from various official Indian Government sources. The school-level dataset was obtained from the Unified Information System for Education (U-DISE) in the Ministry of Human Resource Development. It has annual organizational information of all recognized schools in India (nearly 1.5 million), including infrastructure, demographic make-up, student and teacher counts, academic achievement, and funding (National Institute of Educational Planning and Administration n.d.). Given the data availability for key variables in this study, four years of observations (2014–15 to 2017–18) were retained in the dataset. The unit of analysis for this study, therefore, is an individual K–12 school in each of the four years of observation.

A range of state-level measures that determine socioeconomic health, gender disparity, and political representation of women were collected from various government sources as outlined in Appendix A. Not all state-level measures had information for each year included in our analysis and were therefore interpolated using data from the years closest to those included in the analysis. State-level data was also difficult to obtain for the seven union territories and the state of Telangana that was formed in the year 2014; those jurisdictions were omitted from the analysis, leaving 28 states in the dataset (The state of Jammu and Kashmir, which was included in this analysis, was dissolved in 2019 and reorganized into Union Territories).

The Dependent Variable

Female academic achievement is measured using each school's eighth grade end-of-year examinations. The eighth-grade examinations are a crucial milestone for Indian students to ensure entry into secondary school (Grades 9–10) where they prepare for centralized public examinations that decide their future academic path. The eighth-grade exam results are, therefore, considered a signal by schools on whether students are ready to sit for those crucial public examinations, making them a salient measure of academic achievement. The U-DISE dataset has information on the number of students who scored 60%+(equivalent to a first-class grade) in their examinations, across all subjects. Given the signaling nature of these scores, we use the 60%+ measure as our dependent variable. This also means that our dataset is restricted to those schools that have an eighth grade.

Independent and Moderating Variables

The percentage of female teachers in each school is the main explanatory variable in our model. After grade four, students typically encounter specialized subject teaching and interact with most teachers in their school either through class or through extracurricular and cocurricular activities. We therefore use an organization-wide measure of gender representation to complement the overall academic performance measure (as opposed to subject-specific performance).

https://doi.org/10.1017/spq.2021.30 Published online by Cambridge University Press

To assess the moderating influence of the state's policy environment, we included several state-level social, economic, and political health measures. First, to estimate the socioeconomic environment of the state, we performed a principal component factor analysis on eight variables for each state: the literacy rate, labor force participation, poverty rate, primary school and higher education enrollment, state domestic product, child stunting, child mortality rate, and the percentage of population living in urban areas. Table A.1 lists these variables and their measures and Table B.1 indicates their factor loadings. The scree plot indicated a one-factor solution with an eigenvalue of 5.2 explaining 58% of the variance; that factor is our measure of state socioeconomic environment. Schools with higher values for this factor are located in states that have higher levels of labor force participation, literacy, education participation, urban population, and per capital domestic product, and lower levels of poverty, child stunting, and child malnutrition.

Second, to specifically measure opportunities for women and their participation in society, we created a factor from five variables measuring the sex ratio, female labor force participation, female literacy rate, female enrollment in higher education institutions for tertiary education, and women's voter participation rates in the 2014 general election. The analysis generated one factor with an eigenvalue of 2.3 that explained 46% of the variance among the variables (refer to Table B.2 for the factor loadings). This factor was retained as the state female development factor; higher values indicate more economic and social participation by women.

Finally, we used two variables to capture political representation for women. We used the percent of women elected to each state's delegation to the Lok Sabha (the lower house of India's parliament) and the percent of women who were elected to their respective state's Vidhan Sabha (state legislative assembly). The two measures are only moderately correlated with each other ($r = 0.2$).

Controls

To provide for important school-level factors that may affect student performance and gender representation, we control for student, teacher, and school infrastructure-related characteristics. In terms of student and teacher characteristics, we included the student–teacher ratio, number of instructional days, number of daily hours that teachers work, caste-related diversity in the student body, and the percentage of teachers who were either college graduates or had professional teacher qualifications. In terms of management and infrastructure characteristics, we controlled for English being the medium of instruction, if the school was government-run or privately-run, its location in a rural versus urban area, the ratio of female to male students in the school, and two factors capturing the physical infrastructure availability and management quality of the school (more details on these measures can be found in Dhillon and Meier 2020). These variables cover a range of factors that research suggests may affect academic achievement and the ability of teachers to represent (Monk 1989). At the state level, we also control for state expenditures on education and partisanship (both votes and representation for the governing political party [Bharatiya Janata Party]).

Table 1 shows the descriptive statistics for all variables. The numbers showcase the extreme variation in resources and task complexity in K–12 education in India. Since the dataset includes all government-recognized schools that teach eighth grade, it

https://doi.org/10.1017/spq.2021.30 Published online by Cambridge University Press

Table 1. Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max
Female students scoring 60%+in gr. 8 (%)	62.14	35.44	0.00	100.00
Female teachers (%)	40.02	31.06	0.00	100.00
State socioeconomic development factor	0.0	1.0	−1.55	3.17
State female development factor	0.0	1.0	−1.43	3.21
Seats won by women in the Lok Sabha	10.90	6.32	0.00	28.60
Seats won by women in the State Legislative Bodies	9.40	3.33	0.00	14.00
State expenditure on education (%)	15.53	2.38	8.60	25.50
Votes in state for BJP in 2014 general election (%)	37.57	17.39	0.00	60.11
BJP majority party in state legislative bodies?	0.37	0.48	0.00	1.00
Student teacher ratio	28.46	20.16	0.17	150.00
Teacher working hours	6.52	0.74	2.00	11.00
Instructional days	224.45	13.48	30.00	250.00
English medium school	0.12	0.32	0.00	1.00
Caste Herfindahl index	0.60	0.21	0.25	1.00
Infrastructure index	0.56	0.95	−1.68	2.03
School quality index	0.05	1.00	−1.92	0.81
Rural school	0.83	0.38	0.00	1.00
Government school	0.67	0.47	0.00	1.00
Teachers with graduate degrees	75.44	30.10	0.00	100.00
Teachers with professional qualification	86.56	27.35	0.00	100.00
School sex ratio	1.00	0.46	0.10	6.00

covers areas that were in active armed conflict (Parvaiz 2017), faced natural disasters during certain parts of the year (Paik 2017), or had very low student populations (Ellis-Petersen and Chaurasia 2020). This is evidenced by some schools having as few as 2 hours of average teaching per day in the school year or only 30 instructional days in the year. Additionally, the chronic shortage of trained teachers in the country has meant that some schools have no teachers with professional qualifications. As of 2017, 1.1 million untrained teachers were in the current workforce despite the RTE Act of 2009 specifying the need for them to gain the required educational qualifications by 2015 (Singh 2017).

Method

We analyzed the data in two stages. First, pooled OLS estimates were generated, with year fixed effects to control for any time-dependent variation and standard errors clustered at the state level to adjust for heteroskedasticity across states. This allowed us to estimate the relationship between each state-level moderating variable and female academic achievement. Next, to investigate how various factors can enhance or limit the ability of local bureaucrats to affect policy outcomes, we interacted each of the hypothesized moderating variables with the percentage of female teachers to estimate the marginal effect of the state environment on the representation relationship.[6]

[6]Detailed analytic steps, including the corresponding dataset, can be found in the SPPQ Dataverse page for this manuscript.

https://doi.org/10.1017/spq.2021.30 Published online by Cambridge University Press

Results

Table 2 contains the results of the clustered OLS model with school and state-level controls. Reflecting the unsupportive environment for gender representation and the status of women in India, the relationship between the percent of female teachers and female academic achievement is modest, a standard deviation change in the percentage of women teachers is associated with an increase of approximately 2.5 percentage points in girls passing at the level of 60%+(column 1).[7] The addition of state-level controls (column 2) results in only a slight decrease in this relationship (to approximately 2.4 percentage points). These results support hypothesis 1 on the relationship between bureaucratic gender representation and the performance of girls in school. As hypothesized, the substantively modest relationship also highlights the conditional nature of gender representation in schooling in the country.

The state-level relationships show that significant variation exists across the states in India. Girls' academic achievement is positively associated with the socioeconomic development factor, and whether BJP is the majority party at the state level, and negatively associated with the state female development factor and the percent of women elected to the state's legislative body. The two relationships for the socioeconomic factors are both robust statistically. On average, schools located in states that are more socioeconomically developed have a higher female academic achievement (a one standard deviation increase relates to a 7.7 percentage point increase in female students scoring 60%+in the exam), all other things being equal. Similarly, schools located in states that report better socioeconomic outcomes specifically for women have lower female academic achievement (a 1 SD increase leads to 5.7 percentage point decrease in female students scoring 60%+in the exam). Although the negative relationship for female socioeconomic outcomes might appear counterintuitive, this relationship needs to be interpreted in light of the control for overall socioeconomic development. States can score high on this dimension even if women in the state are worse off than women in other states because the measure is essentially normed to the relative status of women to men within a state.

Both the political relationships are somewhat counterintuitive. In states where BJP holds a majority in the state legislature, academic achievement rates for girls are 9.355 percentage points higher all things being equal, and states with more female members in the state legislative bodies are associated with lower female academic achievement (a 1% increase in seats held by women leads to a 1.2 percentage point decrease in female achievement). There are four reasons to discount these relationships. First, BJP is a right-wing Hindu nationalist party that is not associated with pro-female policy positions. Second, the state and national data for BJP are highly collinear and the coefficient estimate is heavily reliant on a single state (Andhra Pradesh) that has a state BJP majority but not a BJP majority in its national legislative delegation (see Table C.1). When that state is omitted from the analysis, the coefficient effectively drops to zero ($t = 0.07$). Third, the percentages of female legislators are well below any critical mass needed to pass positive legislation and might also simply reflect other state conditions that permit modest levels of gender representation along with low

[7]We also tested this relationship for a critical mass by adding the percentage of female teachers squared. While the estimate was significant, the impact was very gradual and appeared to be more diminishing marginal returns than a critical mass effect.

https://doi.org/10.1017/spq.2021.30 Published online by Cambridge University Press

Table 2. Pooled OLS estimates with school-level and state-level controls

Variables	(1) Only school-level controls	(2) School and state factors
Female teachers (%)	0.082***	0.076***
	(0.019)	(0.019)
State socioeconomic development factor		7.690**
		(2.819)
State female development factor		−5.712**
		(2.475)
Seats won by women in the Lok Sabha		0.060
		(0.254)
Seats won by women in the State Legislative Bodies		−1.221*
		(0.714)
State expenditure on education (%)		0.367
		(0.573)
Votes in the state for BJP in 2014 general election (%)		−0.055
		(0.129)
BJP majority party in state legislative bodies?		9.355*
		(5.097)
Student teacher ratio	−0.136***	−0.074***
	(0.030)	(0.023)
Teacher work hours (per day)	6.104***	6.920***
	(1.766)	(1.544)
Instructional days (per year)	0.093	0.039
	(0.058)	(0.065)
English medium school	0.241	−4.677
	(2.139)	(2.948)
Caste Herfindahl Index	5.715	2.166
	(3.857)	(2.773)
Infrastructure index	4.643***	2.012***
	(1.225)	(0.580)
School quality index	−1.262	−2.171***
	(1.190)	(0.686)
Rural school	−0.413	0.331
	(1.259)	(1.075)
Government school	−14.576***	−12.615***
	(2.908)	(2.996)
Teachers with graduate degrees (%)	−0.122***	−0.079**
	(0.039)	(0.029)
Teachers with teaching qualification (%)	0.166***	0.093**
	(0.045)	(0.034)
School sex ratio	−1.376*	−0.225
	(0.699)	(0.526)
Academic year 2015–16	−2.190	−2.179
	(2.212)	(2.146)
Academic year 2016–17	−0.875	−1.173
	(2.264)	(2.269)
Academic year 2017–18	−0.311	−0.395
	(2.220)	(1.891)
Constant	3.271	16.335
	(15.271)	(22.171)
Observations	1,287,101	1,287,101
R-squared	0.140	0.167

Note. Robust standard errors in parentheses.
***$p < 0.01$;
**$p < 0.05$;
*$p < 0.1$.

https://doi.org/10.1017/spq.2021.30 Published online by Cambridge University Press

Table 3. Moderating relationship between gender representation and state characteristics

Variables	(1) Socioeconomic factor	(2) Female dev factor	(3) Women in Lok Sabha	(4) Women in state legislature
% Female teacher	0.076***	0.077***	0.051	−0.012
	(0.019)	(0.019)	(0.044)	(0.066)
% Female teachers × *moderator*	0.013	0.043*	0.002	0.009
	(0.024)	(0.022)	(0.003)	(0.006)
Socioeconomic development factor	7.122**	7.461**	7.664**	7.706**
	(3.214)	(2.814)	(2.817)	(2.794)
Female development factor	−5.796**	−7.778**	−5.632**	−5.630**
	(2.489)	(3.119)	(2.510)	(2.485)
% Women in Lok Sabha	0.062	0.091	−0.016	0.050
	(0.250)	(0.243)	(0.306)	(0.249)
% Women in state legislature	−1.246*	−1.374*	−1.224*	−1.584**
	(0.706)	(0.686)	(0.707)	(0.758)
% Expenditure on education	0.383	0.428	0.352	0.307
	(0.579)	(0.582)	(0.579)	(0.584)
% Votes for BJP in 2014 GE	−0.056	−0.065	−0.056	−0.051
	(0.129)	(0.128)	(0.128)	(0.128)
BJP in majority in state legislature	9.534*	10.300*	9.282*	9.184*
	(5.109)	(5.083)	(5.076)	(5.041)
Student teacher ratio	−0.075***	−0.078***	−0.073***	−0.071***
	(0.023)	(0.023)	(0.023)	(0.023)
Teacher work hours (per day)	6.858***	6.667***	6.922***	6.889***
	(1.486)	(1.499)	(1.525)	(1.511)
Instructional days (per year)	0.041	0.056	0.040	0.041
	(0.065)	(0.064)	(0.065)	(0.064)
English medium school	−4.810	−5.268*	−4.609	−4.696
	(2.961)	(2.946)	(2.967)	(2.936)
Caste Herfindahl Index	2.061	1.995	2.163	2.276
	(2.681)	(2.716)	(2.766)	(2.706)
Infrastructure index	2.009***	1.974***	2.013***	2.038***
	(0.583)	(0.573)	(0.583)	(0.563)
School quality index	−2.141***	−2.203***	−2.192***	−2.282***
	(0.696)	(0.657)	(0.685)	(0.697)
Rural school	0.348	0.217	0.297	0.333
	(1.053)	(1.049)	(1.083)	(1.076)
Government school	−12.592***	−12.395***	−12.624***	−12.497***
	(2.951)	(2.956)	(2.997)	(3.015)
Teachers with graduate degrees (%)	−0.078**	−0.077**	−0.079**	−0.079**
	(0.029)	(0.029)	(0.029)	(0.029)
Teachers with teaching qualification (%)	0.091**	0.090**	0.093**	0.095***
	(0.034)	(0.034)	(0.034)	(0.034)
School sex ratio	−0.228	−0.229	−0.183	−0.240
	(0.524)	(0.510)	(0.508)	(0.545)
Academic year 2015–16	−2.158	−2.059	−2.184	−2.246
	(2.161)	(2.143)	(2.147)	(2.184)
Academic year 2016–17	−1.154	−1.076	−1.175	−1.248
	(2.262)	(2.247)	(2.262)	(2.273)
Academic year 2017–18	−0.363	−0.303	−0.398	−0.532
	(1.870)	(1.886)	(1.887)	(1.870)
Constant	16.326	14.462	17.375	20.445
	(21.971)	(21.635)	(22.349)	(22.722)
Observations	1,287,101	1,287,101	1,287,101	1,287,101
R-squared	0.168	0.169	0.168	0.168

Note. Standard errors in parentheses.
***$p < 0.01$;
**$p < 0.05$;
*$p < 0.1$.

https://doi.org/10.1017/spq.2021.30 Published online by Cambridge University Press

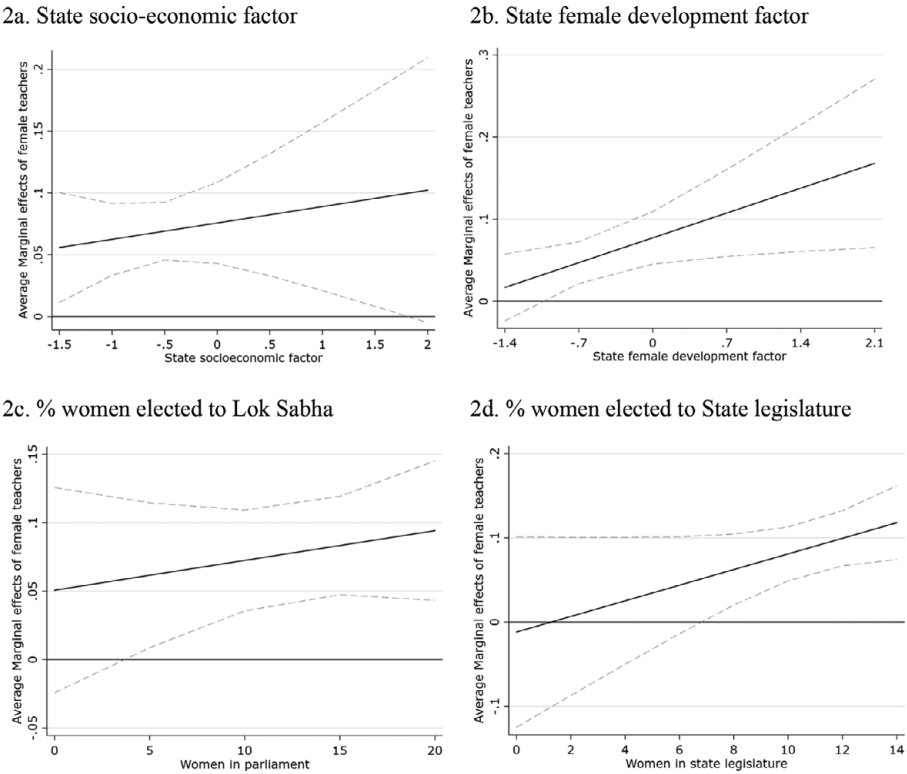

Figure 2. Moderating influence of state characteristics on the representation relationship at 90% confidence intervals.

test scores. Finally, neither relationship is particularly robust rising only to the 0.10 level of statistical significance, a low standard given the large number of cases.

Table 3 models the interactive relationships between female teacher percentage and the relevant state-level variables, to explore the contextual variation in the overall development climate and its influence on the ability of female teachers to represent. Since interactions between continuous variables can be difficult to interpret, Figure 2 plots the average marginal relationship between female teachers and female academic performance at different levels for each of the moderating variables. Figure 2a shows that the state socioeconomic factor has a positive moderating influence on the representation relationship. This moderating influence is modest, however, owing to few states exhibiting higher levels of socioeconomic development.[8]

The three measures depicting female economic and political participation, however, have a stronger moderating influence on the representation relationship. Figure 2b shows that at low values of the female development factor, indicating

[8]Of the 28 states included in the analysis, 20 states have a socioeconomic factor measure between −0.5 and 1.5, with only 3 states having a measure above 1.5.

https://doi.org/10.1017/spq.2021.30 Published online by Cambridge University Press

low levels of female economic and political participation, the relationship between female teacher percentages and female student academic achievement is not significant. The relationship becomes significant in states that report better outcomes for females, and the coefficient more than doubles (0.18) for those states with the highest factor values (supporting hypothesis 3). Similarly, while the representation relationship is insignificant in states where less than 8% of women hold state legislative seats and less than 5% hold Lok Sabha seats, the states with the highest percentages of elected women lawmakers see a significant and stronger than the average relationship between female teachers' percentages and female academic achievement (Figure 2c, d). Both of these representational interactions support hypothesis 4.[9]

Discussion and Conclusion

This study examined female bureaucratic representation in several hundred thousand schools over four years across 28 states in India. The primary objective was to determine how contextual factors such as economic resources, gender equality, and legislative representation influenced the effectiveness of local bureaucratic representation. Consistent with a growing literature, the study shows that female teachers are associated with higher test scores for female students and this bureaucratic representation exists even though representation in either state legislatures or the national legislature has no direct positive effect. The representation influence of female teachers on female students, however, is sensitive to environmental conditions that provide a favorable context for the representation. The estimated influence of female bureaucratic representation increases in states with greater gender equity and in states with more female legislative representation at the state and national levels. These results have implications for both the study of representation and the general study of state politics and policy.

First, bureaucratic representation and legislative representation are separate but interdependent processes. In the Indian case, direct bureaucratic representation exists even though there is no positive association between female legislative representation at either state or national levels and female student results. Although generalizing from one case is always speculative, a reasonable hypothesis going forward is that bureaucratic representation can operate separately from legislative representation and that there might be cases where the two can substitute for each other. Equally important, the influence of bureaucratic representation was greater in states where women were better represented in the state delegation to the national legislature and in the state legislature. This suggests that the representation processes are interdependent. The exact nature of this interdependence, however, needs to be theorized. Is it the result of coalitions among bureaucrats and legislators, the result of teachers reacting to the symbolic representation of women legislators, or perhaps the result of students reacting to symbolic representation of both female politicians and female teachers? Both additional empirical tests and developing more nuanced theory are necessary.

[9]The interaction terms in Table 3 are not significant for three of the four moderators because the marginal effects across the range of the moderating variable values are themselves are not statistically significantly different from one another. Our hypotheses are, however, supported by the evidence that at the representation relationship becomes significant and positive at the higher values of the moderating variables, thereby highlighting the conditional nature of gender representation.

https://doi.org/10.1017/spq.2021.30 Published online by Cambridge University Press

Second, if the representation of a street-level bureaucracy at the local level can be moderated by representation at a much higher level that is well removed from actual bureaucratic actions, then it is feasible that representation processes in all institutions might perform similar functions. Within public administration, representation at the local level could be affected by representation at the state level either through direct interaction, policy making by the higher level, or simply symbolic representation. Similarly, legislative representatives are likely to have their influence increased to the extent they operate in contexts with greater bureaucratic representation (at career or political executive levels), with greater interest group representation, and perhaps even with greater intergovernmental representation.

Third, representation is a process, and as a process, it translates inputs to policy outputs and outcomes. Logic suggests, therefore, that representation should reflect the inputs that it has at its disposal similar to how teacher representation was enhanced by a more gender-equitable environment. The implication is that strategic legislators or other representatives are likely to be aware of the potential resources they might tap into or the policy areas where a representative nudge might produce greater total benefits. This logic is highly consistent with the research showing that female legislative representation is influenced by partisanship (Courtemanche and Green 2017; Kreitzer 2015), professionalism (Cammisa and Reingold 2004), critical mass (Bratton 2005), institutional structures (Hicklin and Meier 2008), and intersectionality (Orey et al. 2007; Reingold and Smith 2012).

Fourth, the theories and logic of US state politics and policy can be applied fruitfully outside the US context. The scholarly advantages of a comparative interchange are numerous. Subnational structures exist in a wide variety of countries and application of US theories to such cases can determine how general our theories and methods are. Our review of the articles published in *State Politics and Policy Quarterly*, however, found only two studies using non-US data (Beer and Cruz-Aceves 2018; Rallings et al. 2004). Across countries, subnational governments vary in their level of autonomy relative to national governments, and this can turn factors that are constant or nearly so in the US (bicameralism) into variables to study. Non-US cases can at times bring better or more appropriate data to important questions in US state politics. The current study, for example, would be difficult to conduct in the US given its reliance on outcomes that are not easily comparable across states. Similarly, many countries can provide more fine-grained data that permit examining the match between bureaucratic and client characteristics at the individual level (see Guul 2018).

Fifth, although the specific study dealt with gender representation in India with a focus on education, the theoretical arguments were presented in general terms and should be testable in many different areas. The logic of representatives in different institutions having multiplicative effects could be applied to representation in race, ethnicity, sexual orientation, or other politically salient identities. Similarly, the idea that representatives use the contextual resources at their disposal to enhance their influence appears to be a reasonable strategy whether the representative is a legislator, a street-level bureaucrat, an elected executive, a politically appointed executive, or an interest group leader. Positioning other studies such as this one in other national contexts could also contribute to a more general understanding of how representatives can effectively represent.

Finally, the substantive and theoretical importance of India for the student of gender equity and representation should be underscored. As the world's largest federal democracy, even the relatively modest impact of female teachers on female

https://doi.org/10.1017/spq.2021.30 Published online by Cambridge University Press

students has a cumulative impact on millions of people. Theoretically, the case of India has far more variation on both independent and dependent variables than those that are more frequent in the literature. As such, it allows a greater understanding of how representation and gender interact in conditions that are more representative of the world than cases from highly developed Western nations.

Despite these advantages, the current study is only a small step on what could be a massive research agenda. It is possible that teachers are an exceptional case of individuals who are knowledgeable about politics and attuned to the benefits of symbolic representation. Only studies in other policy areas can determine this, and street-level bureaucracies in US states in other countries exercise substantial discretion in health policy, employment, social welfare, and other areas. Gender is also only one identity among many that might be salient in different country contexts. Finally, the various institutions that represent and their relative strength varies across nations.

Data Availability Statement. Replication materials are available on SPPQ Dataverse as Meier and Dhillon (2022) at https://doi.org/10.15139/S3/LW9D7D.

Acknowledgments. We would like to thank Charles Barrilleaux, Daniel Hawes, Chris Mooney, and Rene Rocha for helpful comments on an earlier draft.

Funding Statement. The authors received no financial support for the research, authorship, and/or publication of this article.

Conflict of Interest. The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

References

Agyapong, Elijah. 2018. "Representative Bureaucracy: Examining the Effects of Female Teachers on Girls' Education in Ghana." *International Journal of Public Administration* 41 (16): 1338–50.

Atkins, Danielle N., and Vicky M. Wilkins. 2013. "Going Beyond Reading, Writing and Arithmetic: The Effects of Teacher Representation on Teen Pregnancy Rates." *Journal of Public Administration Research and Theory* 23 (4): 771–90.

Bandhyopadhyay, Sanghamitra. 2013. "Why Is Economic Growth Across Indian States Uneven?" *London School of Economics South Asia Centre.* https://blogs.lse.ac.uk/southasia/2013/02/18/why-is-economic-growth-across-indian-states-uneven/. Accessed February 20, 2021.

Barreto, Matt A. 2007. "Isí Se Puede! Latino Candidates and the Mobilization of Latino Voters." *American Political Science Review* 101 (3): 425–41.

Barrilleaux, Charles. 2015. "A Mini-Symposium on Regulation in the States." *State Politics & Policy Quarterly* 15 (3): 319–21.

Beaman, Lori, Esther Duflo, Rohini Pande, and Petia Topalova. 2012. "Female Leadership Raises Aspirations and Educational Attainment for Girls." *Science* 335 (6068): 582–6.

Beer, Caroline, and Victor D. Cruz-Aceves. 2018. "Extending Rights to Marginalized Minorities: Same-Sex Relationship Recognition in Mexico and the United States." *State Politics & Policy Quarterly* 18 (1): 3–26.

Bishu, Sebawit G., and Alexis R. Kennedy. 2020. "Trends and Gaps: A Meta-Review of Representative Bureaucracy." *Review of Public Personnel Administration* 40 (4): 559–88.

Bratton, Kathleen A. 2005. "Critical Mass Theory Revisited: The Behavior and Success of Token Women in State Legislatures." *Politics & Gender* 1 (1): 97–125.

Burden, Barry C. 2005. "Institutions and Policy Representation in the States." *State Politics & Policy Quarterly* 5 (4): 373–93.

Burgess, Michael. 2006. *Comparative Federalism: Theory and Practice*. New York: Routledge.

Caiazza, Amy. 2004. "Does Women's Representation in Elected Office Lead to Women-Friendly Policy? Analysis of State-Level Data." *Women & Politics* 26: 35–70.

https://doi.org/10.1017/spq.2021.30 Published online by Cambridge University Press

Cammisa, Anne, and Beth Reingold. 2004. "Women in State Legislatures and State Legislative Research: Beyond Sameness and Difference." *State Politics & Policy Quarterly* 4 (2): 181–210.

Carlana, Michela. 2019. "Implicit Stereotypes: Evidence from Teachers' Gender Bias." *The Quarterly Journal of Economics* 134 (3): 1163–224.

Courtemanche, Marie, and Joanne Connor Green. 2017. "The Influence of Women Legislators on State Health Care Spending for the Poor." *Social Sciences* 6 (2): 40.

Dahlerup, Drude. 1988. "From a Small to a Large Minority: Women in Scandinavian Politics." *Scandinavian Political Studies* 11 (4): 275–98.

Dahlerup, Drude. 2006. "The Story of the Theory of Critical Mass." *Politics and Gender* 2 (4): 511–22.

Das, Sonali, Sonali Jain-Chandra, Kalpana Kochhar, and Naresh Kumar. 2015. *Women Workers in India: Why so Few among so Many?* Washington, DC: International Monetary Fund. doi:10.5089/9781498315005.001.

Dhar, Diva, Tarun Jain, and Seema Jayachandran. 2018. *Reshaping Adolescents' Gender Attitudes: Evidence from a School-based Experiment in India*. No. w25331. National Bureau of Economic Research.

Dhillon, Anita, and Kenneth J. Meier. 2022. "Representative Bureaucracy in Challenging Environments: Gender Representation, Education, and India." *International Public Management Journal*. 25 (1): 43–64. doi:10.1080/10967494.2020.1802633.

Dye, Thomas R. 1969. *Politics in States and Communities*. Englewood Cliffs, NJ: Prentice-Hall.

Edlund, Lena. 1999. "Son Preference, Sex Ratios, and Marriage Patterns." *Journal of Political Economy* 107 (6): 1275–304.

Ellis-Petersen, Hannah, and Manoj Chaurasia. 2020. "Indian State School Has Two Teachers, a Cook and One Pupil." *The Guardian,* August 9, 2021. https://www.theguardian.com/world/2020/jan/30/indian-state-school-has-two-teachers-a-cook-and-one-pupil.

Ertan, Senem. 2016. "How to Study Gender Equality Policy Cross-nationally?" *Social Indicators Research* 125 (1): 47–76.

Fay, Daniel L., Alisa Hicklin Fryar, Kenneth J. Meier, and Vicky Wilkins. 2021. "Intersectionality and Equity: Dynamic Bureaucratic Representation in Higher Education." *Public Administration* 99 (2): 335–52.

Giles-Sims, Jean, Joanne Connor Green, and Charles Lockhart. 2012. "Do Women Legislators Have a Positive Effect on the Supportiveness of States toward Older Citizens?" *Journal of Women, Politics & Policy* 33 (1): 38–64.

Gilliam, Jr. Frank D. 1996. "Exploring Minority Empowerment: Symbolic Politics, Governing Coalitions and Traces of Political Style in Los Angeles." *American Journal of Political Science* 40 (1): 56–81.

Gray, Sandra. 2006. "Numbers and Beyond: The Relevance of Critical Mass in Gender Research." *Politics and Gender* 2 (4): 492–502.

Grissom, Jason A., Emily C. Kern, and Luis A. Rodriguez. 2015. "The "Representative Bureaucracy" in Education." *Educational Researcher* 44 (3): 185–92.

Guul, Thorbjørn Sejr. 2018. "The Individual-Level Effect of Gender Matching in Representative Bureaucracy." *Public Administration Review* 78 (3): 398–408.

Hicklin, Alisa, and Kenneth J. Meier. 2008. "Race, Structure, and State Governments: The Politics of Higher Education Diversity." *Journal of Politics* 70 (3): 851–60.

Hicks, William D., Seth C. McKee, and Daniel A. Smith. 2016. "The Determinants of State Legislator Support for Restrictive Voter ID Laws." *State Politics & Policy Quarterly* 16 (4): 411–31.

Htun, Mala, and S. Laurel Weldon. 2012. "The Civic Origins of Progressive Policy Change: Combating Violence against Women in Global Perspective, 1975–2005." *American Political Science Review* 106 (03): 548–69.

Hueglin, Thomas O., and Alan Fenna. 2015. *Comparative Federalism: A Systematic Inquiry*. Toronto, ON: University of Toronto Press.

Iyer, Lakshmi. 2019. *"Getting More Women into Politics: Evidence from Elections in India." Vox.* https://voxeu.org/article/getting-more-women-politics-evidence-india. Accessed February 20, 2021.

Jacob, Suraj. 2014. "Gender and Legislative Performance in India." *Politics & Gender* 10 (2): 236–64.

Jaeger, Jillian. 2016. "Securing Communities or Profits? The Effect of Federal-Local Partnerships on Immigration Enforcement." *State Politics & Policy Quarterly* 16 (3): 362–86.

Jayachandran, S. 2015. "The Roots of Gender Inequality in Developing Countries." *Annual Review of Economics* 7: 63–88.

Jensenius, F. R., and G. Verniers. 2019. "Indian National Election and Candidates Database 1962–Today." Trivedi Centre for Political Data, Ashoka University.

https://doi.org/10.1017/spq.2021.30 Published online by Cambridge University Press

Kastellec, Jonathan P. 2018. "How Courts Structure State-Level Representation." *State Politics & Policy Quarterly* 18 (1): 27–60.

Keiser, Lael R., Vicky M. Wilkins, Kenneth J. Meier, and Catherine A. Holland. 2002. "Lipstick and Logarithms: Gender, Institutional Context, and Representative Bureaucracy." *American Political Science Review* 96 (3): 553–64.

Kennedy, Brandy A. 2013. "Sorting Through: The Role of Representation in Bureaucracy." Journal of Public Administration Research and Theory 23 (4): 791–816.

Kim, Byungkyu, and Richard C. Fording. 2010. "Second-Order Devolution and the Implementation of TANF in the U.S. States." *State Politics & Policy Quarterly* 10 (4): 341–67.

Kitchens, Karin E. 2021. "Partisan Politics and Public Education: Finding the Formula for (Electoral) Success." *State Politics & Policy Quarterly* 21 (1): 55–79.

Konisky, David M. 2009. "Assessing U.S. State Susceptibility to Environmental Regulatory Competition." *State Politics & Policy Quarterly* 9 (4): 404–28.

Krause, George A. 2010. "Legislative Delegation of Authority to Bureaucratic Agencies." In *The Oxford Handbook of American Bureaucracy*, ed. Robert F. Durant. Oxford: Oxford University Press. doi:10.1093/oxfordhb/9780199238958.003.0022.

Kreitzer, Rebecca J. 2015. "Politics and Morality in State Abortion Policy." *State Politics & Policy Quarterly* 15 (1): 41–66.

Meganathan, Ramanujam. 2011. "Language Policy in Education and the Role of English in India: From Library Language to Language of Empowerment." ERIC Online Submission, https://files.eric.ed.gov/fulltext/ED530679.pdf.

Manna, Paul, and Timothy Harwood. 2011. "Governance and Educational Expectations in the U.S. States." *State Politics & Policy Quarterly* 11 (4): 483–509.

Mansbridge, Jane. 1999. "Should Blacks Represent Blacks and Women Represent Women? A Contingent "Yes"." *The Journal of Politics* 61 (3): 628–57.

Marx, David M., and Jasmin S. Roman. 2002. "Female Role Models: Protecting Women's Math Test Performance." *Personality and Social Psychology Bulletin* 28 (9): 1183–93.

McBride, Dorothy, and Amy Mazur. 2010. *The Politics of State Feminism*. Philadelphia, PA: Temple University Press.

Meier, Kenneth J. 1984. "Teachers, Students, and Discrimination: The Policy Impact of Black Representation." *Journal of Politics* 46: 252–63.

Meier, Kenneth J. 2019. "Theoretical Frontiers in Representative Bureaucracy." *Perspectives on Public Management and Governance* 2 (1): 39–56.

Meier, Kenneth J., and Anita Dhillon. 2022. "Replication Data For: Gender and the State Politics of Policy Implementation in Education: The Interaction of Bureaucratic and Legislative Representation in India." UNC Dataverse, V1. https://doi.org/10.15139/S3/LW9D7D.

Meier, Kenneth J., and Kendall D. Funk. 2016. "Women and Public Administration in a Comparative Perspective: The Case of Representation in Brazilian Local Governments." *Administration & Society* 49 (1): 121–42.

Meier, Kenneth J., and Amanda Rutherford. 2017. *The Politics of African-American Education: Representation, Partisanship, and Educational Equity*. New York: Cambridge University Press.

Ministry of Human Resource Development. 2018. "*Educational Statistics 2018.*" http://www.moe.gov.cn/publicfiles/business/htmlfiles/moe/s7567/list.html.

Ministry of Human Resource Development, Government of India. 2019. "Right to Education." March 23, 2019. https://mhrd.gov.in/rte.

Ministry of Women and Child Development, Government of India. 2018. "Beti Bachao Beti Padhao." https://wcd.nic.in/bbbp-schemes.

Monk, David H. 1989. "The Education Production Function." *Educational Evaluation and Policy Analysis* 11 (1): 31–45.

Mosher, Frederick C. 1968. *Democracy and the Public Service*. New York: Oxford University Press.

National Institute of Educational Planning and Administration. 2016. "School Education in India: Flash Statistics U-DISE 2015–16." May 18, 2020. http://schoolreportcards.in/SRC-New/Links/DISEPublication.aspx.

Nicholson-Crotty, Sean, and Kenneth J. Meier. 2003. "Crime and Punishment: The Politics of Federal Criminal Justice Sanctions." *Political Research Quarterly* 56 (2): 119–26.

https://doi.org/10.1017/spq.2021.30 Published online by Cambridge University Press

Nikore, M. 2019. *"Beti Bachao Beti Padhao – A Critical Review of Implementation." The Times of India, July 11, 2019.* https://timesofindia.indiatimes.com/blogs/irrational-economics/beti-bachao-beti-padhao-a-critical-review-of-implementation/.

NITI Aayog. 2019. "*Health States Progressive India: Report on the Ranks of States and Union Territories.*" http://social.niti.gov.in/uploads/sample/health_index_report.pdf. Accessed February 20, 2021.

Norrander, Barbara, and Wilcox, Clyde. 1999. "Public Opinion and Policymaking in the States: The Case of Post-Roe Abortion Policy." *Policy Studies Journal* 27: 702–22.

Office of the Registrar General & Census Commissioner. 2011. *"Sex Ratio." 2011 Census Data, February 6, 2019.* http://censusindia.gov.in/Census_Data_2001/India_at_glance/fsex.aspx.

Ojeda, Christopher, Anne M. Whitesell, Michael B. Berkman, and Eric Plutzer. 2019. "Federalism and the Racialization of Welfare Policy." *State Politics & Policy Quarterly* 19 (4): 474–501.

Orey, Byron D'Andrá, Wendy Smooth, Kimberly S. Adams, and Kisha Harris-Clark. 2007. "Race and Gender Matter: Refining Models of Legislative Policy Making in State Legislatures." *Journal of Women, Politics & Policy* 28 (3–4): 97–119.

Paik, Saswati. 2017. "Impact of Natural Disasters on Schools in India." In *Disaster Risk Governance in India and Cross Cutting Issues*, eds. Indrajit Pal and Rajib Shaw, 295–312. Singapore: Springer.

Parvaiz, Athar. 2017. *"Since July 2016, Kashmir's Schools and Colleges Stayed Shut on 60% of Working Days." Hindustan Times.* https://www.hindustantimes.com/india-news/since-july-2016-kashmir-s-schools-and-colleges-stayed-shut-on-60-of-working-days/story-1FlfmjKN23a8osHATOIaFM.html. Accessed August 9, 2021.

Pierson, Paul. 1993. "When Effect Becomes Cause: Policy Feedback and Political Change." *World Politics* 45 (4): 595–628.

Pitkin, Hanna F. 1967. *The Concept of Representation*. Berkeley, CA: University of California Press.

Rallings, Colin, Michael Thrasher, Ron Johnston, and James Downe. 2004. "Redistricting Local Governments in England: Rules, Procedures, and Electoral Outcomes." *State Politics & Policy Quarterly* 4 (4): 470–90.

Reingold, Beth, and Adrienne R. Smith. 2012. "Welfare Policymaking and Intersections of Race, Ethnicity, and Gender in US State Legislatures." *American Journal of Political Science* 56 (1): 131–47.

Riccucci, Norma M., and Gregg G. Van Ryzin. 2017. "Representative Bureaucracy: A Lever to Enhance Social Equity, Coproduction, and Democracy." *Public Administration Review* 77 (1): 21–30.

Robinson, Scott E. 2002. "Rules, Roles, and Minority Representation." *State Politics & Policy Quarterly* 2 (1): 52–65.

Ross, Ashley D., Stella M. Rouse, and Kathleen A. Bratton. 2010. "Latino Representation and Education." *State Politics & Policy Quarterly* 10 (10): 69–95.

Sharkansky, Ira, and Richard I. Hofferbert. 1969. "Dimensions of State Politics, Economics, and Public Policy." *American Political Science Review* 63 (3): 867–79.

Singh, Anisha. 2017. *"Teacher's Crisis in India: Country Falls Short of 1 Million School Teachers." NDTV Education.* https://www.ndtv.com/education/indias-teachers-crisis-country-falls-short-of-1-million-school-teachers-1778220. Accessed August 9, 2021.

Song, Miyeon. 2018. "Gender Representation and Student Performance: Representative Bureaucracy Goes to Korea." *American Review of Public Administration* 48 (4): 346–58.

Spary, Carole. 2020. "Gender, Federalism and the State in India." In *Handbook on Gender, Diversity and Federalism*, eds. Jill Vickers, Joan Grace and Cheryl N. Collier, 279–93. Cheltenham: Edward Elgar.

Suryanarayana, M. H., Ankush Agarwal, and K. Seeta Prabhu. 2011. *Inequality-Adjusted Human Development Index for India's States.* New Delhi: United Nations Development Programme India.

The Hindu BusinessLine. "Centre, States Rapped for Poor Implementation of RTE." July 21, 2017. https://www.thehindubusinessline.com/news/education/centre-states-rapped-for-poor-implementation-of-rte/article9784003.

Thomas, Stucky D., Geralyn M. Miller, and Linda M. Murphy. 2008. "Gender, Guns, and Legislating." *Journal of Women, Politics & Policy* 29 (4): 477–95.

Uhlaner, Carole Jean, and Becki Scola. 2016. "Collective Representation as a Mobilizer: Race/Ethnicity, Gender, and Their Intersections at the State Level." *State Politics & Policy Quarterly* 16 (2): 227–63.

United Nations Development Programme. 2018. "Human Development Reports." December 11, 2018. http://hdr.undp.org/en/countries/profiles/IND.

Vickers, Jill. 2011. "Gendering Federalism: Institutions of Decentralization and Power-sharing." In *Gender, Politics and Institutions*, eds. Mona Krook and Fiona Mackay, 129–46. London: Palgrave Macmillan.

https://doi.org/10.1017/spq.2021.30 Published online by Cambridge University Press

Vickers, Jill. 2013. "Is Federalism Gendered? Incorporating Gender into Studies of Federalism." *Publius: The Journal of Federalism* 43 (1): 1–23.

Vickers, Jill. 2020. "How Can Comparative Studies of Federations Be Gendered?" In *Handbook on Gender, Diversity and Federalism*, eds. Jill Vickers, Joan Grace and Cheryl N. Collier, 16–31. Cheltenham: Edward Elgar.

Weinstein-Tull, Justin. 2016. "Election Law Federalism." *Michigan Law Review* 114 (5): 747–801.

Weldon, S. Laurel. 2002. "Beyond Bodies: Institutional Sources of Representation for Women in Democratic Policymaking." *The Journal of Politics* 64 (4): 1153–74.

White, G., M. Ruther, J. R. Kahn, and D. Dong. 2016. "Educational Inequality in India: An Analysis of Gender Differences in Reading and Mathematics." *Journal of Research in Gender Studies* 6 (2): 153–82.

Wilkins, Vicky M. 2007. "Exploring the Causal Story: Gender, Active Representation, and Bureaucratic Priorities." *Journal of Public Administration Research and Theory* 17 (1): 77–94.

Woetzel, Jonathan, Anu Madgavkar, Rajat Gupta, James Manyika, KKweilin Ellingrud, Shishir Gupta, and Mekala Krishnan. 2015. "The Power of Parity: Advancing Women's Equality in India." Mckinsey Global Institute. https://www.mckinsey.com/featured-insights/employment-and-growth/the-power-of-parity-advancing-womens-equality-in-india#. Accessed February 20, 2021.

Woods, Neal D. 2015. "Separation of Powers and the Politics of Administrative Rule Review." *State Politics & Policy Quarterly* 15 (3): 345–65.

World Bank. 2018. "World Development Indicators Online Database." https://data.worldbank.org/data-catalog/world-development-indicators.

World Economic Forum. 2019. *"Global Gender Gap Report 2020."* http://www3.weforum.org/docs/WEF_GGGR_2020.pdf. Accessed February 5, 2021.

Xu, Ping, James C. Garand, and Ling Zhu. 2016. "Imported Inequality? Immigration and Income Inequality in the American States." *State Politics & Policy Quarterly* 16 (2): 147–71.

Yackee, Susan Webb. 2015. "Invisible (and Visible) Lobbying." *State Politics & Policy Quarterly* 15 (3): 322–44.

Ybarra, Vickie D., Lisa M. Sanchez, and Gabriel R. Sanchez. 2016. "Anti-Immigrant Anxieties in State Policy." *State Politics & Policy Quarterly* 16 (3): 313–39.

Zhang, Youlang. 2019. "Representative Bureaucracy, Gender Congruence, and Student Performance in China." *International Public Management Journal* 22 (2): 321–42.

Zhu, Ling, and Jennifer H. Clark. 2015. "'Rights without Access': The Political Context of Inequality in Health Care Coverage in the U.S. States." *State Politics & Policy Quarterly* 15 (2): 239–62.

Zhu, Ling, and Meredith BL Walker. 2013. ""Too Much too Young": Race, Descriptive Representation, and Heterogeneous Policy Responses in the Case of Teenage Childbearing." *Politics, Groups, and Identities* 1 (4): 528–46.

Zimmerman, Joseph F. 2001. "National-state Relations: Cooperative Federalism in the Twentieth Century." *Publius* 31 (2): 15–30.

https://doi.org/10.1017/spq.2021.30 Published online by Cambridge University Press

Appendix A. Information on Variables

Table A.1. Description of and source for each variable used in the analysis

Variable	Observation level	Source	Description
Female students scoring 60%+in gr. 8 (%)	School	U-DISE	Percent of girls that scored more than 60% in eighth grade exam
Female teachers (%)	School	U-DISE	Percent of total teachers in the school that are female
State socioeconomic development factor	State	Generated from multiple sources	Factor: Measures the level of income, health, and education in the state
State female development factor	State	Generated from multiple sources	Factor: Measures the level of female education and political/ economic participation in state
State expenditure on education (%)	State	Reserve Bank of India	Percent of state expenditure that was spent on education, arts, and sports
Votes in state for BJP in 2014 general election (%)	State	Election Commission of India	Percent of total votes that were cast for the BJP in the 2014 general election
BJP majority party in state legislative bodies?	State	Election Commission of India	Dummy: 1 means BJP retained the majority in the most recent state elections
Seats won by women in the State Legislative Bodies	State	Election Commission of India	Percent of total seats in the State Legislative body that were won by women in the most recent elections
Seats won by women in the Lok Sabha	State	Election Commission of India	Percent of total seats in the Lok Sabha that were won by women in the 2014 general elections
Instructional days	School	U-DISE	Number of instructional days for students in the year
Teacher working hours	School	U-DISE	No. of hours the teachers work in a day
Student teacher ratio	School	U-DISE	Ratio of students to teachers in school
Rural school	School	U-DISE	Dummy: 1 means the school is in a rural area
Infrastructure index	School	Generated from U-DISE data	Factor: Measures availability of computers, library, playground, and electricity
Teachers with graduate degrees	School	U-DISE	Percent of total teachers in school that have graduate degrees or above
Teachers with professional qualification	School	U-DISE	Percent of total teachers in school that have a professional teacher qualification
Government school	School	U-DISE	Dummy: 1 means the school is managed by a govt body (0 is a private body)
English medium school	School	U-DISE	Dummy: 1 means the medium of instruction in the school is English
School sex ratio	School	Generated from U-DISE data	Ratio of the total girls in the school to total boys

(*Continued*)

https://doi.org/10.1017/spq.2021.30 Published online by Cambridge University Press

Table A.1. (*Continued*)

Variable	Observation level	Source	Description
School quality index	School	Generated from U-DISE data	Factor: measures presence of a management committee, development plan, student special training, and textbooks
Caste Herfindahl index	School	Generated from U-DISE data	Index: Measures the size of each caste group in the school as an indicator of diversity

Appendix B. Information on State-Generated Factors

Table B.1. Factor loadings for the state socioeconomic factor

Variable	Factor loadings	Uniqueness
Per capita net state domestic product	0.89	0.21
Population enrolled in higher education (%)	0.68	0.53
Under-5 mortality rate	−0.89	0.19
Net enrolment ratio in primary grades	0.64	0.59
Under-5 child stunting rate	−0.87	0.24
Poverty rate	−0.78	0.39
Labor force participation per 1,000 population	0.52	0.74
Literacy rate	0.67	0.55
% population living in urban areas	0.81	0.35
Eigenvalue		5.19
Cronbach's Alpha		0.9
Cumulative variance		58%

Table B.2. Factor loadings for state female development factor

Variable	Factor loadings	Uniqueness
Female labor force participation rate per 1000	0.56	0.68
Female literacy rate	0.68	0.54
Sex ratio	0.84	0.29
Women's voter participation rate	0.73	0.47
Female enrolment in higher education institutions (%)	0.54	0.71
Eigenvalue		2.32
Cronbach's Alpha		0.70
Cumulative variance		46%

https://doi.org/10.1017/spq.2021.30 Published online by Cambridge University Press

Appendix C. Sensitivity Analysis for the Relationship Between Political Factors and Female Academic Achievement

Table C.1. Pooled OLS estimates with a dummy variable for Andhra Pradesh state

	(1)
Variables	Andhra Pradesh
Female teachers (%)	0.082***
	(0.019)
State socioeconomic development factor	9.406***
	(3.160)
State female development factor	−6.272**
	(2.512)
Seats won by women in the Lok Sabha	0.018
	(0.254)
Seats won by women in the State Legislative Bodies	−0.784
	(0.782)
State expenditure on education (%)	0.395
	(0.573)
Votes in state for BJP in 2014 general election (%)	0.089
	(0.164)
BJP majority party in state legislative bodies?	3.534
	(6.661)
Student teacher ratio	−0.071***
	(0.023)
Teacher work hours (per day)	6.821***
	(1.556)
Instructional days (per year)	0.029
	(0.063)
English medium school	−4.550*
	(2.656)
Caste Herfindahl Index	3.124
	(2.831)
Infrastructure index	2.074***
	(0.535)
School quality index	−2.191***
	(0.716)
Rural school	0.410
	(1.112)
Government school	−12.151***
	(3.004)
Teachers with graduate degrees (%)	−0.081***
	(0.029)
Teachers with teaching qualification (%)	0.075**
	(0.033)
School sex ratio	−0.477
	(0.450)
Academic year 2015–16	−2.090
	(2.149)
Academic year 2016–17	−1.112
	(2.255)
Academic year 2017–18	−0.533
	(1.797)
Dummy for Andhra Pradesh State	17.304*
	(8.830)
Constant	12.049
	(21.749)

(*Continued*)

https://doi.org/10.1017/spq.2021.30 Published online by Cambridge University Press

Table C.1. (*Continued*)

Variables	(1) Andhra Pradesh
Observations	1,287,101
R-squared	0.171

Note. Robust standard errors in parentheses.
***$p < 0.01$;
**$p < 0.05$;
*$p < 0.1$.

Author Biographies. Kenneth J. Meier is a Distinguished Scholar in Residence at the School of Public Affairs, American University, Professor of Bureaucracy and Democracy at Leiden University (the Netherlands), and a Professor of Public Management at the Cardiff School of Business, Cardiff University (Wales). His research interests include public management, the role of bureaucracy in democratic systems, comparative public administration, and behavioral approaches to public administration.

Anita Dhillon is a PhD candidate in public administration and public policy at the School of Public Affairs, American University. Her research interests focus on social welfare policies, human resource management, nonprofits, and organizations under stress. Her dissertation is on child protective services in the US and she has previously published in *International Public Management Journal*.

Cite this article: Meier, Kenneth J., and Anita Dhillon. 2022. Gender and the State Politics of Policy Implementation in Education: The Interaction of Bureaucratic and Legislative Representation in India. *State Politics & Policy Quarterly* **22** (3): 344–370, doi:10.1017/spq.2021.30

https://doi.org/10.1017/spq.2021.30 Published online by Cambridge University Press