

## **Adolescent Gender Beliefs in India: Does Mothers' Empowerment Matter?**

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## ABSTRACT

Abundant studies have documented the positive impact of mothers' empowerment on children's health and education in the Global South, but little is known about how maternal empowerment shapes children's gender beliefs. Using data from the India Human Development Survey, this study examines the relationship between mothers' empowerment and adolescent children's gender beliefs in India. Recognizing the multidimensionality of women's empowerment, we conduct latent class analysis to identify a six-class empowerment typology based on mothers' education, employment, decision-making power at home, mobility outside the home, and memberships in women's organizations. The results reveal unevenness in different dimensions of mothers' empowerment. Maternal empowerment's association with egalitarian gender beliefs is salient among adolescent girls, but not boys. Adolescent girls with mothers labeled as *proactive workers* in our empowerment typology hold the most egalitarian gender beliefs, whereas *low agency* and *underprivileged worker* mothers' daughters are the least egalitarian. By illustrating the complex interplay between multiple dimensions of maternal empowerment and children's gender beliefs in India, this study advances the empirical and theoretical understanding of women's empowerment and the effects of mothers' behaviors on children's gender beliefs.

**Keywords:** women's empowerment, gender beliefs, adolescents, India, latent class analysis

## INTRODUCTION

“Achieve gender equality and empower all women and girls” has been adopted as one of the central goals in the United Nations’ sustainable development agenda since 2015 (United Nations, 2015). Despite progress such as improvement in women’s education and legal rights, gender inequality remains pervasive, particularly in countries like India, where traditional gender beliefs and norms have deep historical roots and are more resistant to changes than other tangible structural barriers (Jayachandran, 2021). Empirical research has documented close relationships between women’s empowerment and children’s outcomes in the Global South (see review by Pratley 2016). However, these studies have overwhelmingly focused on children’s health, nutrition, and educational outcomes, with little attention paid to the potential impact of maternal empowerment on the formation of children’s gender beliefs and attitudes.

Sociologists have longstanding interests in socialization as “a key mechanism of social reproduction” (Guhin et al., 2021). Abundant studies have pointed to the significance of mothers’ behaviors in shaping their children’s gender attitudes, documenting a positive impact of maternal education and employment on children’s gender egalitarian beliefs (see review by Davis and Greenstein, 2009). Nonetheless, most of these studies are based in Western industrialized countries.

Our paper provides a much-needed extension to the existing literature by focusing on children’s egalitarian gender belief and its association with maternal empowerment in India. We posit that the construction of children’s gender ideology in India may be different from that in the industrialized West. The entrenched gender inequality (Arora, 2012; Desai and Joshi, 2019) and rapid education expansion in India (Dejaeghere and Arur, 2020; Rammohan and Vu, 2018) may either strengthen or weaken the role of maternal empowerment in deviating their children from dominant gender norms. More importantly, women’s empowerment is multidimensional and can

be uneven in India (Desai et al., 2022). Women with higher education do not necessarily participate more actively in paid labor, or think/ behave in more gender-egalitarian ways (Bertocchi et al., 2014; Chatterjee et al., 2018). This may complicate the relationship between mothers' empowerment and children's gender beliefs.

Using data from the India Human Development Survey (IHDS), we ask two research questions: 1) Is mothers' empowerment associated with more egalitarian gender beliefs of their adolescent children in India? 2) Does such association differ for adolescent girls and boys? Recognizing the multidimensionality and unevenness of women's empowerment in India, we conduct latent class analysis (LCA) to develop an empowerment typology for mothers based on their education, employment, decision-making power at home, mobility outside the home, and membership in women's organizations. By doing so, we offer an innovative method to measure and interpret women's empowerment. We further explore the complex interplay between multiple dimensions of maternal empowerment and children's gender beliefs in India. Because factors such as household and community environments could shape both maternal empowerment and children's gender beliefs, confounding bias is a prevalent issue in the current body of research concerning maternal influence on children's gender beliefs. Using the inverse probability of treatment weighting (IPTW) method and the primary sample unit (PSU) fixed effects, we aim to alleviate potential confounding biases. Substantively, our work addresses the lack of empirical evidence on mothers' roles in shaping children's gender beliefs in India, thereby advancing our understanding of gender socialization in non-Western contexts. The findings of this study can also inform efforts aimed at fostering egalitarian gender attitudes among children in India, which is crucial for promoting girls' empowerment across their lifespan and facilitating changes in gender norms.

## **BACKGROUND AND THEORETICAL FRAMEWORK**

### **Mothers' Empowerment and Children's Outcomes in the Global South**

Women's empowerment is widely acknowledged as a crucial way to achieve gender equality and an important goal in international development (Desai et al., 2022). A large and growing body of literature has explored the role that mothers' empowerment plays in determining the health outcomes of infants and young children in the Global South. Although detailed results vary by research context and measures of empowerment, these studies have generally found that mothers' labor force participation, mobility, and control over household resources and decisions are positively associated with children's health, including nutrition status, vaccination, and survival rates (see review by Pratley, 2016; Santoso et al., 2019). Other than young children's health outcomes, mothers' empowerment is also found to enable children, particularly daughters to spend more years in school (Afridi, 2010; Afridi et al., 2012). However, so far, little is known about the impact of mothers' empowerment on children's gender beliefs.

Developing egalitarian gender beliefs early in life enables children, particularly girls to be empowered across their lifespan (Davis and Greenstein, 2009; Edmonds et al., 2021). Cultivating egalitarian gender beliefs among children is also crucial for shifting the entrenched social norms that perpetuate gender inequality and impede women's empowerment (Dhar et al., 2022; Jayachandran, 2021, 2015). Efforts have been made in countries such as India and Tanzania to shape adolescents' gender beliefs through school- or community-based interventions (Ahn et al., 2021; Blum, 2020; Dhar et al., 2022; Gupta and Santhya, 2020). However, despite the critical role of mothers in socialization (Acock and Bengtson, 1978; Davis and Greenstein, 2009), surprisingly little attention has been paid to how mothers' empowerment may shape children's gender beliefs in the Global South. In the next section, we review the literature on the impacts of maternal

behaviors on children's gender beliefs, which provides the theoretical background for our empirical study.

### **Mothers' Behaviors and Children's Gender Beliefs**

The exposure-based explanations of ideology formation argue that exposure to egalitarian ideas and behaviors leads to the development of egalitarian beliefs. These explanations have pointed to the significance of mothers' modeling roles in socializing their children's beliefs and attitudes (Bolzendahl and Myers, 2004; Bussey and Bandura, 1999). While there is still no consensus on whether children attend more to mothers' ideology or behaviors as they develop beliefs about gender, empirical studies in Western industrialized countries have shown strong evidence that increased maternal education and labor force participation, as well as mothers' engagement in more stereotypically masculine housework and occupations are associated with children having more egalitarian attitudes regarding the appropriate roles and responsibilities of men and women (Cunningham, 2001a; Davis and Greenstein, 2009; Fan and Marini, 2000; Fulcher et al., 2008; Halpern and Perry-Jenkins, 2016; Platt and Polavieja, 2016; Serbin et al., 1993).

Although current studies have focused mostly on mothers' socialization roles, children's gender ideology formation is also determined by other factors. For example, as children enter into adolescence, the formation of their gender role attitudes is increasingly influenced by their own education, employment, and marital experience (Davis, 2007). Fathers' share of housework and childcare responsibilities are also closely associated with children's gender beliefs (Cano and Hofmeister, 2022; Davis and Wills, 2010; McHale et al., 2003). Factors such as family racial and religious backgrounds, family structure, and community context are also found to influence children's gender ideology (Carlson and Knoester, 2011; Fan and Marini, 2000; Hill, 2002; Moore and Vanneman, 2003).

## **The Context of India**

Current studies on mothers' impact on children's gender attitude formation are conducted mostly in Western industrialized societies. Little is known about the role that mothers play in children's gender belief formation in India. Using data collected from 314 schools in the Haryana state of India, Dhar and colleagues (2019) found that young children are more likely to hold discriminatory gender attitudes when their parents, particularly their mothers have less egalitarian gender beliefs. However, the study only tested the relationship between parents' and children's gender beliefs. It is still unclear how mothers' behaviors, including their education, employment, and agency are associated with their children's gender beliefs. As mentioned above, mothers' behaviors are at least equally important as what they believe in shaping children's gender beliefs.

The formation of children's gender beliefs in India can be different from that in developed countries. Gender inequality is entrenched in India and progress toward equality has been slow (Arora, 2012; Desai and Joshi, 2019), which may make maternal exposure to education, employment, or decision-making power especially important or insufficient to deviate their children from the dominant gender norm. The rapid education expansion in the past few decades may also make schools more important than mothers in shaping children's gender ideology (Dejaeghere and Arur, 2020; Rammohan and Vu, 2018). More importantly, studies in Western industrialized countries, as discussed above, have shown consistent evidence that mothers with higher education participate more actively in paid work, behave in more gender-egalitarian ways, and subsequently raise children with more egalitarian beliefs. Nonetheless, this may not be the case in India. Women's empowerment in the Global South is often uneven, and its effects on children's outcomes can be inconsistent depending on measures of empowerment (Desai et al., 2022; Pratley, 2016). In the next section, we review the literature on the conceptualization and

operationalization of women's empowerment in the Global South, which provides the theoretical background for our empirical measures of mothers' empowerment.

### **Multidimensionality of Women's Empowerment in the Global South**

Current conceptualizations of women's empowerment, though varying in detail, have generally put women's agency, or their ability to gain power and make strategic life choices as the core of empowerment. It is also widely agreed that women's empowerment is comprised of different dimensions, hence multidimensional (see Desai et al. 2022 for a review; also see Yu, Chen, and Desai 2023).

The emphasis on agency and multidimensionality has set great challenges to the empirical measure of women's empowerment. Agency, or the ability to make life choices, is not easy to measure. Some studies use women's education and participation in income-generating activities as proxies of their agency (for example, Bhattacharya 2006; Hossain 2020; Mukherjee 2013). Other studies adopt more direct measures of women's agency using their decision-making power in domains such as household purchases, health care utilization, and fertility (for example, Ahmed et al. 2010; Al Riyami, Afifi, and Mabry 2004; Becker, Fonseca-Becker, and Schenck-Yglesias 2006; Yan, Desai, and Barik 2024). Considerable attention has also been paid to women's agency and mobility in the public spheres, including their abilities to travel outside the home unaccompanied and their access to social networks that can provide resources and support outside households (Jejeebhoy and Sathar, 2001; Koenig et al., 2003).

Empirical studies on women's empowerment have shown that a single indicator is insufficient to reflect women's empowerment status in the Global South. Women may be empowered in one dimension, but not in others. For example, studies have documented a U-shape relationship between women's education and labor force participation in India, meaning receiving



more education may not increase women's chances of employment (Chatterjee et al., 2018). Further, although women's higher education is often associated with more agency and autonomy in other domains, this positive relationship is not universal or consistent (Bertocchi et al., 2014). Studies in Bangladesh have also found that women's participation in paid employment and local organizations such as credit groups can increase, rather than decrease their risks of suffering from domestic violence (Koenig et al., 2003; Rahman, 1999).

In sum, Indian mothers with higher education may not participate more actively in paid labor, have more decision-making power at home, or behave in more gender-egalitarian ways. The impact of different indicators of mothers' empowerment on children's gender beliefs is also likely to be related but inconsistent.

To address the multidimensionality and unevenness of women's empowerment, we conduct latent class analysis (LCA) to classify mothers into mutually exclusive latent classes based on the pattern of their empowerment conditions on different dimensions of empowerment. By doing so, we use a "person-centered" approach (as compared to the traditionally "variable-centered" approach) to characterize mothers with different compositions of empowerment indicators without assuming them to be equally empowered in terms of all indicators.

### **The Present Study**

In this paper, we study the association between mothers' empowerment and adolescent children's gender beliefs in India. Using data from the second wave of the India Human Development Survey (IHDS), we address the following questions:

1. Does mothers' empowerment lead to more egalitarian gender beliefs among their adolescent children? We construct a typology of mothers' empowerment based on their

education, employment, decision-making power at home, mobility outside the home, and membership in women's organizations.

2. Does the relationship between mothers' empowerment and adolescent children's gender beliefs differ for adolescent girls and adolescent boys?

Some studies have found that parental influence on children's gender ideology formation is stronger when operating through same-sex dyads (Cunningham 2001a; Cunningham 2001b; Platt and Polavieja 2016). Therefore, based on existing studies, we expect mothers' empowerment to be positively associated with the formation of children's egalitarian gender beliefs, and the association should be stronger among girls than boys.

## **DATA AND METHODS**

### **Data**

We drew on data from the India Human Development Survey (IHDS), a nationally representative and longitudinal survey collected by the National Council of Applied Economic Research in India and the University of Maryland in 2004-05 and 2011-12 (<https://ihds.umd.edu>). This study used data from the second wave (2011-12) of the survey, where a youth questionnaire that surveyed adolescents aged between 15 and 18 (N=10,164) was added. We restricted the sample to adolescents who coresided with their mothers (N=9,734). Questions related to intra-household decision-making, women's mobility outside the home, and organization membership were only asked for one or two eligible women (ever-married women aged over 15) in the household. Children were, therefore, excluded from the analysis if their mothers were not households' eligible women (N=8,873). About 1.7 percent of the sample had missing values in one or more variables. Because the amount of missing data is small, we applied the listwise deletion method. After dropping cases with missing values, the final sample size of analysis included 8,721 adolescent

children (4,316 girls and 4,405 boys). The number of mothers was 7,473 because 1,192 mothers had more than one child aged between 15 and 18. Whether counting these 1,192 mothers more than once or not produced similar results. We reported results that used 8,721 observations of mothers.

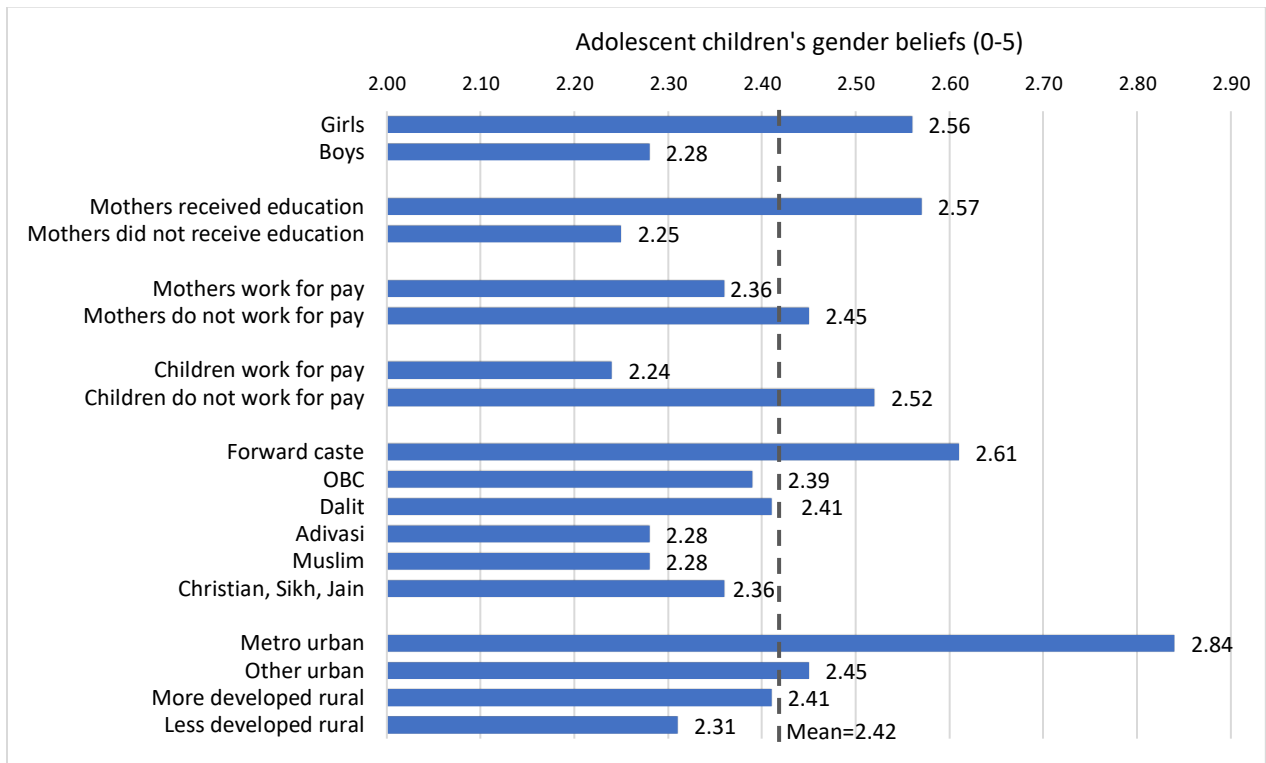
## **Measures**

*Outcome Variable: Adolescents' Gender Beliefs.* In the youth questionnaire, children aged between 15 and 18 were asked whether they agreed with (0=agree, 1=disagree) the following statements: 1) it is best if the husband works and the wife looks after the home, 2) if a husband and a wife cannot get along, it is better that they get divorced, 3) it is not good if the wife is more educated than the husband, 4) it is natural that parents spend less money on girls' education than that of boys, and 5) girls should have as much freedom to go outside the home as boys. We added up children's responses after coding statements 2 and 5 reversely. Higher scores (range between 0 and 5) indicated more egalitarian gender beliefs. Appendix Table A1 presents girls' and boys' average level of agreement with each gender belief statement.

The average gender belief score of all sampled adolescents was 2.42 (Figure 1). Adolescent girls (2.56) were more egalitarian than adolescent boys (2.28). Children's gender beliefs varied depending on mothers' characteristics. For example, children held more egalitarian gender beliefs when their mothers received an education. But mothers working for pay in the past year was associated with more conservative beliefs among their children. Children's own experiences and family/community context also mattered. For example, children who already worked for pay held more conservative gender beliefs than those who did not. Children living in Adivasi and Muslim households were less egalitarian than their peers in other households<sup>1</sup>. Living in metro urban areas was associated with more egalitarian gender beliefs.

The internal consistency of the gender belief index was low (Cronbach’s alpha: 0.21) likely because the five statements measured different dimensions of gender beliefs, including the gendered division of labor, women’s mobility, and attitudes toward divorce. Adolescents might hold egalitarian beliefs only in some dimensions of gender equality. As such, we applied the Exploratory Factor Analysis as an alternative approach, which identifies the patterns of correlations among gender belief statements and constructs the smallest number of common factors that can account for the correlations between these statements. We elaborated on this in the *results* and *discussion* sections.

Figure 1. Mean scores of adolescent children’s gender beliefs by selected independent variables (N=8,721)



Notes: Adolescent children’s gender beliefs range between 0 and 5. Higher scores indicate more egalitarian gender beliefs.

*Key Independent Variables: Mothers’ Empowerment.* The five indicators of mothers’ empowerment were *education, employment, decision-making power at home, mobility outside the home, and memberships in women’s organizations.* We constructed a dichotomous variable to

measure mothers' *education* (0=did not receive education; 1=received education) because about half of the sampled mothers reported receiving zero years of education (Table 1). Changing the education cut-off point (0=no education; 1=primary or secondary education; 2=higher than secondary education) had little impact on the LCA results (not presented).

Mothers' *employment status* was also measured by a dichotomous variable (0=did not work for pay in the past year; 1=worked for pay in the past year). About 67 percent of the sampled mothers did not work for pay in the past year (Table 1), meaning they spent less than 240 hours in income-generating activities in the past year or worked only for household farms or businesses<sup>2</sup>. The other 33 percent of the sampled mothers worked with payment for 240 hours or more in the past year, including salaried work, farm wage work, and non-farm wage work. For robustness checking, we also constructed an alternative categorical variable to measure mothers' employment (0=did not work; 1=worked for household farm/business without pay; 2=worked for pay). The results were similar (not presented).

Mothers' *decision-making power at home* was measured based on whether they had a say in the following household decisions: 1) whether to buy an expensive item such as a TV or a refrigerator; 2) how many children to have; 3) what to do if they fall sick; 4) whether to buy land or property; 5) how much money to spend on a social function such as a marriage; 6) what to do if a child falls sick and 7) to whom your children should marry (Cronbach's alpha: 0.89). The decision on "what to cook on a daily basis" was not included in the index because cooking is typically in women's domain and mothers may have control over it regardless of their decision-making power at home. About 4 percent of the sampled mothers lived in households where some of these decisions had never been made. We, therefore, constructed a continuous variable (range between 0 and 1) to count the percentage of household decisions that mothers have a say on. A

higher score indicated greater decision-making power at home. On average, mothers had a say in about 88 percent of the household decisions (Table 1).

Mothers' *mobility outside the home* was measured according to whether they needed to ask for permission from husbands/senior family members (0=yes; 1=no) to go to the following places: 1) local health center; 2) the home of relatives or friends in the village/neighborhood; 3) Kirana shop (small neighborhood grocery shop); 4) travel in a short distance by train or bus (Cronbach's alpha: 0.84). Around 14 percent of the sampled mothers had never been to or did not need to go to some of these places in daily life. Therefore, we constructed a continuous variable ranging from 0 to 1 to capture among places that mothers had ever been to, the percentage of places they could go to without asking permission from their husbands or seminar family members. A higher score meant higher mobility outside the home. Mothers' mean mobility score was only 0.28 (Table 1), meaning if they had been to all four places, they could go to about one of them without asking permission from husbands/senior family members. We also conducted three robustness checks by dropping mothers from the analytic sample or coding mothers as needing permission or not needing permission to go if they reported never having been to these places. The results (not presented) remained robust.

The three organizations we used to measure mothers' *membership in women's organizations* were: 1) Mahila Mandals; 2) self-help groups; 3) credit/saving groups. Mahila Mandals are traditional local women's organizations that provide women social support, access to government programs, and connections to public realms (Das, 2000). Self-help groups and credit/saving groups are community-based financial intermediary committees where local women make small regular savings and take loans in times of financial scarcity (Ahmad et al., 2020). We counted the number of organizations that mothers had memberships in (ranging from 0 to 3).

Mothers, on average, only had memberships in 0.29 of the three women’s organizations (Table 1). Because self-help groups and credit/saving groups target poor women, their members are more likely to be rural women with low household incomes (Ahmad et al., 2020). The IHDS data also shows that mothers who were members of these two groups had lower household income and a higher chance of living in rural areas than those who were not. We took this socioeconomic status (SES) difference in membership into consideration when interpreting women’s empowerment.

*Covariates:* we first controlled adolescent children’s own life experiences, including their age, years of education received, and whether they were still staying in school or had already worked for pay (0=no; 1=yes). Children’s marital status was not controlled because all sampled adolescents were unmarried. In terms of family backgrounds, we controlled mothers’ age, fathers’ education (0=did not receive education; 1=received education), and employment status in the past year (1=did not work for pay; 2=worked for pay; 3=no coresiding father), household heads’ caste and religion (1=Forward caste; 2=OBC; 3=Dalit; 4=Adivasi; 5=Muslim; 6=Christian, Sikh, Jain<sup>3</sup>), households’ rural/urban residency (1=metro urban; 2=other urban; 3=more developed rural; 4=less developed rural), household income (1=poorest; 2=second quintile, 3=third quintile, 4=fourth quintile, 5=Richest), the primary source of household income (1=salaried job; 2=daily labor; 3=farming; 4=business; 5=other), household structure (0=nuclear; 1=joint), and whether adolescents had elder brothers, younger brothers, elder sisters, and younger sisters (0=no; 1=yes). Descriptive statistics of control variables are presented in Table 1.

Table 1. Descriptive statistics (mean and standard deviation) of independent variables (N=8,721)

	Mean	SD
<u>Mothers' empowerment</u>		
Mothers received education	0.52	0.50
Mothers worked for pay	0.33	0.47
Mothers' decision-making power at home	0.88	0.25
Mothers' mobility	0.28	0.36

No. of women's organizations mothers participated	0.29	0.61
<u>Children's characteristics</u>		
Children's age	16.37	1.07
Children's years of education	8.88	2.48
Children still in school	0.77	0.42
Children worked for pay	0.37	0.48
<u>Household contexts</u>		
Mothers' age	40.92	5.08
Fathers received education	0.74	0.44
Fathers worked for pay	0.59	0.49
No coresiding father	0.10	0.31
Households' caste & religion		
Forward caste	0.21	0.41
OBC	0.33	0.47
Dalit	0.23	0.42
Adivasi	0.07	0.26
Muslim	0.13	0.33
Christian, Sikh, Jain	0.03	0.16
Urban/Rural		
Metro urban	0.07	0.25
Other urban	0.27	0.45
More developed rural	0.32	0.47
Less developed rural	0.34	0.47
Household income		
Poorest	0.14	0.35
Second quintile	0.16	0.37
Third quintile	0.22	0.42
Fourth quintile	0.24	0.43
Richest	0.24	0.42
Primary source of household income		
Salaried job	0.23	0.42
Daily labor	0.35	0.48
Farming	0.19	0.39
Business	0.15	0.36
Other	0.09	0.28
Household structure		
Nuclear	0.63	0.48
Joint	0.37	0.48
Had elder brothers	0.62	0.84
Had younger brothers	0.67	0.81
Had elder sisters	0.76	1.01
Had younger sisters	0.58	0.86

## Analytic Strategies

The analysis was composed of two parts. We started by applying latent class analysis (LCA) to identify an empowerment typology for adolescent children's mothers based on their education, employment, decision-making power at home, mobility outside the home, and memberships in women's organizations. The LCA model estimated *latent class membership probabilities* and *item*



*response probabilities/means*. Latent class membership probabilities described distributions of the constructed latent classes (all classes adding up to a probability of 1). We determined the ideal number of latent classes by computing a model first with one latent class and then steadily adding more classes. Models were compared based on statistics such as Akaike's information criterion (AIC) and Bayesian information criterion (BIC), as well as the theoretical meaningfulness of the class solution. We predicted mothers' probabilities of belonging to each latent class and put mothers into the class they were most likely to belong to<sup>4</sup>. The item response probabilities/means estimated the association between each observed variable (i.e., empowerment indicator) and each latent class. For binary indicators (education levels and employment status), the number is a probability with 0 suggesting no association and 1 suggesting the highest association between the indicator and the specific latent class. For continuous indicators (decision-making power, mobility, and organization memberships), the number stands for the mean score of the indicator within a specific latent class. We summarized the characteristics of each class according to the item response probability/mean of each empowerment indicator. The LCA was conducted using Stata's *gsem* command. To facilitate model convergence, we tried different sets of starting values, as suggested by Stata's structural equation modeling reference manual (StataCorp, 2023).

After constructing the empowerment typology, we explored the association between mothers' empowerment and adolescent children's gender beliefs. This was done first by conducting Ordinary Least Squares (OLS) regression with children's gender beliefs as the dependent variable and the empowerment latent class that mothers belonged to as the key independent variable. We interacted the empowerment class with adolescent children's gender to check if the association varied between adolescent girls and boys. In Appendix Figure A1, we also

present the coefficients of the associations between each indicator of mothers' empowerment and the gender beliefs of adolescent girls and boys.

One of the common problems that OLS regression models face is confounding or selection bias. Factors such as household SES and family structure may predict both mothers' empowerment conditions and children's gender beliefs. Differences in children's gender beliefs may thus be attributed to disparities in these confounding factors, instead of mothers' empowerment. Further, not all confounders can be measured, causing omitted variable bias. For example, maternal empowerment and children's gender beliefs may be correlated with unmeasured factors such as community gender norms. We took two approaches to partially address these potential biases. The first was to include primary sample unit (PSU) fixed effects in the model, which could effectively control for all unmeasured heterogeneities at the community level, including local gender norms. A PSU was a village in rural areas and a neighborhood in urban areas. Second, we applied the inverse probability of treatment weighting method (IPTW) with one of the maternal empowerment classes as the control group and the other classes as treatment groups<sup>5</sup>. We predicted children's probabilities of being assigned to different maternal empowerment classes (i.e., treatment and control groups) using the covariates we discussed above, as well as the highest education of household adults, whether families own the house they reside in, and mothers' report of the prevalence of domestic violence in the community. We then applied the inverse of these probabilities as sampling weights in our fitted OLS regression models. This would allow us to compare gender beliefs among children who had similar distributions across all these individual and family characteristics but maternal empowerment classes. We used the *mnps* command that the RAND corporation developed<sup>6</sup> (Cefalu and Buenaventura, 2017). Using Stata's *teffects aipw* command produced very similar results (not presented). To further check the robustness of our

results, we also conducted propensity score matching analysis (using Stata’s *psmatch2* command), where we had one empowerment class as the control group and made several pairwise contrasts by one-to-one nearest neighbor matching for each treatment. The results (not presented) remained robust.

## RESULTS

### Mothers’ Empowerment Typology – Latent Class Analysis

Table 2 presents the goodness-of-fit statistics from the LCA. It shows the likelihood ratio statistics, AIC, and BIC from a two-class to a seven-class model. Adding the sixth class was meaningful according to the statistics and provided a valuable new pattern in empowerment composition. While adding the seventh class increased model fitness slightly, it did not provide any meaningful new empowerment pattern. We, therefore, chose the six-class model.

Table 2. Model fit statistics for 2-7 latent classes

No. of classes	Log likelihood	Degree of freedom	AIC	BIC
2	-23134.57	13	46295.15	46387.10
3	-20709.98	20	41459.95	41601.42
4	-16185.65	26	32423.31	32607.22
5	-10458.11	32	20980.21	21206.56
<b>6</b>	<b>-10367.67</b>	<b>37</b>	<b>20809.33</b>	<b>21071.05</b>
7	-10299.13	43	20684.26	20988.42

The first class we identified was named *educated homemakers*, which accounted for 21.2 percent of the mothers (Table 3). Mothers in this latent class had a 0.82 probability of receiving education, the highest among all classes. However, their probability of working for pay in the past year was the lowest (0.07). Further, despite having higher-than-average decision-making power at home (0.95), their mobility outside the home (0.11) was among the lowest and the average number of women’s organizations they had membership in was almost 0.

We defined the second class of mothers as *proactive workers*. Only 5.6 percent of the mothers belonged to this class. Although their probability of receiving education (0.63) was not

particularly higher compared to the average, they had the highest probability of working for pay (0.57) and above-average decision-making power at home (0.94). Another salient characteristic of these mothers is that the number of local women's organizations they participated in (2.26) was notably higher than mothers from other classes. Given that both self-help groups and credit/saving groups are financial organizations, it is likely that *proactive worker* mothers were not only working to support households financially but also had some control over their own and their household's income. Their mobility outside the home (0.24) was similar to the sample mean.

Around 16 percent of the mothers were *averagely empowered workers* (Class 3). They had a slightly higher-than-average score in all empowerment indicators but did not excel at any of them.

The fourth class was mothers with *high mobility*, which accounted for 15.2 percent of the mothers. Mothers in this class had the highest mobility outside the home (0.84). Their decision-making power at home (0.94) was also higher than the average. However, their probabilities of receiving education (0.52) and working for pay (0.35) were only at the mean levels, and they rarely participated in women's organizations (<0.001).

8.6 percent of the mothers had *low agency* (Class 5). This was the only class where mothers' decision-making power at home (0.22) was lower than the sample mean. Further, *low agency* mothers' probabilities of receiving education (0.45), working for pay (0.24), as well as their mobility outside the home (0.23) and organization memberships (<0.001) were all lower than the average.

The sixth class was *underprivileged workers* (Class 6). 33.4 percent of the mothers belonged to this class. Mothers in this class had the lowest probability of receiving education (0.29), but their chance of working for pay (0.43) was higher than the mean level. However, unlike *proactive workers* and *averagely empowered worker* mothers, who participated actively in local

women’s organizations and had close to average mobility outside households, *underprivileged worker* mothers had almost the lowest mobility outside households (0.13) and rarely participated in women’s organizations (<0.001).

Table 3. Item-response probabilities/means and latent class membership probabilities (N=8,721)

	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Mean
	Educated homemakers	Proactive workers	Averagely empowered workers	High mobility	Low agency	Underprivileged workers	
Mothers received education (0-1)	0.82	0.63	0.60	0.52	0.45	0.29	0.52
Mothers worked for pay (0-1)	0.07	0.57	0.44	0.35	0.24	0.43	0.33
Mothers' decision-making power (0-1)	0.95	0.94	0.91	0.94	0.22	0.96	0.88
Mothers' mobility (0-1)	0.11	0.24	0.30	0.84	0.23	0.13	0.28
Number of women's organizations mothers participated (0-3)	<0.001	2.26	1.00	<0.001	<0.001	<0.001	0.29
Latent class membership probabilities	21.2%	5.6%	16.0%	15.2%	8.6%	33.4%	

In Appendix Table A2, we present descriptive statistics of selected household characteristic variables by latent classes. The differences in household characteristics by mothers’ empowerment latent classes can be seen. For example, *educated homemakers* had the highest household income and the highest chance of living in urban Forward caste households where salaried jobs were the primary sources of household income. The high SES might explain their low participation in women’s organizations, many of which targeted women with lower incomes. *Proactive worker*, *averagely empowered worker*, and *underprivileged worker* mothers had a higher-than-average chance of living in rural households with daily labor as the primary source of income. The household income of *averagely empowered worker* and *underprivileged worker* mothers was the lowest among all mothers. *High mobility* mothers lived in households with average SES. Their likelihood of coresiding with children’s fathers was particularly low, which might be one of the reasons why they had high mobility outside the home. *Low agency* mothers’ household income was about the second highest among all six classes. This may be because they were more likely to live in joint households with business as the main source of income. They were also more likely to reside in Muslim households.

Due to associations between empowerment latent classes and aforementioned household characteristics, as well as many other individual, family, and community characteristics, the estimates of maternal empowerment on children's gender beliefs could be biased without adequately accounting for these confounding factors. By weighting the data using the IPTW of multiple covariates, we ensured that observable household and individual characteristics were equally distributed among different empowerment classes (see Appendix Table A3 for selected household characteristic variables by latent classes after the IPTW) and the association between empowerment and gender beliefs can be considered independent of these covariates. We also included PSU fixed effects in the models to control for all unmeasured heterogeneities at the community level across empowerment classes.

### **Mothers' Empowerment and Children's Gender Beliefs**

To understand the relationship between mothers' empowerment and adolescent children's gender beliefs, we first conducted an OLS regression model with the empowerment classes that mothers belonged to as the key independent variable and interacted it with children's gender (Table 4 Model 1). We then steadily added controls for children's life experiences (Model 2), family backgrounds (Model 3), and PSU fixed effects (Model 4) to the model. Model 5 presents regression coefficients after weighting the data with the IPTW and including PSU fixed effects. We also present the predicted means of adolescent girls' and boys' gender beliefs by mothers' empowerment classes in Figure 2 (based on Table 4 Model 5).

Without controls (Table 4 Model 1), adolescent daughters of *educated homemakers* and *proactive workers* held significantly more egalitarian gender beliefs than those of mothers in all other empowerment classes. In contrast, *underprivileged workers'* daughters were significantly less egalitarian compared with the rest. Adolescent sons of *educated homemakers* were also

significantly more egalitarian than those of mothers in other classes, whereas *low agency* mothers had the least egalitarian sons among all mothers.

After controlling for children's own experience, family background, and community contexts (Models 2, 3, and 4), *proactive workers'* daughters were still significantly more egalitarian than daughters of mothers in other empowerment classes. The gender beliefs of *averagely empowered worker* and *high mobility* mothers' daughters, relative to that of *educated homemakers'* daughters, were sensitive to control variables. But *low agency* and *underprivileged worker* mothers' daughters were still less egalitarian than those of *educated homemakers* and *proactive workers*. The results were similar when using the IPTW to further adjust for potential confounding biases (Model 5 and Figure 2). The gender belief score of *proactive workers'* daughters was 2.91, significantly higher than that of mothers in other classes. Daughters of *educated homemaker* (2.68), *averagely empowered worker* (2.59), and *high mobility* (2.62) mothers had similar gender belief scores. *Low agency* (2.47) and *underprivileged worker* (2.52) mothers' daughters were less egalitarian compared to the others, except for the difference between daughters of *underprivileged worker* and *averagely empowered worker* mothers, which was not significant.

Adolescent boys of *educated homemakers* (2.30) were no longer the most egalitarian after using the IPTW and community fixed effects to adjust for potential estimation biases (Model 5 and Figure 2). They had similar gender belief scores as sons of *proactive worker* (2.20), *averagely empowered worker* (2.20), *high mobility* (2.24), and *lower agency* (2.17) mothers. In contrast, *underprivileged workers'* sons (2.41) became significantly more egalitarian than those of mothers in other empowerment classes.

Adolescent boys held more conservative gender beliefs than adolescent girls in general. However, this gender gap varied depending on mothers' empowerment class membership. The gender belief differences between adolescent girls and boys were the smallest when their mothers were *underprivileged workers*, and the largest when their mothers were *proactive workers*. Similar gender differences were observed when children had *educated homemaker*, *averagely empowered worker*, *high mobility*, and *low agency* mothers.

Table 4. Regression models of mothers' empowerment class predicting adolescent girls' and adolescent boys' gender beliefs (N=8,721)

	Model 1	Model 2	Model 3	Model 4	Model 5
		+Children's experiences	+Household contexts	PSU fixed effects	IPTW+PSU fixed effects
Mothers' empowerment classes (ref=educated homemakers)					
Proactive workers	0.146 (0.079)	0.175* (0.079)	0.219** (0.079)	0.163 (0.095)	0.235* (0.114)
Averagely empowered workers	-0.150** (0.056)	-0.105 (0.056)	-0.041 (0.057)	-0.136* (0.067)	-0.087 (0.081)
High mobility	-0.233*** (0.059)	-0.149* (0.059)	-0.105 (0.060)	-0.096 (0.069)	-0.055 (0.087)
Low agency	-0.314*** (0.069)	-0.233*** (0.069)	-0.169* (0.069)	-0.162* (0.082)	-0.210* (0.094)
Underprivileged workers	-0.462*** (0.047)	-0.341*** (0.048)	-0.263*** (0.049)	-0.197*** (0.056)	-0.153* (0.068)
Boys (ref=girls)	-0.380*** (0.051)	-0.350*** (0.051)	-0.372*** (0.051)	-0.402*** (0.056)	-0.375*** (0.076)
Empowerment classes*Children's gender					
Proactive workers *Boys	-0.294** (0.114)	-0.298** (0.113)	-0.278* (0.113)	-0.297* (0.122)	-0.339* (0.140)
Averagely empowered workers *Boys	0.015 (0.079)	0.022 (0.079)	0.010 (0.078)	0.033 (0.084)	-0.019 (0.105)
High mobility *Boys	0.058 (0.082)	0.047 (0.082)	0.038 (0.081)	0.055 (0.088)	-0.007 (0.112)
Low agency *Boys	-0.020 (0.098)	-0.023 (0.097)	-0.041 (0.097)	0.039 (0.103)	0.082 (0.121)
Underprivileged workers *Boys	0.329*** (0.066)	0.310*** (0.065)	0.308*** (0.065)	0.299*** (0.070)	0.261** (0.092)
Children's age		0.003 (0.012)	0.000 (0.013)	-0.013 (0.013)	-0.009 (0.017)
Children's years of education		0.039*** (0.007)	0.025*** (0.007)	0.025** (0.008)	0.012 (0.011)
Children still in school (ref=no)		0.030 (0.038)	0.016 (0.038)	0.084* (0.042)	0.131* (0.054)
Children worked for pay (ref=no)		-0.152*** (0.027)	-0.097*** (0.029)	0.010 (0.033)	0.049 (0.043)
Mothers' age			0.002 (0.003)	0.005 (0.003)	0.007 (0.004)

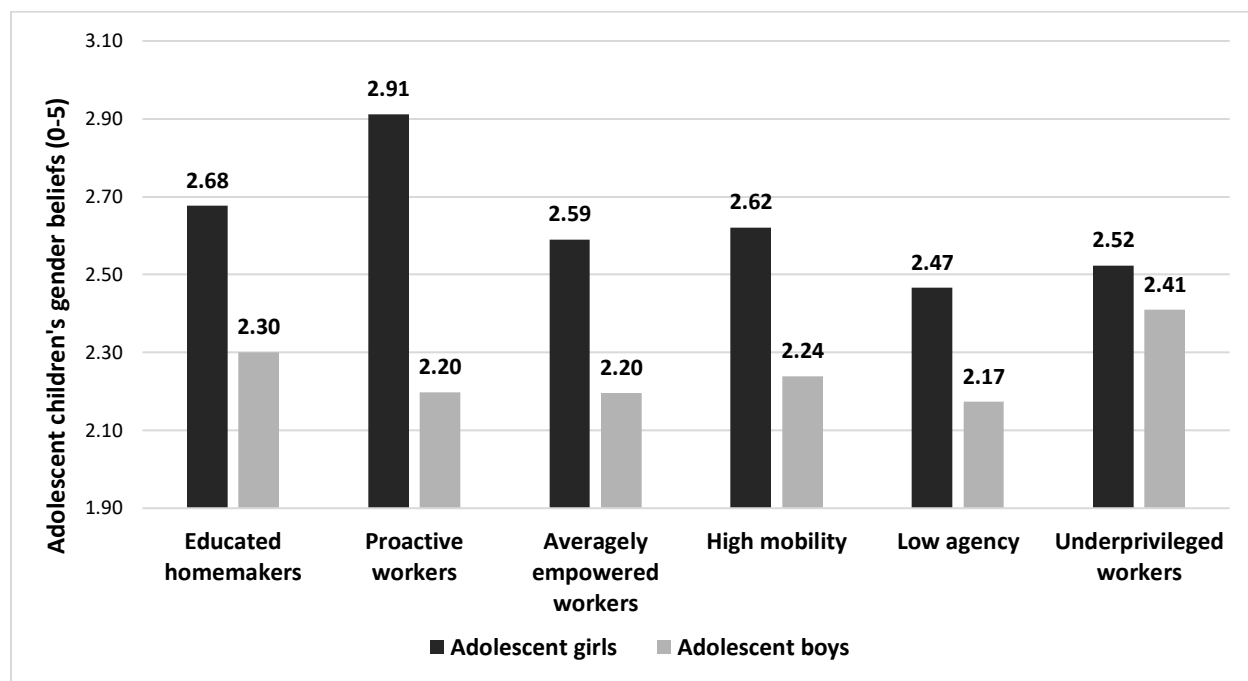


Fathers received education (ref=no)	0.039 (0.031)	0.019 (0.035)	0.005 (0.047)
Fathers worked for pay (ref=no)			
Yes	<0.001 (0.036)	0.003 (0.041)	0.055 (0.051)
No coresiding father	0.012 (0.050)	0.096 (0.056)	0.139 (0.071)
Households' caste & religion (ref=Forward)			
OBC	-0.104** (0.035)	-0.010 (0.047)	-0.026 (0.056)
Dalit	-0.071 (0.039)	-0.001 (0.050)	-0.036 (0.060)
Adivasi	-0.111* (0.054)	-0.132 (0.082)	-0.102 (0.105)
Muslim	-0.146** (0.046)	-0.212** (0.071)	-0.281** (0.089)
Christian, Sikh, Jain	-0.269*** (0.077)	-0.077 (0.107)	-0.124 (0.130)
Urban/Rural (ref. metro urban)			
Other urban	-0.298*** (0.052)		
More developed rural	-0.257*** (0.054)		
Less developed rural	-0.292*** (0.055)		
Household income (ref=poorest)			
Second quintile	0.050 (0.044)	0.024 (0.049)	0.008 (0.062)
Third quintile	0.046 (0.042)	0.076 (0.048)	0.054 (0.060)
Fourth quintile	0.034 (0.042)	0.036 (0.050)	0.034 (0.060)
Richest	0.160*** (0.044)	0.153** (0.054)	0.178** (0.065)
Primary source of household income (ref=salaried job)			
Daily labor	-0.017 (0.037)	0.028 (0.043)	0.033 (0.051)
Farming	-0.045 (0.046)	-0.037 (0.053)	0.014 (0.065)
Business	0.032 (0.049)	0.091 (0.055)	0.085 (0.066)
Other	0.011 (0.055)	0.000 (0.063)	0.069 (0.079)
Joint households (ref=nuclear households)	-0.056* (0.025)	-0.021 (0.029)	-0.055 (0.036)
Children had elder brothers (ref=no)	-0.108*** (0.028)	-0.024 (0.032)	-0.046 (0.040)
Children had younger brothers (ref=no)	-0.056* (0.027)	0.007 (0.030)	0.045 (0.037)
Children had elder sisters (ref=no)	-0.067* (0.026)	-0.051 (0.029)	-0.025 (0.035)
Children had younger sisters (ref=no)	-0.086*** (0.026)	-0.036 (0.029)	-0.033 (0.035)

Highest education of household adults					0.006 (0.079)
Families owned the house they resided (ref=no)					-0.030 (0.005)
Prevalence of domestic violence in community					-0.006 (0.012)
Constant	2.787*** (0.037)	2.355*** (0.197)	2.983*** (0.243)	2.435*** (0.262)	2.410*** (0.335)
Adjusted R-squared	0.031	0.045	0.057	0.200	0.291

Notes: Results present regression coefficients with standard errors in parentheses. A PSU (primary sample unit) is a village in rural areas and a neighborhood in urban areas. IPTW=inverse probability of treatment weighting. Coefficients for households’ rural/urban residency were omitted in Models 4 and 5 due to collinearity. \* p < .05, \*\* p < .01, \*\*\* p < .001.

Figure 2. Predicted means of adolescent girls’ and adolescent boys’ gender beliefs by mothers’ empowerment classes (N=8,721).



Note: Adolescent children’s gender beliefs range between 0 and 5. Higher scores indicate more egalitarian beliefs.

To check the robustness of the results and see if the relationships between mothers’ empowerment and children’s gender beliefs were consistent across different gender belief dimensions, we also applied the Exploratory Factor Analysis to identify the patterns of correlations among gender belief statements. We constructed three common factors that can account for the correlations between these statements. Appendix Table A4 shows the correlations between each statement and the constructed factors. Factor 1 was labeled *labor division* because it was mainly

defined by statement 1 (it is best if the husband works and the wife looks after the home), statement 3 (it is not good if the wife is more educated than the husband), and statement 4 (it is natural that parents spend less money on girls' education than that of boys). Factor 2 (*mobility*) was predominantly characterized by statement 5 (girls should have as much freedom to go outside the home as boys). Factor 3 (*divorce*) was primarily determined by statement 2 (if a husband and a wife cannot get along, it is better that they get divorced). We then conducted OLS regression with IPTW and PSU fixed effects, using the three constructed factors as dependent variables respectively (Appendix Table A5). When Factor 1 was used as the dependent variable (Model 1), the pattern of differences by maternal empowerment and children's gender generally resembled that of the results using the sum of five gender belief statements as the outcome. No significant differences by maternal empowerment were observed in boys' and girls' gender beliefs when Factor 2 (Model 2) and Factor 3 (Model 3) were used as dependent variables. Thus, while the results using the sum of five gender belief statements were robust, it should be noted that the relationship between mothers' empowerment latent classes and children's gender beliefs tended to be driven primarily by the three statements on the gendered division of labor.

## DISCUSSION

Despite India's rapid economic development and social transformation in recent decades, its record on gender inequality remains dismal (Desai and Joshi, 2019; Rammohan and Vu, 2018). Our analysis has indeed revealed that the majority of mothers with adolescent children in our sample have uneven and low levels of empowerment. None of the six classes of mothers score high on all empowerment indicators. The modal class (33.4 percent of the sample) *underprivileged workers* have a higher-than-average participation rate in paid work and a high decision-making power at home. However, their chance of receiving education is the lowest among all mothers. They also

score low in mobility outside the home and have little access to social resources and support through women's organizations. The second largest class is *educated homemakers* (21.1 percent), who have the highest chance of receiving education but rarely work for pay and score similarly low as *underprivileged workers* in terms of mobility outside the home and women's organization memberships. Despite the recent expansion of education, Indian women's labor force participation rate remains low and even shows a tendency to decrease (Kapsos et al., 2014). With not working being perceived as having "high social status" even among educated women and the lack of employment opportunities for moderately educated women, women receiving education does not guarantee more active labor force participation or more access to resources and support outside the home, hence can even impede gender equality (Chatterjee et al., 2018).

The remaining half of the sample is split among four classes. The distribution of the item-response possibilities/means further illustrates that women's empowerment in India is not a continuum of low to high but rather shows unique combinations of various types of indicators. Among these four classes, *proactive worker* and *averagely empowered worker* mothers stand out by having much more active participation in paid work and women's organizations. Yet their mobility outside the home is only around the average. In contrast, *high mobility* mothers have a particularly high level of mobility but rank noticeably lower on education, paid work participation, and women's organization memberships than *proactive worker* and *averagely empowered worker* mothers. *Low agency* mothers are the only group that has low decision-making power at home. They also score low in other indicators, especially participation in paid work and women's organizations. With a person-centered approach, our study reveals the complexity and multidimensionality of women's empowerment in India. Although the five indicators are widely

used for measuring women's empowerment, none of them alone seems to be a sufficient precondition of empowerment.

The intricate interplay of empowerment indicators complicates the relationship between mothers' empowerment and children's gender beliefs. As mentioned above, empirical studies in the Western context have shown clear evidence that increased maternal education and labor force participation are associated with more egalitarian gender beliefs among children. Our results, although suggesting a positive relationship between mothers' empowerment and adolescent daughters' gender beliefs in general, are much more nuanced. Adolescent girls with the most educated mothers (*educated homemakers*) are NOT the most egalitarian. After adjusting for children's characteristics, family backgrounds, and community contexts, the gender belief score of *educated homemakers'* daughters is similar to that of *averagely empowered worker* and *high mobility* mothers' daughters, all of whom have significantly lower scores than *proactive workers'* daughters. Yet, it should be noted that mothers in these four classes are still more educated than *low agency* and *underprivileged worker* mothers, whose daughters are significantly less egalitarian. Thus, although maternal education matters, mothers with some disadvantages in education can also have daughters with egalitarian beliefs if they participate more actively in paid work and join local women's organizations to gain access to resources and support outside the home.

In terms of maternal employment, although *proactive workers'* (who participate most actively in paid work) daughters are indeed the most egalitarian, a simple high participation in paid work does not seem to be enough. *Averagely empowered worker* and *underprivileged worker* mothers also participate actively in paid work, but their daughters are less egalitarian than *proactive workers'* daughters. *Underprivileged workers'* daughters are even the least egalitarian among all classes. Given *proactive workers'* high agency, particularly their active participation in

women's organizations, it is likely that maternal employment, when combined with the agency to mobilize resources and draw support from their networks outside the home, are important sources of empowerment for women. Empowered mothers may then invest more household resources in their daughters' education, serve as role models, and expose their daughters to similarly empowered women in the workplace and women's organizations. All of these can help adolescent girls develop more egalitarian gender beliefs.

In contrast to adolescent girls, mothers' empowerment does not seem to be associated with more egalitarian gender beliefs among their adolescent sons, especially when controlling for children's own life experiences, family backgrounds, and community contexts. Unlike adolescent girls, adolescent boys of *educated homemakers* and *proactive workers* do not exhibit more egalitarian gender attitudes than boys whose mothers come from other empowerment classes. Instead, they are the most egalitarian when their mothers are *underprivileged workers*. This seems to suggest that high maternal education, or the combination of mothers' participation in paid work and women's organizations is not associated with more egalitarian gender beliefs among adolescent boys. One possible explanation is that parental influences on children's gender belief formation are stronger when operating through same-sex dyads, a phenomenon that has been observed in developed countries (Cunningham, 2001b; Platt and Polavieja, 2016). Also, given the prevalence of gender inequality and son preference in India, adolescent boys may receive more attention from other family members and have more mobility outside households than adolescent girls, making factors such as their own education and interaction with male family and community members more influential to their gender beliefs. Further, the gender belief difference between girls and boys is the smallest when their mothers are *underprivileged workers*. Because *underprivileged worker* mothers live in households with lower SES, it is possible that in

disadvantaged households, the division of labor at home is less gendered as all family members need to contribute to household income.

Although maternal empowerment matters for daughters' gender beliefs, we acknowledge the effect is modest. The near doubling of adjusted R-squared (coefficient of determination) after including children and family characteristics suggests the importance of children's own life experiences and family contexts in shaping adolescents' gender beliefs<sup>7</sup>. The fact that our model fit improves drastically after including PSU fixed effects provides evidence that community context is highly relevant. We see our results as largely consistent with the literature on the effects of maternal empowerment on children's health outcomes. In their influential work, Desai and Alva (1998) found that maternal education's effects on children's health outcomes attenuated substantially once community contexts were taken into consideration. Although we cannot test directly, our findings point to the direction that pervasive gender norms at the local level could trump family and other influences on children's gender belief development.

Some limitations of this study are worth noting. First, as discussed above, the index we use to measure children's gender beliefs captures different aspects of gender egalitarianism. By conducting the Exploratory Factor Analysis as a robustness check, we find that the association between maternal empowerment and children's gender beliefs tends to be driven mainly by the three statements on the gendered division of labor. Children's beliefs in terms of divorce and girls' mobility outside the home do not seem to be sensitive to mothers' empowerment status. To better understand the relationship between maternal empowerment and children's gender beliefs, more efforts are needed to systematically measure different dimensions of children's gender beliefs in India. Second, there is a potential bias that differences in children's gender beliefs are caused by observed and unobserved factors that can determine both mothers' empowerment and children's

gender beliefs. By using the IPTW method to resolve the confounding bias caused by measured factors and conducting community fixed effects to control for all unmeasured heterogeneities at the community level, we partially address this bias and find the results to be largely consistent before and after using these methods. Third, due to the survey design of the IHDS, data on mothers' empowerment and children's gender beliefs are both available only when children were still coresiding with their mothers at the time of the interview. It is, therefore, unclear whether the findings of this study can be generalized to children who leave natal families at a younger age due to reasons such as marriage, school attendance, and work.

Despite these limitations, this paper is among the first to provide empirical evidence on the association between mothers' empowerment and adolescent children's gender beliefs in India. In the context of India, where gender inequality is deeply entrenched, answering this question has strong implications for gender equality and global development for the next generation. By taking the multidimensionality and unevenness of women's empowerment in India into concern, our findings have the potential to depict pathways to promote gender egalitarianism among adolescent girls through empowering their mothers. Maternal education and employment undoubtedly matter but are not enough. Mothers' agency and ability to obtain resources and support outside the home are also of paramount importance. However, the results of this study also suggest that in a highly gendered society, the role of mothers' behaviors in socializing children's gender beliefs may be limited. Despite mothers' and adolescent girls' agency in breaking traditional gender norms, other family and community members still seem to play critical roles in socializing children's, particularly boys' gender beliefs, and reproduce the structure of gender oppression.



## NOTES

1. However, supplementary analyses (results not presented) show that the gender gap in adolescents' gender beliefs was smaller in Adivasi and Muslim households, especially when compared with Forward caste and Christian, Sikh, or Jain households.
2. The 240 cut-off point is widely employed by surveys and studies in India (e.g., Lei and Desai 2021).
3. OBC refers to Other Backward Castes. Dalits are also known as Scheduled Castes, and Adivasis are also known as Scheduled Tribes. Forward castes are generally considered the most advantaged socioeconomically, followed by OBCs. Dalits and Adivasis are considered the most disadvantaged (Starr and Sahgal, 2021).
4. The class solution we adopted had an entropy of 0.829. This high entropy suggests that 82.9% of the time respondents were correctly classified in latent classes and it is appropriate to use the most likely class membership (Clark and Muthen, 2009).
5. IPTW is found to be effective in reducing confounding biases when the control and treatment groups are latent classes, and the most likely class assignment method is used to create the latent class variable (Schuler et al., 2014).
6. For all covariates, the weighted maximum absolute standardized mean differences (ASMD) were lower than 0.2 and the weighted maximum Kolmogorov-Smirnov distances (KS) were lower than 0.1, suggesting the treatment and control groups were balanced in all covariates (Burgette et al., 2016).
7. Table 4 presents R-squared values for the full sample that included both adolescent girls and boys. The changing pattern of the R-squared values was similar when restricting the sample to only adolescent girls or adolescent boys.

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## APPENDIX

Table A1. Descriptive statistics of children's gender belief

	Girls	Boys
Gender belief (sum of five statements)	2.56 (1.16)	2.28 (1.11)
It is best if the husband works and wife looks after the home (0=agree, 1=disagree)	0.31 (0.46)	0.20 (0.40)
If a husband and a wife cannot get along, it is better that they get divorced (0=disagree, 1=agree)	0.40 (0.49)	0.48 (0.50)
It is not good if wife is more educated than the husband (0=agree, 1=disagree)	0.57 (0.50)	0.53 (0.50)
It is natural that parents spend less money on girls' education than that of boys (0=agree, 1=disagree)	0.54 (0.50)	0.54 (0.50)
Girls should have as much freedom to go outside the home as boys (0=disagree, 1=agree)	0.74 (0.44)	0.53 (0.50)

Note: Results present means with standard deviations in parentheses. Higher scores indicate more egalitarian beliefs.

Table A2. Selected household characteristics of mothers in different empowerment latent classes (N=8,721)

	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6
	Educated homemakers	Proactive workers	Averagely empowered workers	High mobility	Low agency	Underprivileged workers
Household income (%)						
Poorest	10.6	11.4	14.0	14.0	13.0	16.5
Second quintile	11.5	16.9	17.4	16.6	14.7	19.1
Third quintile	16.6	23.4	27.1	24.3	21.1	23.4
Fourth quintile	25.7	28.1	23.2	22.6	23.0	22.9
Richest	35.7	20.2	18.3	22.5	28.2	18.1
Primary source of household income (%)						
Salaried job	32.0	21.8	20.6	24.3	19.7	17.7
Daily labor	14.7	44.6	43.7	31.7	30.3	45.0
Farming	21.8	18.3	15.0	14.2	20.0	19.7
Business	22.5	9.0	13.7	15.6	19.5	10.3
Other	9.0	6.3	6.9	14.1	10.5	7.3
Households' caste & religion (%)						
Forward caste	35.3	19.5	19.4	22.6	19.7	11.7
OBC	31.4	36.1	35.7	27.9	28.8	35.3
Dalit	14.2	25.9	26.3	22.6	21.6	27.7
Adivasi	2.5	7.9	7.9	9.9	5.6	9.8
Muslim	11.6	7.3	8.4	14.3	20.7	14.2
Christian, Sikh, Jain	5.0	3.3	2.3	2.7	3.6	1.4
Urban/Rural (%)						
Metro urban	14.1	3.5	2.7	6.8	8.4	4.3
Other urban	37.4	24.0	24.5	32.5	27.3	20.4
More developed rural	26.1	45.2	38.6	28.7	26.3	32.3
Less developed rural	22.4	27.3	34.2	32.0	38.0	43.0
Household structure (%)						
Nuclear	61.5	61.9	64.4	68.6	54.3	62.9
Joint	38.5	38.1	35.6	31.4	45.7	37.1
Coresided with fathers (%)	96.3	92.7	91.2	77.2	97.4	93.9

Table A3. Selected household characteristics of mothers in different empowerment latent classes, data weighted using the Inverse Probability of Treatment Weight (IPTW) (N=8,721)

	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6
	Educated homemakers	Proactive workers	Averagely empowered workers	High mobility	Low agency	Underprivileged workers
Household income (%)						
Poorest	13.1	13.9	13.3	13.6	13.1	13.8
Second quintile	14.9	16.1	17.0	16.9	16.6	16.7
Third quintile	21.7	23.9	23.3	22.3	21.6	22.5
Fourth quintile	24.3	26.0	23.8	22.8	23.7	23.1
Richest	26.0	20.2	22.6	24.4	25.0	23.8
Primary source of household income (%)						
Salaried job	23.3	21.6	22.4	23.0	22.8	23.4
Daily labor	31.8	36.9	37.5	35.2	32.6	37.0
Farming	19.3	18.9	17.7	17.4	20.3	18.6
Business	16.5	14.8	14.8	15.2	16.0	13.0
Other	9.2	7.8	7.6	9.3	8.4	8.2
Households' caste & religion (%)						
Forward caste	23.0	19.4	21.1	20.5	21.2	19.0
OBC	32.0	34.8	33.6	33.1	34.1	33.6
Dalit	21.9	23.5	23.6	23.5	22.0	23.9
Adivasi	5.6	7.0	7.9	7.3	7.3	7.7
Muslim	14.6	12.8	11.6	12.9	12.6	13.0
Christian, Sikh, Jain	3.1	2.5	2.1	2.6	3.0	2.8
Urban/Rural (%)						
Metro urban	7.2	3.2	5.0	6.5	6.6	6.1
Other urban	30.4	29.5	27.0	28.4	27.7	26.9
More developed rural	30.0	33.1	33.2	31.4	29.6	32.1
Less developed rural	32.5	34.2	34.8	33.7	36.1	34.9
Household structure (%)						
Nuclear	62.9	63.3	63.9	63.9	60.5	62.8
Joint	37.1	36.7	36.1	36.1	39.5	37.2
Coresided with fathers (%)	93.8	92.7	91.4	91.3	96.9	92.6



Table A4. Rotated factor loadings for children’s gender beliefs and values of communalities.

	Factor 1	Factor 2	Factor 3	Communality
	Labor division	Mobility	Divorce	
ST1: it is best if the husband works and wife looks after the home	<b>0.57</b>	0.33	-0.26	0.56
ST2: if a husband and a wife cannot get along, it is better that they get divorced	0.06	0.06	<b>0.95</b>	0.90
ST3: it is not good if wife is more educated than the husband	<b>0.73</b>	0.04	0.24	0.56
ST4: it is natural that parents spend less money on girls' education than that of boys	<b>0.62</b>	-0.38	-0.06	0.52
ST5: girls should have as much freedom to go outside the home as boys	-0.01	<b>0.89</b>	0.06	0.79

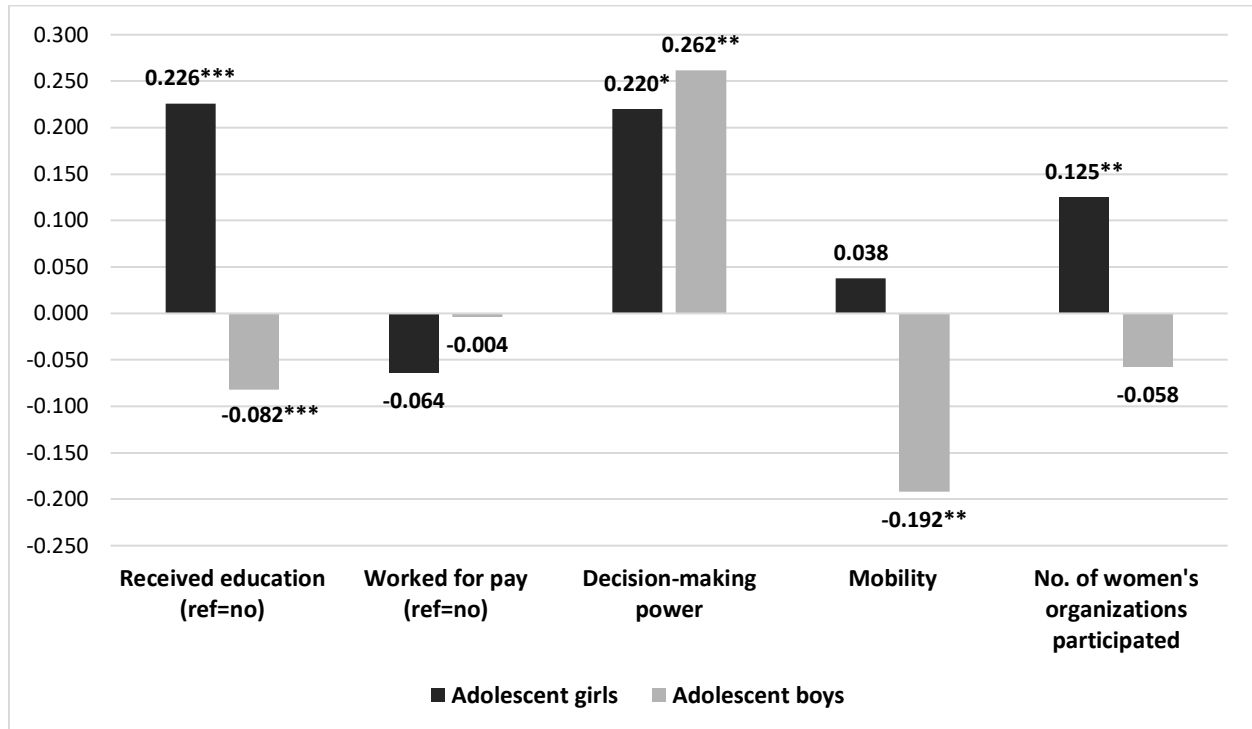
Notes: Principal component factor analysis and Oblique rotation are used. The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.524, and Bartlett's test value of sphericity was found significant at 0.001 levels, suggesting there is a substantial correlation in the data, and factor analysis is appropriate. Three factors with an eigenvalue of more than 1 explained 66.6% of the total variance.

Table A5. Regression models of mothers' empowerment class predicting adolescent girls' and adolescent boys' gender belief factors (N=8,721)

	Model 1	Model 2	Model 3
	Factor 1	Factor 2	Factor 3
	(Labor division)	(Mobility)	(Divorce)
Mothers' empowerment classes (ref=educated homemakers)			
Proactive workers	0.165 (0.094)	0.082 (0.090)	0.132 (0.089)
Averagely empowered workers	-0.069 (0.068)	-0.010 (0.068)	-0.005 (0.066)
High mobility	-0.062 (0.076)	0.002 (0.069)	-0.000 (0.069)
Low agency	-0.301*** (0.082)	-0.024 (0.084)	0.123 (0.084)
Underprivileged workers	-0.190** (0.060)	0.002 (0.056)	0.034 (0.056)
Boys (ref=girls)	-0.259*** (0.067)	-0.442*** (0.063)	0.177** (0.063)
Empowerment classes*Children's gender			
Proactive workers *Boys	-0.300* (0.120)	-0.198 (0.116)	0.012 (0.122)
Averagely empowered workers *Boys	-0.047 (0.090)	0.027 (0.088)	0.015 (0.087)
High mobility *Boys	-0.030 (0.099)	-0.003 (0.090)	0.046 (0.092)
Low agency *Boys	0.221 (0.107)	-0.045 (0.107)	-0.200 (0.110)
Underprivileged workers *Boys	0.237** (0.081)	0.031 (0.077)	0.074 (0.077)
Constant	0.050 (0.286)	0.148 (0.282)	0.038 (0.293)
Adjusted R-squared	0.297	0.297	0.296

Notes: Results present regression coefficients with standard errors in parentheses. All models use the primary sample unit fixed effect and the inverse probability of treatment weighting method. Coefficients for control variables were omitted to conserve space. \* p < .05, \*\* p < .01, \*\*\* p < .001.

Figure A1. Coefficients of the association between mothers' empowerment indicators and adolescent children's gender beliefs by children's gender



Notes: \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .