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Gender Stratification and Parental Stimulation of Children: Exploring Differences in Maternal and Paternal Practices

Kenji Kitamura[1] · Claudia Cappa [2] · Nicole Petrowski[2] · Lauren Pandolfelli[2] · Suguru Mizunoya[2]

Abstract

Parents' engagement in playing and learning is important for children's development. Insufficient engagement of parents in such activities, however, has been reported in low- and middle-income countries. Additionally, there is evidence documenting that the extent of paternal stimulation is often much lower than that of maternal stimulation. The underlying reasons for such a difference, including those linked to levels of gender stratification or inequality within a society, have yet to be fully explored. Employing a cross-sectional analysis of a sample of 47 low- and middle-income countries with data between 2011 and 2016, the paper investigates the extent to which predictors linked to gender stratification theory influence the extent of parental stimulation with children in the home, and differences in maternal and paternal engagement. The analysis included seven country-level variables that are related to gender stratification in society as well as one country-level control variable (gross domestic product [GDP] per capita). Parental stimulation was measured in terms of the percentage of children aged 24–59 months whose mother or father engaged in certain activities such as singing or reading with them in the past 3 days. The analysis revealed that in all 47 countries, young children were more likely to receive stimulating care from their mothers than their fathers. On average, 34.7% of young children received four or more stimulating activities from their mothers compared to only 14.1% from their fathers. The results also showed that gender stratification in a society, especially within the economic, political, and reproductive autonomy domains, influences the proportion of children whose mothers/fathers were engaged in stimulating activities. Such factors, however, do not necessarily determine both parents' behaviors in the direction expected by gender stratification theory.

Keywords Parental stimulation · Child development · Gender stratification · Low- and middle-income countries

Highlights

- Cross-national analysis to examine differences in maternal and paternal engagement based on predictors linked to gender stratification theory.
- Young children were more likely to receive stimulating care from their mothers than their fathers.
- Gender equality in labor participation, political participation and educational attainment led to more active parenting engagement by both mothers and fathers, but more so by mothers.
- The existence of maternity leave policies in the absence of paternity leave policies was associated with a smaller proportion of actively engaged fathers.

Exploring the Extent of Parental Stimulation with Children through the Lens of Gender Stratification Theory

Parents' engagement in playing and learning is important for children's development (Jeong et al., 2016; Urke et al., 2018). Research has shown a stronger association between maternal caregiving and children's development of social competence than with other types of care, ranging from

✉ Claudia Cappa
ccappa@unicef.org

1 Teachers College, Columbia University, New York, NY, USA

2 Data and Analytics Section, Division of Data, Analytics, Planning and Monitoring, UNICEF, New York, NY, USA

center-based care to care by relatives (NICHD Early Child Care Research Network, 2002). Parenting practices have a direct relationship with various development domains, including cognitive (NICHD Early Child Care Research Network, 2002; Paxson and Schady, 2007) and social-emotional ones (NICHD Early Child Care Research Network, 2002). Interventions to improve parenting practices show positive impacts, although the magnitude of effects varies across interventions due in part to differences in program quality (Engle et al., 2011; Jeong et al., 2018). Insufficient engagement of parents in such activities has been reported in both low- and middle-income countries (Jeong et al., 2016; Sun et al., 2016). Additionally, there is evidence that the extent of paternal stimulation is often much lower than that of maternal stimulation (Sun et al., 2016). The underlying reasons for such a difference, however, including those linked to levels of gender stratification or inequality within a society, have yet to be fully explored. Evidence-based policies and practices to support quality interactions between children and their parents require a deeper understanding of the societal factors that underlie mothers' and fathers' caregiving practices in low- and middle-income countries. Employing a cross-sectional analysis with a sample of 47 such countries with data between 2011 and 2016, we investigate the extent to which predictors linked to gender stratification theory influence the extent of parental stimulation with children in the home, and differences in maternal and paternal engagement.

Determinants of Parental Stimulating Activities

The ecological systems model is a comprehensive theory of human development that focuses on the interaction of the child with multilevel ecological settings (Bronfenbrenner and Morris, 2006). It provides a picture of the environment in which children develop. Using this perspective, Luster and Okagaki (2006) explain that parenting practices are shaped by multiple factors: the characteristics of the child and parents themselves, the household environment, and the broader social context.

Age and gender are two demographic characteristics of children that are often reported as influential. Studies have found that parents were more responsive to younger children (Vandermaas-Peeler et al., 2003; Wertsch et al., 1980), and that they tended to increase their amount of talk and vocabulary as children became older (Rowe et al., 2005). Some studies have found that parents were more likely to engage in responsive interactions with children of the same gender as themselves (Ivrendi and Isikoglu, 2010; Leaper et al., 1998). Other studies have indicated that a child's gender does not influence parental engagement

levels (Rowe et al., 2004; Rowe et al., 2005; Tulananda and Roopnarine, 2001).

One of the most frequently explored family factors is parental education, which has consistently been positively associated with parental stimulation (Ozgun and Honig, 2005; Rowe et al., 2005; Saraff and Srivastava, 2010; Suizzo and Stapleton, 2007; Sun et al., 2016). A family's economic environment also has been associated with parental engagement in stimulating activities with their children (Bradley et al., 2001; Hoff-Ginsberg, 1998; Nievar and Luster, 2006; Rafferty and Griffin, 2010). The available literature posits that broader social factors can influence parenting in multiple ways. For instance, Ogbu (1981) argues that the availability of resources or subsistence demands are a driving factor. Cultural beliefs and values around parental roles and responsibilities also influence parenting practices and are shaped by social and economic factors (Ozgun and Honig, 2005; Rowe et al., 2004; Saraff and Srivastava, 2010). Despite the wide recognition that the broader social context plays a role in parenting, only a few studies have empirically analyzed these macro-level factors. To date, no studies have examined how gender inequality mediates these factors, despite the gendered nature of parenting practices. Studies have largely utilized cross-nationally comparable datasets, such as those from the Multiple Indicator Cluster Surveys (MICS) supported by the United Nations Children's Fund. For instance, Sun et al. (2016) and Bornstein and Putnick (2012) found that the Human Development Index (HDI), as a country-level composite measure of overall social and economic status, positively correlated with parental engagement. In particular, gross domestic product (GDP) significantly correlated with maternal caregiving, after controlling for the other two HDI components: life expectancy and general educational development (Bornstein and Putnick, 2012).

Less attention has been paid to understanding differences in levels of maternal versus paternal engagement despite empirical studies consistently finding that mothers tend to engage with their children more than fathers in many countries (Sun et al., 2016), and the documented importance of fathers' participation in children's development (Foster et al., 2016; Lewis and Lamb, 2003; McWayne et al., 2013; Tamis-LeMonda et al., 2004). Understanding the potential reasons for the gender gap in parental stimulation is therefore essential for constructing effective policies to support quality caregiving for young children.

Sun et al. (2016) found that maternal education level and its interaction with a county's social and economic status, as measured by the HDI, partly explained the gender gap in stimulating activities. That is, while in countries with high HDI scores (signaling a higher level of human

development) both mothers and fathers with different education levels had the same engagement, in countries with low HDI scores, more-educated mothers engaged in more stimulating activities than less-educated mothers, and fathers with more-educated wives were less engaged than fathers with less-educated wives. This finding indicates that there is a wider gap between maternal and paternal engagement in households with more-educated mothers than in households with less-educated mothers in countries with low HDI scores. Studies also suggest that the status of mothers relative to fathers needs to be considered as well. Caregiving practices are influenced by the mother's status relative to male household members in terms of overall investments in females relative to males throughout the life cycle (Smith and Haddad (2000)). Similarly, research on the division of household labor found that the wages, education and occupation of women relative to men helped sustain men's greater power within the family in the allocation of tasks (Coverman, 1985; Presser, 1994; Ross, 1987). While gender status within households is important, little attention has been paid to the broader social factors influencing gender disparities in parenting practices. In sum, the existing literature provides a limited picture of the social dynamics that underlie gender disparities in parenting practices.

Gender Stratification Theory

Gender stratification refers to the unequal distribution of wealth, power, and privilege between women and men, with women being accorded a lower status, on average, than men across various domains, including education, work, and politics. While gender inequalities are generated and maintained at all levels, including individual, family, group, and societal levels, macro-level mechanisms of gender stratification shape gender inequalities at the micro level (Blumberg, 1984; Mason, 1986). For example, studies have shown that parents are more likely to invest in their son's education than that of their daughter if the labor market favors men's employment (Alderman and King, 1998), and legal regimes discriminate against daughters' right to inherit land (Deininger et al., 2013). Macro-level gender inequalities thus influence women's positions in households relative to men's. In highly gender-stratified societies, women may exhibit less intrahousehold decision-making power and control over resources while assuming a greater share of domestic and care work. The unequal distribution of unpaid work within the household is not the 'natural duty' of women, but is carried on within a hierarchical relationship embedded at the social level (Danaj, 2016; Risman, 2004). This logic of gender stratification theory

can be applied to explain the gender gap in parental stimulation. That is, in societies with high levels of gender stratification, the disadvantage of women in various spheres of life may lead mothers to adopt the role of primary caregiver, including engagement in stimulating activities with children, while fathers, as breadwinners, are less likely to be engaged in child stimulation, considered to be the domain of women.

Gender stratification is both a conceptually and empirically multidimensional phenomenon (Mason, 1986). Thus, based on a wide literature review on this theory, we focus on broad social contextual factors that are related to gender stratification and potentially influence gender roles in child-rearing: economic participation (Ayalon and Livneh, 2013; Blumberg, 1984; Boehmer and Williamson, 1996; Danaj, 2016; Else-Quest et al., 2010; Risman, 2004), political empowerment (Ayalon and Livneh, 2013; Blumberg, 1984; Boehmer and Williamson, 1996; Danaj, 2016; Else-Quest et al., 2010), educational attainment (Boehmer and Williamson, 1996; Danaj, 2016; Else-Quest et al., 2010; Shen and Williamson, 1997; Shen and Williamson, 1999), and reproductive autonomy (Ayalon and Livneh, 2013; Boehmer and Williamson, 1996; Shen and Williamson, 1997, 1999). We analyze population level data from 47 low- and middle-income countries to reveal whether, and to what extent, gender stratification within a society influences mothers' and fathers' stimulation of children in the home, and whether these factors influence gender gaps in paternal engagement. By applying gender stratification theory, we aim to address the limitation of the existing literature regarding the potential mechanisms through which maternal and paternal engagement levels are influenced by social factors.

Method

Data

The MICS is an international household survey program that allows countries to monitor and report on a variety of indicators of the well-being of children, including, for example, nutritional status, immunization, and parenting practices. In addition, the MICS features a dedicated module on early childhood development to gather data on such vital areas as the quality of caregiving in the home. Since its first round in the mid-1990s, the MICS has been conducted approximately every 5 years. Data from two rounds of the MICS were used (MICS4 and MICS5) for this study. These data were collected at different times for each country, over a period from 2011 to 2016. Data sets could be accessed for a total of 48 countries. The sample

was limited to those children whose mother and father were both living in the same household, since the aim of the study is to explore differences in maternal and paternal engagement in stimulating activities with children. This inclusion criteria excluded data from one country that did not collect information on parents' residence. The sample was also restricted to parents with children aged 24–59 months, given that information on parental stimulation was only collected for children within this age range. Based on these inclusion criteria, the analyses were based on data from the 47 countries with all the information necessary to specify the sample.

We used seven country-level variables related to gender stratification in society as well as one country-level control variable (i.e., GDP per capita). Among the seven gender stratification variables, three are in the economic domain (the female labor force participation [LFP] rate relative to the male rate, maternity leave, and paternity leave), one in the political domain (share of seats held by women in parliament), one in the education domain (the female lower-secondary education enrollment [LSE] rate relative to the male rate), and two in the reproductive autonomy domain (fertility rate and women's unmet need for family planning). Because the relative status of women compared to men is central to gender stratification theory, we used values of women's LFP and LSE relative to men's rather than absolute values for women. Also, to reflect the influence of the education system on current parents of young children, we used the LSE ratio with a 10-year lag. Country-level variables were obtained from various international databases (Addati et al., 2014; International Labour Organization, n.d.-a.; International Labour Organization, n.d.-b.; UNESCO Institute of Statistics, n.d.; United Nations Development Programme, n.d.; World Bank, n.d.) and were merged with MICS data.

Efforts were made to identify data points for country-level variables consistent with the reference period for MICS data collection in each country. That said, we allowed up to a 3-year gap between the reference year for the MICS data and the reference year for other country-level variables. Even after making such an allowance, our sample was still limited by data availability across countries. The list of countries included in the analysis and detailed information on country-level variables are provided in Table 3 in the Appendix.

Measures

Parental engagement in stimulating activities

In the MICS questionnaire, the mother (or if the mother is deceased or not living in the household, the primary caregiver) of each child aged 24–59 months is asked to report on whether she, the father, and/or any other household members over 15 years old engaged in any of the following six activities with the child at home in the past 3 days: (1) reading books or looking at picture books with the child; (2) telling stories to the child; (3) singing songs to or with the child; (4) taking the child outside the home, yard, or enclosure; (5) playing with the child; and (6) naming, counting, or drawing to or with the child. These six questions are used to calculate an indicator of support for a learning/stimulating environment (Kariger et al., 2012). We created outcome variables to reflect the proportion of children aged 24–59 months whose mother/father engaged in at least four of the six activities with them in the past 3 days. To capture the gender disparities in stimulation activities, we simply subtracted a proportion of children receiving active paternal engagement from that of children whose mother was actively engaged.

Social level gender stratification

As stated above, gender stratification is a multi-dimensional phenomenon (Mason, 1986). We included four important dimensions of gender stratification in a society: the economy, political empowerment, educational attainment, and reproductive autonomy. For the economic domain, two aspects were considered. The first, deemed critical for women's economic empowerment, is their labor force participation, measured here as the female LFP rate relative to the male rate. Women's lower LFP, on average, highlights the greater difficulty women experience entering the labor force, due in part to the unbalanced division of unpaid work within the household. In fact, when women assume the bulk of unpaid domestic and care work, they are less likely to work for pay or profit (International Labour Organization, 2019). In countries with a higher participation of women in the labor force, men might assume more care work in the household, including stimulation of children. While the intent was to measure LFP specifically for the population of reproductive age (i.e., aged 15–49), doing so would have reduced the sample size significantly due to data unavailability, so the indicator captures the working-age population aged 15 years or older.

The second aspect considered entails family-friendly policies encouraging parents to take care of young children while sustaining their jobs. Specifically, we used variables on whether a country has maternity and paternity leave policies. The mere existence of maternity leave can potentially influence the behaviors of fathers and mothers in both directions. Especially when there are no cash benefits, maternity leave can result in reinforcing traditional roles and stereotypes, including that women are solely

responsible for the family, which in turn reduces the likelihood that women will return to employment after leave (Addati et al., 2014). To better measure economic policy that mitigates gender stratification in the economic domain, we created a binary variable of the existence of maternity leave for at least 14 weeks with cash benefits of at least two thirds of previous earnings, following Convention No. 183 of the International Labour Organization (ILO) (Addati et al., 2014). While there are no ILO standards specifically on paternity leave, the existence of a paternity leave policy is likely to indicate a positive public attitude toward fathers' roles in child-rearing and gender equal economic opportunities. Thus, we used a binary variable on the existence of paternity leave. While recent research has suggested a positive association between men's use of paternity leave and their time spent caring for their children in industrialized countries, even after the paternity leave has ended (Huerta et al., 2013; Tamm, 2018), data limitations meant the variables we employ do not measure use of maternity and paternity benefits by employees, only the existence of national-level policies. Further, even in countries with legal rights to parental leave, not all workers will have access, such as those employed part-time or in the informal economy.

To capture gender stratification in the political realm, the share of seats held by women in parliament was used as a proxy measure of female political empowerment and participation. Several studies have found that higher levels of women's political participation are associated with increased state spending on social policy (Bolzendahl, 2009; Bolzendahl and Brooks, 2007; Bratton and Ray 2002). In countries with higher rates of female labor force participation, higher levels of female political participation have been found to correlate with increases in spending on family benefits, including childcare, as women in political office are seemingly more responsive to demands for childcare services by women in paid employment (Ennser-Jedenastik, 2017). In countries with a higher share of parliamentary seats occupied by women, therefore, more equitable child stimulation between mothers and fathers may be expected.

To represent gender stratification in the education domain, we used the ratio of the female gross LSE ratio to that of males with a 10-year lag. This level of education is often used in empirical studies related to gender stratification (Boehmer and Williamson, 1996; Shen and Williamson, 1999, 1997) as attainment of secondary education yields considerable benefits for young women over the attainment of primary education alone. For example, while women with primary education earn only marginally more than women with no education, women with secondary education earn twice as much, on average, as women who have not gone to school (Wodon et al., 2018). Women's educational

attainment is also correlated with improvements in child survival and well-being (United Nations Children's Fund, 2007). Thus, in countries with higher ratios of female LSE relative to males' ratios, increases in both maternal and paternal child stimulation may be observed.

As for women's reproductive autonomy, we used two variables: fertility rate, and women's unmet need for family planning. While fertility rate measures the lack of control over reproductive behavior, it may also reflect women's reproductive autonomy (Boehmer and Williamson, 1996; Shen and Williamson, 1997, 1999). Higher fertility rates, however, are likely to be associated with a larger number of young children in the family (Dibaba and Mitike, 2016) competing for their parents' time and engagement (Dunifon et al., 2017; Suizzo and Stapleton, 2007). Fertility rate is also related to demographic transition and has been used as an indicator of social development (Frongillo et al., 2019). Thus, this variable may be correlated with maternal and paternal parenting practices not only as an indicator of women's reproductive autonomy but also as a proxy of the number of children in the family and social development more broadly. A more direct measure of women's reproductive autonomy is the variable of unmet need for family planning, which captures the gap between women's reproductive intentions and their contraceptive behavior.

Finally, we included GDP per capita in all the models as a baseline control variable, given that prior studies have found the economic situation of countries, as measured by GDP, to be strongly related to the level of parental stimulating activities even after controlling for other relevant country-level variables (Bornstein and Putnick, 2012). To allow this variable to better fit the models, we used the log-transformed variable of GDP per capita (purchasing power parity based on constant 2011 international dollars).

Approaches to analysis

All 47 country datasets were merged into one file. Many of the gender stratification variables correlate with each other, as shown in Table 4 in the Appendix. Thus, one variable can be confounded with others in association with the outcome variables. To see the partial association of each variable with the outcomes, while holding other variables constant, we employed multiple regression analyses. In doing this, we discovered that where the correlations of fertility rate with female relative LSE ratio and unmet need for family planning are large ($r = -0.68$ and 0.60, respectively), including these variables in one model may cause multicollinearity. In fact, when all gender stratification variables were included in one model, the variance inflation factor (VIF), which is a measure of

multicollinearity in multiple regressions, was 3.82 for the fertility rate. While different VIF thresholds are employed in the literature for detecting multicollinearity, we adopt a conservative approach and use a VIF of 2.5 or greater (Johnston, Jones and Manley, 2018). Therefore, instead of running a single full model that included all gender stratification variables together, we ran two separate models. The first model included all variables except the fertility rate while the second model included all variables except the two gender stratification variables that showed relatively large correlations with the fertility rate (i.e., female relative LSE ratio and unmet need for family planning). This specification led to lower VIFs for the fertility rate (2.05), which satisfies the criteria.

There are missing values in the predictors. We employed Little's test to see the missing mechanism, using the Stata 15.1 mcartest command. The test failed to reject the null hypothesis that the values are missing completely at random (MCAR) (X^2 (38, $N = 47$) $= 39.23$, $p = 0.41$). We also conducted a test of the covariate-dependent missingness (CDM) assumption. The CDM assumption indicates that patterns of missing values depend on completely observed variables, and it is a special case of the missing at random (MAR) assumption (Li, 2013). In this test, we added one of the outcome variables (the gender gap in the proportion of children receiving active stimulations), which had no missing values, to the predictor variables. The test statistics, X^2 (76, $N = 47$) $= 65.73$, was highly nonsignificant ($p = 0.79$), suggesting that our data can be reasonably viewed as CDM, if not MCAR. To address missing data among the independent variables, based on the CDM assumption, and maintain statistical power, we conducted multiple regression analyses with full-information maximum likelihood for estimation using the Stata 15.1 sem command with the mlmv option. We first regressed a ratio of children whose mother/father actively engaged in stimulation activities on gender stratification variables and GDP per capita. Then, we conducted the same analyses using the gender gap in stimulation activities as the outcome variable. Since this outcome variable is simply the gap between the ratio of children who received active engagement from their mothers and the ratio of children who received active engagement from their fathers, these models provide similar but more summarized information focusing on gender disparities in stimulation activities.

Results

Our analysis revealed that, in all 47 countries, young children were more likely to receive stimulating care from their mothers than their fathers. On average, 34.7% of young children received four or more stimulating activities from their mothers compared to only 14.1% from their fathers (see Table 3 in the Appendix). In Table 1, Model 1 and Model 2 are results of multiple regression for a ratio of children whose mother actively engaged in stimulation activities with two different specifications. The results for the same models with outcome variable being proportion of children receiving active stimulations from fathers are presented in Model 3 and Model 4. Log GDP per capita is included across models as a baseline model. As predicted, log GDP per capita was positively associated with both maternal and paternal engagement in all models.

As for maternal stimulation, three gender stratification variables were found to have significant associations in Model 1. The interaction term between maternal leave and paternal leave was positively associated with maternal stimulation ($\beta = 0.24$, $p = 0.06$), indicating that the existence of policies for both maternal and paternal leave results in an increase in the proportion of young children receiving stimulating care from their mothers. Share of women in parliament also showed a positive association ($\beta = 0.005$, $p = 0.03$). The third significant coefficient was women's unmet need for family planning ($\beta = -0.009$, $p = 0.02$), indicating that higher unmet need resulted in a lower proportion of children with maternal active engagement. Although the female relative LSE ratio showed positive association with maternal stimulation, the coefficient is not statistically significant ($\beta = 0.20$, p $= 0.21$).

When fertility rate was included in place of female relative LSE rate and women's unmet need for family planning in Model 2, the two variables that were significant in Model 1 became insignificant, which implies the possibility that significant associations in Model 1 were confounded by fertility rate. In Model 2, it is only fertility rate that showed significant association ($\beta = -0.09$, $p = <0.001$). While the direction of this coefficient is opposite to our gender stratification hypothesis, this is somewhat predictable. As stated above, fertility rates are considered positively associated with the number of young children in a family, which in turn negatively correlates with maternal engagement in stimulating activities with each child. The other gender stratification variables had smaller coefficients and were far from reaching statistical significance.

The results from Model 3 and Model 4 revealed that the gender stratification variables had the same direction of associations with both maternal and paternal stimulation, although multitudes of coefficients vary between the two outcome variables. Except for the variable on maternity leave, all gender stratification variables had smaller magnitudes of associations with proportion of

Table 1 Maternal and paternal stimulation and gender stratification

Variables	Maternal stimulation		Paternal stimulation	
	(1)	(2)	(3)	(4)
Log GDP per capita	0.126[***]	0.089[***]	0.069[***]	0.046[***]
	(0.027)	(0.026)	(0.017)	(0.017)
Female relative LFP rate	0.086	0.155	0.082	0.114
	(0.162)	(0.136)	(0.100)	(0.086)
Maternity leave	−0.106	−0.036	−0.108[**]	−0.071[**]
	(0.068)	(0.049)	(0.044)	(0.031)
Paternity leave	−0.132	−0.002	−0.085	−0.019
	(0.093)	(0.063)	(0.060)	(0.040)
Maternity × paternity leave	0.238[*]	0.106	0.154[*]	0.082
	(0.128)	(0.087)	(0.084)	(0.055)
Share of women in parliament	0.005[**]	0.002	0.002	0.001
	(0.002)	(0.002)	(0.001)	(0.001)
Female relative LSE ratio	0.203		0.073	
	(0.160)		(0.098)	
Fertility rate		−0.089[***]		−0.045[***]
		(0.019)		(0.012)
Unmet need	−0.009[**]		−0.004	
	(0.004)		(0.003)	
Constant	−0.931[***]	−0.347	−0.516[*]	−0.204
	(0.351)	(0.323)	(0.221)	(0.204)
Observations	47	47	47	47
Adjusted R-squared	0.634	0.696	0.521	0.584

Standard errors in parentheses

[***] $p < 0.01$; [**] $p < 0.05$; [*] $p < 0.10$

actively engaged fathers than with actively engaged mothers. In Model 3, the existence of relevant maternity leave policies showed a significant negative association ($\beta = -0.11$, $p = 0.02$). Since we included the interaction term between maternal leave and paternal leave, this significant coefficient of the maternity leave variable indicates its association with paternal engagement in the absence of a paternity leave policy. Like Model 1, the interaction term between maternal leave and paternal leave in Model 3 showed a positive correlation ($\beta = 0.15$, $p = 0.07$).

In Model 4, the fertility rate was negatively associated with paternal stimulation ($\beta = -0.05$, $p = 0.002$). While this association may imply that women's lower reproductive autonomy is associated with less paternal engagement, we cannot rule out the possibility that it is rather a reflection of the influence of having a larger number of young children within a family. The direction of coefficients for variables on maternity and paternity leave and their interactions remain the same from Model 3, but magnitudes became smaller. While the association of the interaction term between maternal leave and

paternal leave was no longer statistically significant, the maternity leave variable consistently showed a significant negative association ($\beta = -0.07$, $p = 0.02$). The female relative LFP ratio was positively associated with fathers' engagement, but not to a statistically significant degree ($\beta = 0.11$, $p = 0.18$). The other gender stratification variables had smaller coefficients and were far from reaching statistical significance.

Table 2 shows the results of the regression analyses on gender disparities in stimulation activities as measured by the differences in the ratio of children with maternal and paternal engagement in each country. In Models 1 and 2, three variables in two domains of gender stratification (i.e., political and reproductive autonomy) showed significant associations with the gender gap in stimulating activities. In Model 1, share of women in parliament was associated with the wider gap ($\beta = 0.003$, $p = 0.02$), which reflects the fact that this variable had stronger positive correlation with paternal engagement than with maternal engagement. Women's unmet need for family planning was associated with the smaller gender gap in stimulating activities at the 95% confidence level

Table 2 Difference in maternal and paternal stimulation and gender stratification

Variables	(1)	(2)
Log GDP per capita	0.057***	0.042***
	(0.015)	(0.015)
Female relative LFP rate	0.004	0.042
	(0.092)	(0.081)
Maternity leave	−0.002	0.035
	(0.037)	(0.029)
Paternity leave	−0.048	−0.019
	(0.051)	(0.039)
Maternity × paternity leave	0.088	0.025
	(0.070)	(0.054)
Share of women in parliament	0.003**	0.002
	(0.001)	(0.001)
Female relative LSE ratio	0.140	
	(0.092)	
Fertility rate		−0.046***
		0.011
Unmet need	−0.005**	
	(0.002)	
Constant	−0.419**	−0.134
	(0.199)	(0.188)
Observations	47	47
Adjusted R-squared	0.635	0.672

Standard errors in parentheses

***$p < 0.01$; **$p < 0.05$

($\beta = -0.005$, $p = 0.02$). This indicates that higher unmet need, or women having lower reproductive autonomy, correlated with a smaller gender disparity in stimulating activities, which is inconsistent with gender stratification theory. This finding can be explained by the fact that the negative association of women's unmet need with maternal engagement was stronger than with paternal engagement, as Table 1 shows. The association of the fertility rate with a smaller gender gap in stimulation activities ($\beta = -0.05$, $p < 0.001$) in Model 2 is due to its stronger association with maternal engagement than with paternal engagement, while both associations were negative.

The female relative LFP rate and LSE ratio, which are measures of economic and education domains, respectively, had associations with a wider gender gap in stimulation activities, although they were not statistically significant. These positive yet insignificant associations with the gap in stimulation activities between mothers and fathers can be explained by their stronger positive associations with maternal engagement than with paternal engagement. Similarly, the existence of both maternity and

paternity leave policies were positively correlated with both maternal and paternal engagement but to a stronger degree with maternal engagement, which led to wider gender gap in stimulation.

Discussion

The findings revealed that different domains of gender stratification within a society exert different influences on maternal engagement compared to paternal engagement. In the economic domain, a higher relative female LFP rate showed a positive yet insignificant association with the proportion of children whose fathers engaged them, as expected, but it did not decrease but rather increased the proportion of children whose mothers were actively engaged in stimulating activities. In other words, in societies with less gender stratification in terms of economic opportunity, fathers actively participate more in child stimulation while mothers also increase their engagement level. Gender equality in economic opportunity seems to have a complementary rather than a supplementary role in terms of parental engagement in stimulating activities.

Another variable in the economic domain, maternity and paternity leave, also showed interesting relationships with children's experience of parental engagement. We defined our maternity leave variable so that it reflected economic policy for gender equality by specifying at least 14 weeks of leave with cash benefits of at least two thirds of previous earnings. Our results revealed that, even with such restrictions, the existence of maternity leave without a paternity leave policy resulted in a lower likelihood of fathers actively engaging in stimulating activities with their children. Thus, despite the intention of family-friendly policies to encourage mothers to return to their jobs after having children, focusing such policies only on mothers rather than on both parents may implicitly send a message to both the public and families that it is a woman's role to take care of young children. Contrary to our expectation that paternity leave policies would encourage fathers to take more active roles in child-rearing, the coefficients of this variable were small and remained insignificant across models. As this variable simply measured the existence of paternity leave regardless of its length and participation rate, this finding may suggest that merely having a paternity leave policy without actively supporting working fathers to use the benefit is insufficient in encouraging active paternal engagement with children.

Female political empowerment within a society was found to be relevant in explaining maternal engagement. In the societies with higher female political empowerment

and participation, children were more likely to receive active maternal simulation. However, such higher female political empowerment and participation did not lead to a significant increase in the proportion of actively engaged fathers. As a result of its positive and null associations with maternal and paternal stimulation, respectively, political empowerment within a society was associated with wider gender gap in stimulation.

The education domain had an unexpected direction of relationship with children's exposures to maternal engagement, but an expected direction of association with paternal engagement, while statistical tests for both associations did not reach significance. Gender stratification theory may argue that gender equality in educational attainment between mother and father leads to more gender equal engagement in stimulation activities for children. Our results showed, however, that the higher education attainment of mothers relative to fathers was associated with more maternal engagement, which is consistent with existing studies that show a positive association between maternal engagement and mothers' education levels in absolute terms rather than relative to fathers (Ozgun and Honig, 2005; Suizzo and Stapleton, 2007; Sun et al., 2016). While more fathers with relatively more-educated wives seemed to be engaged in stimulation activities, the extent of this correlation was smaller, which led to a wider gap in the proportion of children with engaged mothers and engaged fathers.

Lastly, our analyses had limited support for the gender stratification theory within the domain of reproductive autonomy. Women's unmet need for family planning showed an unexpected direction of association with the gender gap, in that lower reproductive autonomy of women correlated with less gender disparity. The negative associations of the fertility rate with the proportion of children with engaged mothers may suggest that this variable was functioning as a proxy for the number of children in a family and an indicator of social development more broadly rather than as a measure of reproductive autonomy. Results with regards to this dimension of gender stratification are therefore less conclusive than for other domains.

These findings have several limitations in terms of measurements and external validity. Some country-level variables are proxy measures of important aspects of gender stratification in society. For instance, one of the variables in the economic domain does not capture the actual take-up of maternity and paternity leave by employees, only the existence of national-level policies. Furthermore, as mentioned above, the fertility rate might indicate multiple constructs, such as women's reproductive autonomy, the number of children in the family,

and social development. Regarding external validity, the sample may represent the global population to a limited degree. We limit our sample to the countries whose data were collected in either the fourth or fifth rounds of the MICS to avoid confounders due to maturation effects. Although the sample includes countries across regions, the relatively small size of observations may limit the degree to which the findings can be generalized to the population outside of the current sample.

Conclusion

Our study is the first cross-national analysis, to our knowledge, to examine differences in maternal and paternal engagement based on predictors linked to gender stratification theory. The results revealed that gender stratification in a society, especially within the economic, political and reproductive autonomy domains, influences the proportion of children whose mothers and fathers are engaged in stimulating activities. Such factors do not necessarily determine both parents' behaviors in the direction expected by gender stratification theory, however. While a higher relative female LFP rate showed the expected positive relationship with the proportion of children with actively engaged fathers, it did not reduce the proportion of children with actively engaged mothers. Gender equality in labor participation, political participation, and educational attainment led to more active parenting engagement by both mothers and fathers, but more so from mothers. This in turn widened the gender gap while increasing overall levels of parental stimulation. Another interesting finding is that the existence of maternity leave policies in the absence of paternity leave policies is associated with a smaller proportion of actively engaged fathers. This implies that the mere existence of a supportive maternity leave policy is insufficient in bridging the gender gap in child-rearing. There is a clear need to enhance family-friendly policies to include fathers.

Compliance with Ethical Standards

Appendix

Table 3, Table 4

Table 3 Descriptive information of countries and included variables

Year	Country	GDP per capita	Female relative LFP rate	Maternity leave	Paternity leave	Share of women in parliament	Female relative LSE ratio	Fertility rate	Unmet need for family planning	Maternal stimulation	Paternal stimulation	Difference in stimulation
2011	Afghanistan	1649.15	0.524	NA	NA	27.6	0.332	5.595	28	0.274	0.060	0.214
2011	Argentina	19629.35	0.646	No	No	37.7	1.027	2.358	18	0.033	0.026	0.008
2011	Belize	7855.08	0.642	No	Yes	11.1	1.021	2.676	19.4	0.712	0.312	0.400
2011	Costa Rica	13397.23	0.603	Yes	No	38.6	1.035	1.893	27.5	0.416	0.206	0.210
2011	Ghana	3404.46	0.913	Yes	No	8.3	0.877	4.234	33.7	0.322	0.123	0.199
2011	Jamaica	8101.91	0.781	No	No	15.5	1.001	2.136	14.9	0.057	0.024	0.032
2011	North Macedonia	11611.81	0.641	No	No	30.9	0.967	1.474	10.9	0.461	0.181	0.280
2011	Trinidad and Tobago	31012.72	0.689	Yes	NA	27.4	1.070	1.804	15.2	0.402	0.132	0.269
2012	Barbados	16460.67	0.863	No	No	19.6	0.941	1.788	6.1	0.586	0.365	0.221
2012	Belarus	17472.32	0.826	No	No	29.5	0.994	1.620	10.4	0.617	0.383	0.235
2012	Bosnia and Herzegovina	9929.69	0.617	Yes	No	19.3	NA	1.314	17.9	0.577	0.224	0.353
2012	Qatar	125302.08	0.576	Yes	Yes	0.1	0.944	1.997	11.6	0.580	0.221	0.359
2012	Republic of Moldova	4150.50	0.868	No	No	19.8	1.013	1.269	17.2	0.505	0.218	0.286
2012	Saint Lucia	11969.81	0.785	Yes	No	17.2	1.263	1.507	33.6	0.524	0.138	0.387
2012	Tunisia	10404.22	0.357	No	No	26.7	0.975	2.214	13	0.494	0.236	0.258
2012	Ukraine	8322.17	0.743	No	Yes	9.4	1.004	1.531	30.5	0.301	0.124	0.177
2013	Bangladesh	2835.77	0.385	Yes	No	19.7	1.179	2.199	27.6	0.594	0.221	0.374
2013	Mongolia	10720.06	0.811	Yes	Yes	14.9	1.093	2.805	28.9	0.250	0.065	0.184
2013	Montenegro	14548.10	0.763	Yes	No	16.0	1.006	1.706	12.1	0.188	0.076	0.112
2013	Panama	19377.91	0.613	Yes	NA	8.5	1.024	2.585	6.2	0.647	0.322	0.325
2013	Uruguay	19270.58	0.726	Yes	No	12.3	1.068	2.033	12.1	0.307	0.094	0.212
2014	Cameroon	3196.36	0.871	No	Yes	27.1	0.795	4.848	NA	0.764	0.439	0.325
2014	Cuba	NA	0.605	Yes	No	48.9	0.977	1.713	8	0.484	0.197	0.287
2014	Dominican Republic	12663.04	0.597	Yes	Yes	19.1	0.963	2.510	25	0.095	0.030	0.065
2014	El Salvador	6890.72	0.610	Yes	No	27.4	0.977	2.126	8	0.484	0.197	0.287
2014	Guinea-Bissau	1398.25	0.845	No	Yes	13.7	NA	4.784	7	0.211	0.065	0.146
2014	Guyana	6906.01	0.542	No	Yes	31.3	1.017	2.559	4.9	0.279	0.076	0.203
2014	Kyrgyzstan	3181.64	0.671	No	No	23.3	1.006	3.200	13.9	0.013	0.006	0.007
2014	Malawi	1090.37	0.879	No	No	16.7	0.808	4.740	16	0.402	0.145	0.258

Table 3 (continued)

Year	Country	GDP per capita	Female relative LFP rate	Maternity leave	Paternity leave	Share of women in parliament	Female relative LSE ratio	Fertility rate	Unmet need for family planning	Maternal stimulation	Paternal stimulation	Difference in stimulation
2014	Nepal	2266.18	0.944	Yes	No	29.5	0.790	2.218	21.8	0.209	0.025	0.184
2014	Sao Tome and Principe	2902.69	0.554	No	No	18.2	1.090	4.578	16.4	0.069	0.025	0.044
2014	Serbia	13112.88	0.728	No	No	34.0	0.993	1.460	NA	0.171	0.108	0.063
2014	State of Palestine	4320.00	NA	No	No	NA	1.033	NA	18	0.109	0.037	0.072
2014	Eswatini	7870.97	0.837	Yes	Yes	6.2	0.988	3.204	11.4	0.907	0.417	0.491
2014	Viet Nam	5264.83	0.885	No	NA	24.3	0.960	1.960	11	0.380	0.086	0.294
2014	Zimbabwe	2209.68	0.877	No	No	35.1	0.933	3.903	22.3	0.143	0.038	0.106
2015	Congo	5542.89	0.933	Yes	No	11.5	0.878	4.721	28	0.308	0.112	0.196
2015	Kazakhstan	23524.06	0.849	Yes	No	20.1	0.981	2.730	18	0.140	0.034	0.106
2015	Mali	1919.23	0.755	Yes	Yes	8.8	0.630	6.145	19.4	0.153	0.064	0.089
2015	Mauritania	3601.61	0.454	Yes	Yes	22.2	0.886	4.736	27.5	0.365	0.050	0.315
2015	Mexico	16934.73	0.554	Yes	Yes	40.6	1.060	2.809	33.7	0.144	0.032	0.112
2016	Côte d'Ivoire	3413.26	0.725	Yes	Yes	9.2	NA	4.911	14.9	0.148	0.050	0.098
2016	Guinea	1894.44	0.818	Yes	No	21.9	0.566	4.855	10.9	0.412	0.109	0.303
2016	Nigeria	5448.05	0.841	Yes	Yes	5.8	0.831	5.526	15.2	0.077	0.040	0.038
2016	Paraguay	11470.28	0.670	No	No	16.8	1.029	2.480	6.1	0.105	0.036	0.069
2016	Thailand	15705.81	0.784	No	No	6.1	1.009	1.482	10.4	0.207	0.086	0.121
2016	Turkmenistan	15648.37	0.678	No	Yes	25.8	NA	2.888	17.9	0.316	0.138	0.179
	Mean (SD)	11865.260 (18412.089)	0.715 (0.145)			20.733 (10.573)	0.954 (0.157)	2.909 (1.373)	16.670 (7.889)	0.347 (0.218)	0.141 (0.118)	0.206 (0.122)

Addati et al., 2014; International Labour Organization, n.d.-a., International Labour Organization, n.d.-b., UNESCO Institute of Statistics, n.d., United Nations Development Programme, n.d., World Bank, n.d.

Table 4 Correlation matrix for gender-related variables

	Female relative LFP rate	Maternity leave	Paternity leave	Share of women in parliament	Female relative LSE ratio	Fertility rate	Unmet need for family planning	Log GDP per capita
Female relative LFP rate	1.000							
Maternity leave	−0.017	1.000						
Paternity leave	−0.271	0.164	1.000					
Share of women in parliament	−0.251	0.212	0.021	1.000				
Female relative LSE ratio	−0.163	0.118	0.007	0.018	1.000			
Fertility rate	0.144	−0.087	0.079	−0.242	−0.684***	1.000		
Unmet need for family planning	0.083	−0.273	−0.035	−0.194	−0.300	0.595***	1.000	
Log GDP per capita	−0.207	0.010	0.054	−0.027	0.515	−0.668***	−0.375*	1.000

$^* p < 0.05$; $^{***} p < 0.001$. They are pairwise correlations

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