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Maternal Household Decision-Making Autonomy and Adolescent Education in Honduras

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Abstract

Maternal decision-making autonomy has been linked to positive outcomes for children's health and well-being early in life in low- and middle-income countries throughout the world. However, there is a dearth of research examining if and how maternal autonomy continues to influence children's outcomes into adolescence and whether it impacts other domains of children's lives beyond health, such as their education. The goal of this study was to determine whether high maternal decision-making was associated with school enrollment for secondary school-aged youth in Honduras. Further, we aimed to assess whether the relationships between maternal autonomy and school enrollment varied by adolescents' environmental contexts and individual characteristics such as gender. Our analytical sample included 6,579 adolescents ages 12–16 living with their mothers from the Honduran Demographic and Health Survey (DHS) 2011–12. We used stepwise logistic regression models to investigate the association between maternal household decision-making autonomy and adolescents' school enrollment. Our findings suggest that adolescents, especially girls, benefit from their mothers' high decision-making autonomy. Findings suggest that maternal decision-making autonomy promotes adolescents' school enrollment above and beyond other maternal, household, and regional influences.

Keywords

Maternal decision-making autonomy; adolescence; girls; education; Latin America; Honduras; Demographic and Health Surveys

1. Introduction

Many well-documented socio-demographic factors predict educational success for children and youth. Mothers' characteristics, such as their age at first birth and their own educational success are strong predictors of their children's educational outcomes (Augustine et al. 2009; Carneiro et al. 2013; Marteleteo et al. 2012; Marteleteo and Dondero 2013). A more nuanced understanding of how and when a mother's experience translates to her child's educational persistence and success amidst geographic and other barriers has the potential to

inform policy and programming aimed at promoting youth's educational attainment and success.

Understanding how and when a mother's experience translates into her child's educational success is of particular importance in regions where the level of school enrollment among secondary school-aged children is low. One example is Honduras, where the percentage of secondary school-aged children currently out of school surpasses most countries in Latin America and low and middle income countries worldwide (Education Policy Data Center 2014). It is currently a challenging time to be an adolescent in Honduras, and there is a need to understand the factors protecting Honduran youth, keeping them in school, and advancing in their education.

Maternal decision-making autonomy has been linked to numerous positive outcomes for children's health and well-being early in life in low- and middle-income countries (Rahman et al. 2015; Thorpe et al. 2015). However, there is a dearth of research examining if and how maternal autonomy continues to influence children's outcomes into adolescence. Further, few studies have investigated the influence of maternal autonomy on other domains of children's lives beyond health, such as their education (Luz and Agadjanian 2015). In the current study, we aim to address these gaps by examining the research question, "Is maternal decision-making autonomy associated with school enrollment among secondary-school aged youth in Honduras?" We also investigate if the relationship between maternal decision-making autonomy and adolescents' school enrollment varies by the child's individual characteristics (gender and age) and environmental contexts (level of urbanization and household wealth).

Data for the current study are from the Honduran Demographic and Health Survey (DHS) 2011–12. Our analytical sample includes 6,579 adolescents ages 12–16. We use stepwise logistic regression models to investigate the association between maternal household decision-making autonomy and school enrollment among adolescents in Honduras. Our findings suggest maternal decision-making autonomy is associated with adolescents', especially girls', school enrollment, above and beyond the influences of other maternal, household, and regional influences. We do not find that the relationship between maternal decision-making autonomy and school enrollment varies by environmental contexts in Honduras. Our study contributes to previous literature in this field by demonstrating that maternal decision-making autonomy protects well-being during adolescence in a low- to middle- income country, which is later in the life course than had been previously demonstrated. Further, our findings support theories that maternal decision-making autonomy influences other domains in addition to health, and may be more protective for girls.

2. Maternal decision-making autonomy

Women's status is a multidimensional construct representing women's level of power, access, and resources within the contexts of relationships, families, communities, and societies (Tlapek 2014). It is comprised of how women are perceived and valued by themselves and others within these contexts which determines their capacity and state of

self-governing and exerting power in their lives (Kishor and Subaiya 2008; Murphy-Graham 2012). Women's social and physical environments, as well as their intrapersonal characteristics, are strongly associated with women's status. In particular, higher levels of women's educational attainment, and living in a more developed region, predict higher levels of women's status (Acharya et al. 2010).

A behavioral indicator of women's status, women's decision-making autonomy, has been widely studied in its capacity to impact women's and their children's outcomes. Women's decision-making autonomy represents women's "full participation in the decisions that affect the lives of women, their families, their communities and society at large" (United Nations Economic Commission for Latin America and the Caribbean 2016). Women's household decision-making autonomy refers to women's participation in decisions relating to the family and household in multiple domains including household finances, family health care utilization, and personal mobility (i.e., when and where women can travel outside of the home). The concept of decision-making autonomy is measured in multiple ways in the literature (Carlson et al. 2015). In some literature, it is measured by indicating whether it is necessary for a woman to seek permission from or inform others in the household of her activities such as visiting friends, making purchases, or seeking health care (Luz and Agadjanian 2015). In other literature, particularly that which draws from Demographic Health Surveys (DHS), it is measured by determining who in the household usually makes decisions around these activities with the woman noted to have higher levels of household decision-making autonomy if she is involved in making the household decisions and lower levels if her husband/partner or another family makes these decisions without her involvement (Acharya et al. 2010; Adhikari and Sawangdee 2011; Rahman et al. 2015).

Women's decision-making autonomy is consistently associated with protective maternal health behaviors and positive outcomes for their children. Maternal decision-making autonomy leads to improvements in children's health through mothers' capacity to direct household resources to their children, to enact their preferences in caring for and raising their children, as well as their mobility outside the home which increases awareness of, and access to, health-promoting resources (Thorpe et al. 2015). In recent literature in developing countries, higher levels of maternal decision-making autonomy have been associated with superior nutritional and growth status of their children (Carlson et al. 2015; Na et al. 2015; Rahman et al. 2015; Shroff et al. 2009; Ziaei et al. 2015), reduced incidence of diarrhea and acute respiratory tract infections (Agustina et al. 2015), increased preventative health care utilization and immunizations (Malhotra et al. 2014; Thorpe et al. 2015), and increases in child survival (Smith-Greenaway 2013).

While the associations between maternal decision-making autonomy and children's positive outcomes early in life have been well documented, there is a dearth of research examining if and how maternal decision-making autonomy continues to influence children's outcomes into adolescence. Considering the abundant literature documenting the positive influence on children's health and well-being early in life in low- and middle-income countries throughout the world, one would assume that the positive influence also transcends to other domains of children's lives (including their education) and extends later in the life course (into adolescence and beyond). This could happen directly or indirectly. Directly, as seen

when mothers direct household resources to promote their children's health early in life, mothers with high decision-making autonomy may direct household resources to enable their children to attend school. Indirectly, children who are healthier, as a result of their mothers' high decision-making autonomy during pregnancy and early in their lives, may be more equipped to attend and succeed in school. However, few studies have directly investigated the influence of maternal decision-making autonomy on other domains of children's lives beyond health, such as their education. An exception is a recent study on the influence of women's decision-making autonomy on younger children's probability of school enrollment in rural Mozambique (Luz and Agadjanian 2015). Findings suggest that higher levels of maternal decision-making autonomy are associated with a higher probability of school enrollment for daughters, but not for sons. While this study provides preliminary evidence that maternal decision-making autonomy is protective of children's probability of school enrollment, we are not aware of any studies which have examined the relationship between maternal decision-making autonomy and children's education in the Latin American context, nor among secondary-school aged youth.

Though not previously assessed in research exploring the influence of maternal decision-making autonomy on children's educational outcomes, contextual factors may moderate the influence of a mother's decision-making autonomy on her child's educational opportunities, experiences, and outcomes. For example, in a family with sufficient wealth where there is not a need for children to work during the day to support the household, maternal autonomy may not be as powerful of a protective influence on her children's school enrollment as it may be in a family with little wealth. Also, in urban communities with convenient access to secondary schools, maternal autonomy may not be as influential on children continuing their education as it may be in a rural environment where children must travel to attend secondary school. Thus, when examining the relationship between mother's autonomy and children's education, it is necessary to consider how this relationship may vary by environmental conditions that may amplify or diminish the influence of maternal autonomy.

Similarly, maternal decision-making autonomy may differentially protect children based on children's individual characteristics, such as gender and age (Agustina et al. 2015; Bose 2011). For girls, greater decision-making autonomy may enable mothers to better negotiate the household roles and responsibilities traditionally placed on daughters that may prevent girls from attending school (Grant and Behrman 2010; Luz and Agadjanian 2015). Further, mothers who demonstrate high decision-making autonomy may act as female role models for gender equity and consequently positively influence their daughters' attitudes and expectations for their own educational and life course trajectories (Johnston et al. 2014). Conversely, mothers' decision-making autonomy may be more protective of sons' schooling if mothers believe the future returns from their children's schooling will be higher for sons than daughters (Buchmann 2000; Luz and Agadjanian 2015). In addition, the importance of maternal decision-making autonomy in protecting children's education may increase with child's age as the risk for school drop-out increases with age in many Latin American countries, including Honduras (Education Policy Data Center 2014). While these factors may be important in certain contexts, some studies do not report moderation tests by child's individual characteristics. Those that do have reported mixed findings (Agustina et al. 2015; Luz and Agadjanian 2015; Malhotra et al. 2014). Research specifically assessing educational

outcomes has found maternal autonomy to protect girls' school enrollment, but not boys' (Luz and Agadjanian 2015). However, this research focused on young children in an area where there is a gender gap in educational attainment disadvantaging girls, which is not currently the case for most of Latin America. In order to inform policy and programming promoting adolescent educational success and persistence, there remains a need to better understand if, when, and how the influence of a mother's decision-making autonomy may vary by her children's individual characteristics, as well.

3. Adolescent education in Honduras

Honduras is a middle to low income country in Central America with 8 million inhabitants (The World Bank 2016), over half of whom are under the age of 25 (United Nations Statistics Division 2015). It is a small, geographically diverse country of 43,278 square miles bordered on the north and east by the Caribbean Sea. About 46% of Honduran people live in rural areas (United Nations Statistics Division 2016). Honduras has experienced a turbulent political history. Until the 1980's, the nation was under military rule. More recently, in 2009, politicians and military officers staged a coup, removing the president from office. Currently, there is vast economic inequality across the country with two-thirds of the population living in poverty and half living in extreme poverty (The World Bank 2016a). In 2013, the Gini index was 53.7, the highest in Latin America (The World Bank 2016b). In recent years, violent crime and gang activity has increased rapidly, positioning Honduras as the country with the highest intentional homicide rate in the world (The World Bank 2016c). It is a challenging time to be an adolescent in Honduras, and there is a need to understand the factors protecting Honduran youth, keeping them in school, and advancing in their education.

School enrollment in Latin America is often a function of family wealth (Marteleto et al. 2012). As over half of Honduran families live in extreme poverty, and nearly half live in rural communities, many adolescents in Honduras are called upon to work, either for pay or within the household, to assist their families. Particularly, adolescents living in rural communities may be called upon to participate in seasonal employment, such as coffee or other agricultural harvests, which do not coincide with annual school breaks. The opportunity cost of attending secondary school in rural regions may be particularly high when also taking into account that adolescents from rural communities often must travel outside of their communities to attend secondary school (Adelman and Szekely 2016). Understanding the factors that influence adolescent school enrollment is key precisely because of the high opportunity cost of attending school and how it competes with working to support the household. Further, teenage pregnancy is common in rural regions and lower income households in Central America and thus adolescent girls may leave school either due to lack of child care or in order to start a family while young (Adelman and Szekely 2016).

In Honduras, primary school begins at age six and includes grades 1–6. Lower secondary includes grades 7–9 and upper secondary includes grades 10–11 or 10–12, depending on if the student attends an academic or pre-vocational secondary school, respectively (UNESCO International Bureau of Education 2010). Currently, only primary school is compulsory, but efforts are underway to increase compulsory education through grade 9 (E. Murphy-Graham,

personal communication, February 24, 2016). Fifty percent of secondary school-aged children (ages 12–16) living in rural areas are not enrolled in school as are 62% of secondary school-aged children from households in the lowest wealth quintile (Education Policy Data Center 2014). Accordingly, the percentage of secondary school-aged children out of school surpasses most countries in Latin America and low and middle income countries worldwide. As is the case in much of Latin America today, the gender achievement gap has closed in Honduras and girls are outperforming boys in many educational metrics, despite the poor overall educational outcomes of Honduran adolescents (Education Policy Data Center 2014). As secondary school attendance is associated with numerous beneficial outcomes across the life course for individuals, their families, and their communities (Adelman and Szekely 2016; Lloyd 2005; Lloyd and Mensch 1999), there is a critical need to understand the influences most salient in protecting Honduran adolescents in their persistence and success in the educational system.

4. Hypotheses

In the current study, we extend previous literature which documents the positive influence of maternal autonomy on children's health and well-being early in life in low- and middle-income countries throughout the world. We posit that the positive influence of maternal decision-making autonomy transcends to the domain of children's education and extends later in the life course, into adolescence. We choose the context of Honduras to test our hypothesis due to the acute need to identify mechanisms to promote school enrollment among secondary school-aged youth in this country where the percentage of secondary school-aged youth not enrolled in school is high. Drawing from data from the Honduran DHS, we test whether maternal decision-making autonomy (as measured by mothers' involvement in making household decisions regarding woman's health care, large household purchases, visits to family and friends, and what to do with money the husband earns) predicts adolescents' school enrollment above and beyond other maternal, household, and regional influences and whether this relationship varies by children's individual (gender and age) and contextual (level of urbanization and household wealth) characteristics. We advance the following hypothesis and sub-hypotheses.

1. Higher maternal decision-making autonomy is positively associated with school enrollment among secondary-school aged adolescents in Honduras.
 - a. The relationship between maternal decision-making autonomy and adolescent school enrollment will be stronger for adolescents in rural communities and in households with lower wealth due to the increased barriers in school attendance and advancement faced by adolescents in these contexts.
 - b. The relationship between maternal decision-making autonomy and school enrollment will be stronger for older adolescents because schooling intertwines with other transitions to adulthood during adolescence.
 - c. The relationship between maternal decision-making autonomy and school enrollment will be stronger for girls due to both mothers'

increased ability to negotiate household resources for daughters, and mothers' protective influence on daughters' attitudes and expectations for their own educational and life course trajectories.

5. Data and methods

5.1. Data

Data are from the Honduran Demographic and Health Surveys (DHS) from 2011–2012. The DHS are nationally representative, population-based surveys conducted in developing countries throughout the world with the aim of providing decision makers with information on countries' populations and health status and practices. The DHS are a fitting source of data for the current study as they contain rich socio-ecological information about women of reproductive age (15–49) including indicators assessing women's status and empowerment (Kishor and Subaiya 2008). The data also provide information regarding the school enrollment status and years of completed schooling for children through age 17 living in the household. Our analytic sample consists of the secondary school-aged adolescents (ages 12–16) who were living with their mother at the time of the survey and whose mothers were currently married or living with a male romantic partner and completed survey items regarding decision-making autonomy and children's educational status and attainment (N=6,579). We linked adolescent household and educational information from the Honduran DHS individual household member file with maternal information from the Honduran DHS woman's file to conduct our analyses. We conducted sensitivity analyses to determine how the analytic sample differed from all adolescents ages 12–16 in the Honduran DHS. Adolescents not living with their mothers significantly differed from those included in the analytic sample in that they were less likely to be enrolled in school. They were also more likely to be female, from rural and poor households, and to not live with their fathers. Those excluded due to living with a single mother were less likely to be living with their biological fathers and more likely to have a mother that had been employed in the past year than the analytic sample. They did not differ by other descriptive characteristics. We discuss the implications of these differences in the discussion section.

5.2. Measures

5.2.1. Dependent variables—Our dichotomous dependent variable is current school enrollment among secondary school-aged youth (ages 12–16). In DHS surveys, a representative from each household is asked the current school enrollment status of all household members between the ages of 5 and 24. If participants reported that the household member attended school during the most recent school year, the household member was considered to be currently enrolled in school.

5.2.2. Independent variables—Our independent variable of interest is maternal decision-making autonomy. Women who reported that they were married or living with a man as if married at the time of the interview were asked four questions regarding who usually makes household decisions: “you, your husband/partner, you and your husband/partner jointly, or someone else?” The four questions covered decisions regarding the woman's health care, making large household purchases, visits to family and friends, and

what to do with the money the husband earns. We coded each question so that women reporting the husband or someone else usually made the decision without them received 0 points for the question. Those reporting that they usually made the decision themselves or together with someone else received 1 point for the question. This yielded a score range of 0–4. To assess the internal consistency of the underlying factor of the maternal decision-making autonomy scale, we first computed Cronbach's alpha coefficient ($\alpha=.58$). However, as the scale only had four items and binary responses (0 or 1), we also conducted principal component analysis (PCA) and confirmatory factor analysis to determine the suitability of the maternal decision-making autonomy scale for analyses in this sample (StataCorp 2013). We used tetrachoric correlations for binary variables to create a pairwise correlation matrix for use in the PCA and factor analysis. The resulting PCA yielded only one component with an eigenvalue greater than 1.0 ($\lambda=2.38$) and all 4 items had positive loadings between .42 and .55. In confirmatory factor analysis (Abdi 2003), all items had loadings between 0.50 and 0.76 on the one retained factor. Thus, we determined the scale acceptable for analyses in the current study. However, we saw in preliminary analyses that the score distribution was skewed toward higher scores suggesting that a 1 point increase in score may not have the same meaning across the range of scores. Also, previous research demonstrating influence of women's autonomy on their children's educational outcomes treated maternal autonomy as a dichotomous variable (Luz and Agadjanian 2015). Thus, in creating our categorical variable, we defined having low decision-making autonomy (0–2) as having a score lower than the sample mean ($M=3.17$, $SD=1.05$) and high autonomy as having at or above the sample mean (3–4). To test the robustness of this measure, we conducted sensitivity analyses by re-running models with household decision-making autonomy as a continuous variable. We also re-ran models maternal household decision-making autonomy re-coded with mothers having sole decision-making autonomy coded as 2, shared decision-making autonomy coded as 1 and no involvement in the decision as 0. Neither variation substantively altered the findings, save for the significance test of gender as a moderator of the relationship between maternal household decision-making autonomy and adolescent school enrollment. We discuss this discrepancy in the Results and in Appendix A. Further, considering the possibility that shared decision-making may be an indicator of a healthier marital relationship which may also be protective of adolescents' schooling, we tested whether scoring shared decision-making as 2, sole decision-making as 1, and no involvement in the decision as 0 altered findings. We present these findings alongside our findings from maternal household decision-making autonomy in Appendix A.

In multivariate models, we controlled for child, household, and maternal characteristics. Child characteristics include the child's age, gender, and birth order. For household characteristics, we considered level of urbanization (urban/rural), household composition (whether the mother lives only with her husband or partner, with her husband/partner and additional adult family members, or some other combination), whether the biological father of the child lived in the household at the time of the interview (yes/no), the number of children under age 5 living in the household (0–5), the number of the mother's daughters (0–8) and sons (0–9) living in the household, and the DHS household wealth index score (1–5). The DHS wealth index is a composite measure calculated from information on the household's assets, such as television ownership and types of water access and sanitation

facilities. We considered the mother's ethnicity as a maternal characteristic. We coded women as having minority ethnicity if they identified as any of the minority ethnicities in the DHS dataset (e.g., Garifuna, Lenca, Maya Chorti, Misquito). We also included mothers' educational attainment in years, current age, age at first marriage, age at first birth, marital status (whether they were married or living with their partner as if married at the time of the interview), and relationship to the head of the household (self, wife, or other relationship). Finally, we considered mother's work status, whether they had been working in the past year and if so, the type of payment they received for their work (unpaid, cash, in kind, a combination of cash and in kind).

5.3. Analytic Strategy

We conducted all analyses in Stata 14.0 and adjusted for weighting, clustering, and stratification using DHS women's weights to account for the sample design and appropriately calculate standard errors for statistical testing. We used survey-based stepwise logistic regression analyses to examine the associations between maternal decision-making autonomy and adolescents' current school enrollment status. In the first model, we assessed the bivariate relationship. In the next three models, we added covariates regarding child, household, and finally, maternal characteristics. We conducted Wald tests for the collection of new variables added at each step to determine if adding the variables significantly improved the fit of the model (Powers et al. 2000). To test the robustness of our findings from the survey-based logistic regression models, we re-ran analyses using cluster fixed effects models to control for observable and unobservable differences across DHS sample clusters using Stata's *xtlogit* command with fixed effects options. We retained all child, household, and maternal characteristic covariates in the models aside from level of urbanization which was dropped from the models due to the sampling design of the DHS. Results from fixed effects models were more conservative, but overall corroborated findings from survey-based models and are presented in Appendix A. Per our study hypotheses that the impact of maternal decision-making autonomy on adolescents' educational outcomes would vary by children's contextual and individual factors, we tested for moderation of the associations between maternal decision-making autonomy and school enrollment by gender, age, level of urbanization, and household wealth. We conducted tests for moderation by including interaction terms of maternal decision-making autonomy score and each of the proposed moderators in a series of multivariate logistic regression models. Prior to creating interaction terms, we centered continuous variables involved in the interaction term by subtracting the variable mean from each observation. We established a p-value of <.05 for the interaction term coefficient to indicate the presence of an interaction. For significant interactions, we used Stata's *margins* command, holding all covariates at their means, to calculate the predicted probabilities of school enrollment by maternal decision-making autonomy score and the varying levels of the moderator.

6. Results

In Table 1, we present a correlation matrix of maternal characteristics of the analytic sample. Maternal decision-making autonomy had a small, positive correlation with both household wealth and maternal educational attainment ($r=.19$ and $.20$, respectively). It had a negligible

association with all other continuous maternal characteristics (age at first marriage, age at first birth, current age). These results provided initial evidence for assessing mothers' decision-making autonomy as a distinct maternal characteristic in its association with children's educational outcomes.

The weighted proportions of descriptive characteristics of the total analytic sample ($N=6,579$) are shown in Table 2 alongside the proportion of adolescents currently ($n=4,535$, 73%) and not currently ($n=2,044$, 27%) enrolled in school by descriptive characteristics. More boys had dropped out (31%) than girls (23%). The proportion of adolescents who had dropped out increased with age in that 10% of 12-year-olds were not enrolled in school compared to 45% of 16-year-olds. Similarly, children higher in birth order were more often not enrolled compared to lower birth order children. We found a great disparity in educational outcomes by level of urbanization and household wealth: 38% of rural adolescents were not enrolled in school compared to 13% of urban adolescents and 47% of the adolescents from the poorest households were not enrolled compared to 4% of the wealthiest households. Compared with their counterparts, mothers who were younger, were married, had attained more than 10 years of education, had their first birth after age 18, and were involved in cash-paid employment all had adolescents who more often enrolled. Also, 38% of adolescents with mothers reporting low decision-making autonomy were not enrolled in school compared with 24% of adolescents with mothers reporting high levels. These findings illustrate the vast disparities in access to secondary education in Honduras by individual, household, and maternal characteristics and the need for identifying protective mechanisms that can inform educational practice and policy.

Turning to the findings from our stepwise logistic regression models, Table 3 presents the odds ratios for school enrollment. Model A is a bivariate logistic regression model with only maternal decision-making autonomy as a predictor in the model. Model B includes adolescent individual characteristics as covariates (age, gender, and birth order). Model C additionally includes the adolescents' household characteristics as covariates (level of urbanization, wealth, adult household structure, father presence), while Model D additionally includes maternal characteristics (ethnicity, educational attainment, current age, age at first marriage and birth, relationship to the head of the household, marital status, work status). Results from Wald tests indicated that inclusion of the additional variables at each step statistically improved model fit ($p<.005$) for each of the models (Powers et al. 2000).

Adolescents with mothers reporting high decision-making autonomy had nearly double the odds of school enrollment than adolescents with low maternal decision-making autonomy in the bivariate model (Model A) and after controlling for individual characteristics of age, gender, and birth order (Model B). After additionally considering household characteristics (Model C), adolescents with mothers reporting high decision-making autonomy continued to have an increased odds of school enrollment by 51%. Finally, after the inclusion of other maternal characteristics (ethnicity, educational attainment, current age, age at first marriage and birth, relationship to the head of the household, marital status, and work status), high maternal decision-making autonomy increased adolescents' odds of school enrollment by 36% (Model D). All covariates that were significant in multivariate models predicted probabilities of school enrollment in the expected direction, except for maternal ethnicity.

Adolescents with mothers identifying as being of a minority ethnicity (e.g., Garifuna, Lenca, Maya-Chorti, Misquito) had 54% higher odds of school enrollment than adolescents with mothers not identifying as being of a minority ethnicity after controlling for all individual, household, and other maternal characteristics. Several of the household and maternal characteristic covariates we anticipated to predict educational outcomes did not remain significant in multivariate models. These included adult household composition, father presence in the household, sibling number and gender composition, the number of children < age 5 in the household, mothers' current age, their age at first marriage and birth, mothers' marital and work status, and mothers' relationship to the head of the household.

All tests for moderation of the relationship between maternal decision-making autonomy and school enrollment were non-significant at the .05 level except for the interaction of maternal decision-making autonomy and adolescent gender when assessing maternal household decision-making autonomy as a continuous variable (0–4 and 0–8). In the test for moderation of gender with maternal autonomy as a dichotomous variable (high (3–4) v. low (0–2)), the interaction term approached significance, but did not reach our originally specified $p < .05$ cutoff ($p = .075$). Considering that the test for moderation by gender yielded a p -value of $< .05$ using multiple variations of the maternal household decision-making autonomy variable (see Appendix A), and near .05 when assessing maternal decision-making autonomy dichotomously, we decided to examine the interaction. The predicted probabilities, holding all covariates at their means, of enrollment status by gender and maternal decision-making autonomy suggested that girls with mothers reporting high household decision-making autonomy had a lower probability of not being enrolled in school than girls with mothers reporting low decision-making autonomy; this was not the case for boys (see Figure 1). Further, girls with low maternal decision-making autonomy had similar probabilities of not being enrolled in school as boys with low and high maternal decision-making autonomy.

7. Discussion

In this study we aimed to determine whether maternal decision-making autonomy is associated with school enrollment among adolescents in Honduras. Identifying the factors protective of adolescents' education is especially important in Honduras, where adolescents lag behind much of the world's similar income countries in enrollment and persistence in secondary school. Our study drew from a national sample of Honduran adolescents to test whether maternal household decision-making autonomy is associated with adolescents' probabilities of school enrollment. As such, we add to previous literature in this field in important ways. Specifically, aspects of women's status in developing countries, including maternal decision-making autonomy, have been shown to be strong protective influences on children's health and well-being in early life. However, little research has assessed whether this protective influence continues beyond early life into adolescence and whether it impacts other domains of children's lives outside of health, such as education.

Our findings suggest that maternal decision-making autonomy is protective of adolescents' school enrollment. We see that this association holds after accounting for other individual, household, and maternal characteristics that may confound the relationship between

maternal decision-making autonomy and adolescents' education. Hence, while characteristics such as household wealth and maternal education may explain some of the association between maternal autonomy and adolescents' educational outcomes, our findings suggest that maternal decision-making autonomy makes an independent, positive contribution to protecting secondary school aged youths' educational persistence and advancement. Just as it has been seen to protect young children's health and well-being, maternal autonomy may protect their adolescents' educations through mothers' capacity to direct household resources to their children's education, to enact their preferences in caring for and raising their children, and also by acting as autonomous female role models for their adolescent children.

Our secondary goal was to assess whether the relationship between maternal decision-making autonomy and secondary school enrollment varied by environmental contexts and individual characteristics, such as gender. We hypothesized that maternal decision-making autonomy would be a stronger protective influence in environmental contexts with increased barriers to attending secondary school in Honduras, specifically in rural communities where fewer secondary schools are found, and in lower wealth households where the opportunity costs of sending an adolescent to school may present greater barriers to attendance. This hypothesis was not supported as our findings demonstrated that the relationship between maternal decision-making autonomy and school enrollment did not vary by these environment contexts. Specifically, we found no interaction effect between maternal household autonomy and household wealth or level of urbanization. These findings suggest that maternal autonomy operated independently of wealth or household location. In other words, when mothers have a high level of household autonomy, children in both poor and wealthy households benefit. Similarly, adolescents in both urban and rural areas also benefit. The relationship between maternal household decision-making autonomy possibly varies, however, by adolescent gender. Supporting previous research in contexts outside of Latin America (Luz and Agadjanian 2015), we found maternal decision-making autonomy to be more protective for girls than boys. This finding is particularly striking in that previous research noting maternal decision-making autonomy to be protective for girls' education and not for boys' was in an African nation where an education gender gap favoring boys still exists (Luz and Agadjanian 2015). In Honduras, the education gender gap has closed and girls now outperform boys in many education metrics (Education Policy Data Center 2014). Despite the varying educational contexts of the settings of these studies, maternal decision-making autonomy was found to be more protective for girls' education in both settings. This supported our hypotheses that greater decision-making autonomy enables mothers to better negotiate the household roles and responsibilities traditionally placed on daughters that may prevent girls from attending school (Grant and Behrman 2010; Luz and Agadjanian 2015) and that mothers who demonstrate high decision-making autonomy act as female role models for gender equity and consequently positively influence their daughters' attitudes and expectations for their own educational and life course trajectories (Johnston et al. 2014). It is also important to note that specifically in the Honduran context, the underlying causes for adolescents to not be enrolled in school may vary by gender, and thus, maternal decision-making autonomy may not mitigate the causes for boys in the same way as it does for girls. In Central America, and especially Honduras, girls are more likely to leave school for

pregnancy or early marriage and boys for participating in unskilled, paid labor or illicit activities such as gang involvement (Adelman and Szekely 2016). If maternal decision-making autonomy additionally protects girls from leaving school by role-modeling gender equity and thereby encouraging girls to delay pregnancy and marriage, we would assume adolescent girls may benefit from higher maternal decision-making autonomy more than boys. Our findings suggest further research on the mechanisms by which maternal decision-making autonomy protects adolescents' school enrollment is needed.

The current study has important limitations and implications for future research. First, the DHS is cross-sectional by design. We were therefore unable to assess whether maternal decision-making autonomy was stable over time and to confirm the directionality of the relationship between maternal decision-making autonomy and adolescent educational outcomes. Further, we were only able to include adolescents who lived with their mothers at the time of the interview in the current study. While the question of the influence of maternal decision-making autonomy may not be as relevant for an adolescent not living with her mother, perhaps the decision-making autonomy of the female adults in the household in which she is living—whether they be her grandmother or a mother-in-law—may similarly impact adolescent girls' education and should be explored in future research. Also, we were only able to include adolescents whose mothers were currently married or living with a romantic partner as these are the only women who are surveyed about decision-making autonomy in DHS surveys. Hence, it is possible that maternal decision-making autonomy operates differently and has differential protective strength in households in which the mother is living with a husband or romantic partner than in single-mother households. As migration for work and non-traditional households are common in Honduras, this is an important area for future research to provide a more comprehensive understanding of the influence of maternal decision-making autonomy on adolescents.

The current study also has timely policy implications. As the protective influence of maternal decision-making autonomy has long been well-documented in promoting women's and children's health, education policymakers can collaborate with public health policymakers in their efforts to promote women's decision-making autonomy in regions where secondary school enrollment is low. In a report presented at the 13th Regional Conference on Women in Latin America and the Caribbean organized by the United Nations' Economic Commission for Latin America and the Caribbean (ECLAC) in October of 2016, the authors note the 2030 Sustainable Development Goal #5 to "achieve gender equality and empower all girls and women" presents an opportunity to ensure policies in all domains and at all policy levels promote gender equity (United Nations Economic Commission for Latin America and the Caribbean 2016). The current study provides evidence for education policymakers to include parents, and to incorporate gender equity promotion, into their efforts to improve secondary school enrollment rates among girls.

8. Conclusion

In sum, our study contributes to previous literature in this field by demonstrating that maternal decision-making autonomy protects well-being during adolescence in a low- to middle- income country, which is later in the life course than had been previously

demonstrated. Further, our findings support the theory that maternal decision-making autonomy influences other domains in addition to health, specifically education, and is more protective of girls. Future research in this field should assess maternal decision-making autonomy and children's educational outcomes longitudinally and also determine whether these findings hold in non-traditional households. Further, findings from the current study suggest educational policymakers should include parents, and incorporate gender equity promotion, into policies aimed at promoting school enrollment among secondary-school aged girls.

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Appendix A

Odds ratios from logistic regression models of current school enrollment regressed on maternal household decision-making autonomy with variations of maternal household decision-making autonomy independent variable construction and model type

	Main effects models				Interaction term from interaction models			
	Model A	Model B	Model C	Model D	gender (girl v. boy)	age (12–16)	household wealth (1–5)	urbanicity (urban v. rural)
<i>survey-based models- all</i>								
dichotomous (high (3–4) v. low (0–2))	1.95 ***	1.91 ***	1.51 ***	1.36 ***	1.32 *	1.02	0.99	0.99
continuous (0–4)	1.34 ***	1.34 ***	1.20 ***	1.15 ***	1.14 **	1.02	1.04	1.05
continuous (0–8)	1.21 ***	1.19 ***	1.09 ***	1.08 **	1.10 **	1.01	1.00	0.96
shared household decision-making (0–8)	1.10 ***	1.12 ***	1.09 ***	1.07 ***	1.05	1.01	1.01	1.04
<i>survey-based models- girls only</i>								
dichotomous (high (3–4) v. low (0–2))				1.54 ***				
continuous (0–4)				1.22 ***				
continuous (0–8)				1.12 ***				
shared household decision-making (0–8)				1.10 ***				
<i>survey-based models- boys only</i>								
dichotomous (high (3–4) v. low (0–2))				1.22 **				
continuous (0–4)				1.10 **				
continuous (0–8)				1.03				
shared household decision-making (0–8)				1.05 **				
<i>sample cluster fixed effects models- all</i>								
dichotomous (high (3–4) v. low (0–2))	1.42 ***	1.40 ***	1.35 ***	1.23 **	1.39 **	1.08	1.03	
continuous (0–4)	1.16 ***	1.16 ***	1.13 ***	1.08 **	1.19 **	1.03	1.01	
continuous (0–8)	1.08 ***	1.07 **	1.05 **	1.03	1.13 **	1.01	0.98	
shared household decision-making (0–8)	1.07 ***	1.07 ***	1.06 ***	1.04 **	1.06 *	1.02	1.01	

	Main effects models				Interaction term from interaction models			
	Model A	Model B	Model C	Model D	gender (girl v. boy)	age (12–16)	household wealth (1–5)	urbanicity (urban v. rural)
<i>fixed effects models-girls only</i>								
dichotomous (high (3–4) v. low (0–2))				1.42 **				
continuous (0–4)				1.16 **				
continuous (0–8)				1.09 **				
shared household decision-making (0–8)				1.07 **				
<i>fixed effects models-boys only</i>								
dichotomous (high (3–4) v. low (0–2))				1.05				
continuous (0–4)				1.01				
continuous (0–8)				0.98				
shared household decision-making (0–8)				1.01				

Source: Demographic and Health Surveys (DHS) Honduras 2011–12

Notes: Odds ratios shown. Model A is a bivariate logistic regression model. Model B controls for child characteristic covariates. Model C additionally controls for household-level characteristic covariates. Model D additionally controls for maternal characteristic covariates. Main effects from models without interaction terms refer to the odds ratio of the variation of the maternal household decision-making autonomy variable indicated: 1) dichotomous: (high=3–4 v. low=0–2); 2) continuous (0–4: 1 point for each decision mother makes alone or together with someone from the household; 0 points for decisions made solely by spouse or other person); 3) continuous (0–8: 2 points for decisions mother makes alone; 1 point for decisions made together with spouse or other person; 0 points for decisions made solely by husband or other person); 4) shared household decision-making (0–8: 2 points for decisions made together with spouse or other person, 1 point for decisions mother makes alone; 0 points for decisions made solely by husband or other person). Interaction term from interaction models refers to the odds ratio for the interaction term of maternal household decision-making autonomy variable together with the indicated variable (gender, age, household wealth, or urbanicity) in interaction models. Interaction models control for all child, household, and maternal characteristics. Sample cluster fixed effects models do not include urbanicity due to DHS sampling cluster design.

*
p<.10;

**
p<.05;

p<.005

Figure 1. Predicted probabilities of not currently being enrolled in school for Honduran youth ages 12–16 by gender and maternal household decision-making autonomy level

Source: Demographic and Health Surveys (DHS) Honduras 2011–12

Notes: 95% confidence intervals shown in brackets. All covariates held at their means (age, birth order, household wealth, level of urbanization, mother's ethnicity, mother's educational attainment, mother's age at first marriage and birth, father presence in the household, number of children < age 5 in the household, number of mother's daughters in the household, number of mother's sons in the household, mother's relationship to household head, mother's age, household composition, mother's marital status, and mother's work status). Maternal decision-making autonomy score (range: 0–4, $M=3.17$, $SD=1.05$) was dichotomized into “low” (0–2) and “high” (3–4).

Table 1

Correlation matrix of maternal descriptive characteristics of 12–16 year olds, Honduras, 2011–2012 (N=6,579)

	Decision-making autonomy	Household wealth	Educational attainment	Age at first marriage	Age at first birth	Current age
Decision-making autonomy (0–4)	1.00					
Household wealth (1–5)	0.20	1.00				
Educational attainment (0–22)	0.20	0.62	1.00			
Age at first marriage (8–41)	0.04	0.23	0.34	1.00		
Age at first birth (11–35)	0.02	0.22	0.34	0.80	1.00	
Current age (25–49)	–0.05	0.01	–0.05	0.34	0.38	1.00

Source: Demographic and Health Surveys (DHS) Honduras 2011–12

Note: Weighted Pearson's product-moment correlation coefficients shown.

Table 2

Descriptive characteristics of 12–16 year olds, Honduras, 2011–2012

	Total	Not currently enrolled	Currently enrolled
Total	1.00	0.27	0.73
Gender			
Boy	0.53	0.31	0.69
Girl	0.47	0.23	0.77
Age			
12	0.24	0.10	0.90
13	0.22	0.22	0.78
14	0.20	0.30	0.70
15	0.18	0.39	0.61
16	0.16	0.45	0.55
Birth order			
1	0.17	0.16	0.84
2	0.30	0.21	0.79
3	0.26	0.25	0.75
4	0.14	0.38	0.62
5+	0.14	0.51	0.49
Urbanicity			
Rural	0.59	0.38	0.62
Urban	0.41	0.13	0.87
Household wealth index (1=poorest; 5=most wealthy)			
1	0.24	0.47	0.53
2	0.21	0.39	0.61
3	0.20	0.25	0.75
4	0.18	0.12	0.88
5	0.16	0.04	0.96
Adult household structure			
2 related opposite sex adults	0.24	0.17	0.83
3 or more related adults	0.59	0.34	0.66
Other	0.17	0.20	0.80
Father lives in household			
No	0.21	0.21	0.79
Yes	0.79	0.29	0.71
Number of children < age 5 living in household			
0	0.52	0.23	0.77
1	0.33	0.29	0.71
2	0.12	0.39	0.61
3+	0.03	0.39	0.61
Number of daughters mother has living in household			
0	0.13	0.25	0.75

	Total	Not currently enrolled	Currently enrolled
1	0.34	0.25	0.75
2	0.29	0.26	0.74
3	0.16	0.33	0.67
4+	0.08	0.39	0.61
Number of sons mother has living in household			
0	0.10	0.11	0.89
1	0.29	0.20	0.80
2	0.29	0.27	0.73
3	0.18	0.35	0.65
4+	0.14	0.47	0.53
Mother's relationship to head of household			
Self	0.10	0.21	0.79
Wife of household head	0.86	0.28	0.72
Other relationship	0.04	0.21	0.79
Mother's marital status			
Married	0.52	0.26	0.74
Living with partner	0.48	0.29	0.71
Mother's ethnicity			
Majority	0.87	0.28	0.72
Minority	0.13	0.24	0.76
Mother's current age			
<30	0.05	0.17	0.83
31–40	0.60	0.26	0.74
40+	0.35	0.31	0.69
Mothers' total years of education (range=0–22)			
<6	0.47	0.42	0.58
6–10	0.40	0.18	0.82
>10	0.13	0.03	0.97
Mothers' age at first marriage (range=8–41)			
<18	0.52	0.33	0.67
18	0.47	0.22	0.78
Mothers' age at first birth (range=11–35)			
<18	0.36	0.33	0.67
18	0.64	0.25	0.75
Mother's work status			
Has not worked in the past year	0.46	0.34	0.66
Unpaid work	0.04	0.31	0.69
Cash-paid work	0.50	0.21	0.79
Mothers' decision-making autonomy score (range=0–4)			
Low (0–2)	0.23	0.38	0.62
High (3–4)	0.77	0.24	0.76
N	6,579	2,044	4,535

Source: Demographic and Health Surveys (DHS) Honduras, 2011–12

Note: Weighted proportions shown. Proportions in “Total” column sum vertically to 1.0 for each characteristic. Proportions in “Not currently enrolled” and “Currently enrolled” columns together sum horizontally to 1.0 for each row.

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Table 3

Weighted logistic regression models predicting current school enrollment among 12–16 year olds, Honduras, 2011–2012

	Model A	Model B	Model C	Model D
Mothers' decision-making autonomy score (ref: Low (< M))				
High maternal decision making autonomy	1.95** (1.69,2.26)	1.91** (1.63,2.22)	1.51** (1.29,1.78)	1.36** (1.16,1.61)
Age (years)		0.65** (0.61,0.68)	0.57** (0.54,0.61)	0.56** (0.53,0.60)
Gender (ref: Boy)				
Girl		1.45** (1.27,1.66)	1.43** (1.22,1.68)	1.47** (1.25,1.73)
Birth order (1–11)		0.72** (0.68,0.75)	0.98 (0.90,1.07)	0.95 (0.86,1.05)
Level of urbanization (ref: Rural)				
Urban			1.65** (1.26,2.16)	1.58** (1.22,2.05)
Household wealth index (range: 1–5)			1.78** (1.63,1.94)	1.49** (1.35,1.64)
Adult household structure (ref: 2 related opposite sex adults)				
3 or more related adults			0.88 (0.70,1.11)	0.95 (0.74,1.21)
Other			1.00 (0.82,1.51)	1.19 (0.87,1.63)
Father lives in household (ref: No)				
Yes			1.11 (0.89,1.40)	1.05 (0.77,1.41)
Number of children < age 5 living in household (0–5)			0.99 (0.88,1.11)	1.00 (0.89,1.13)
Number of mothers' daughters living in household (0–8)			0.94 (0.85,1.03)	0.98 (0.88,1.08)
Number of mothers' sons living in household (0–9)			0.87** (0.80,0.95)	0.92 (0.84,1.01)
Mothers' ethnicity (ref: Majority)				
Minority				1.54** (1.23,1.92)
Mothers' educational attainment (years)				1.18** (1.14,1.22)
Mother's current age (years)				0.99 (0.97,1.01)
Mothers' age at first marriage (years)				1.03 (0.99,1.07)
Mothers' age at first birth (years)				1.00 (0.96,1.06)
Mother's relationship to head of household (ref: Self)				
Wife of household head				1.14 (0.79,1.63)
Other relationship				0.93 (0.57,1.51)
Mother's marital status (ref: Living with partner)				

	Model A	Model B	Model C	Model D
Married				1.03 (0.86,1.22)
Mother's work status (ref: Not working)				
Unpaid work				1.28 (0.92,1.79)
Cash-paid work				1.12 (0.95,1.33)
Wald Test (F)		196.47**	53.05**	18.19**
N=6,579				

Source: Demographic and Health Surveys (DHS) Honduras 2011–12

Note: Odds ratios shown. 95% confidence intervals shown in parentheses. Model A is a bivariate logistic regression model. Model B includes child characteristic covariates. Model C additionally includes household-level characteristic covariates. Model D additionally includes maternal characteristic covariates.

* p<.05;
** p<.005