



# *Maryland Population Research Center*

WORKING PAPER

## **Profiles of Mothering and Effects on Children's Immunization in West Africa**

PWP-MPRC-2021-001

February 2021



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## **Profiles of Mothering and Effects on Children's Immunization in West Africa**

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## **Abstract**

**Background:** The concept of mothering is almost entirely missing from recent research in the African context, where the focus on women's empowerment as a key determinant of child outcomes has rendered it an acceptable proxy for mothering.

**Objective:** We aim to construct a multi-dimensional measure of mothering based on decision-making power, educational attainment and exposure to health-related information and analyze the relationship between mothering and children's vaccination status.

**Methods:** We draw on samples of women in union and with children aged 0-4 from the Mali Demographic and Health Survey. We use latent class analysis to identify categories of "mothering" and logistic regression to examine the effect of mothering type on the odds of a child being vaccinated on time.

**Results:** We identify four distinct classes of mothering types: agentic, constrained, passive and disadvantaged and find significant effects of mothering type on vaccination, although in unexpected ways. The children of constrained mothers enjoy the highest odds of being vaccinated on time.

**Conclusion:** Empowerment may be an insufficient measure of mothering, and children of mothers with high decision making power (agentic) may not enjoy significant benefits in terms of their health care.

**Contribution:** The importance of this inquiry is underscored by the need to better understand the variation in strategies that women employ in child rearing.

**Key words:** decision-making power, education, public health, immunization, Africa, latent class analysis

“Poor Nnu Ego, even in death she had no peace! Still, many agreed that she had given all to her children. The joy of being a mother was the joy of giving all to your children, they said.” (Emecheta 1979: 224).

In *The Joys of Motherhood*, Nigerian novelist Buchi Emecheta paints a poignant portrait of the intense pressure to be a good mother in a context marked by poverty and constant assaults on children’s health and survival. Academics have also been concerned with children’s well-being in Africa but have relied extensively on empowerment to measure effective mothering. A large body of research has identified a beneficial effect of women’s empowerment, commonly measured through decision-making power, on children’s well-being in various developing country contexts (Aliofe et al 2017; Allendorf 2007; Fielding et al. 2017; Pratley 2016). The dominant message is that where mothers have high decision-making power relative to the other adults in the household, children do better (Amugsi et al 2016; Lepine and Strobi 2013). Implicit in this connection is that decision-making power supports effective mothering. In this analysis, we move beyond decision-making power to 1) to identify classes of “mothering,” defined as the way in which women draw on intrinsic and external resources to rear children and 2) examine the association between mothering classes and children’s immunization status. In doing so, we interrogate the relative value of empowerment as a measure of effective mothering and the extent to which it translates into benefits for children. We draw on samples of women in union with children aged 0 - 59 months from the Demographic and Health Survey in Mali.

The importance of this inquiry can be appreciated in several ways. First is the need to develop a more nuanced understanding of the mechanisms underlying the relationship between empowerment and children’s well-being. Most studies rely on decision-making power as a measure of effective mothering but do not consider how decision-making power interacts with educational attainment and exposure to information to produce different strategies of mothering. Latent class analysis is an underutilized yet powerful way to identify a more comprehensive patterning of nuanced relationships that has been effectively used to examine obesity (Scharoun-Lee et al. 2011), physical activity (Patnode et al. 2011) and substance use (Valente et al. 2017). Second, despite the known cost effectiveness and health benefits of

immunization for children under five, mortality and morbidity due to vaccine preventable diseases remains a concern (Harris et al. 2014). Even though immunization coverage has significantly improved globally, disparities continue particularly in Africa. Third, while there is little doubt that improving women's empowerment should be a development goal in itself, we need to expand our scope of inquiry to encompass less intuitive and more complicated scenarios that might allow us to develop more nuanced intervention strategies to benefit both mothers and children. For example, distinguishing mothers who are able to leverage their decision-making power to surmount educational deficits from those whose exposure to health information can compensate for lack of decision-making power could point to more targeted intervention approaches to improve outcomes for children. Lastly, the class variable we develop in this analysis could be useful to examine other outcomes of interest such as children's nutritional status and educational outcomes as well as women's family planning use and domestic violence.

## **Background**

Mothering research in the US and western contexts is heavily influenced by feminist analysis of gender roles (Chodorow 2000; Dequinzio 1993) and sociological analysis of intersectionality via race and class (Dow 2019; Lareau 2011). "Intensive mothering" scripts that emphasize the need for large amounts of time, effort and emotional investment into children are nearly impossible to meet (Hays 1996) particularly for low income mothers who lack the resources to follow these directives (Turgeon 2019) and for non-white mothers who may value other aspects of child rearing (Christopher 2012). Yet most mothers feel the pressure to conform because not doing so would label them as "bad" mothers (Collins, 2000; Hays, 2003; Kaplan, 1996) and undermine their children's abilities to gain traction in a hyper competitive educational and employment market place (Hollister 2011; Newman 2012). Indeed, recent scholarship has advanced the idea of "safeguarding status" defined as "mothers' vigilant labor to prepare a child's pathway to the highest status achievable" (Milkie, Warner and Ray forthcoming). The effect of such intensive mothering on mothers' emotional status vary by union status though there is an overall positive association between mothering and emotional well-being (Meier et al. 2016).

There is limited recent research on mothering in Africa, except in the South African context (MacLeod 2001; Spjeldnæs et al. 2014). While older work addressed the psychosocial (Reisman 1992) and cultural dimensions of child rearing practices (LeVine et al. 1996), the more recent work has almost entirely focused on women's empowerment and its effects on child well-being. According to Kabeer (1999), women's empowerment can be understood as the ability to exercise *agency*, and use *enabling resources* to transform her own life or those of others in contexts where this ability has been denied. The extent of decision-making power that a woman can exercise -- or autonomy -- is commonly used as an indicator of empowerment (Acharya et al. 2010; Becker et al. 2006). The link between decision-making power and children's well-being is rooted in resource allocation patterns commonly operationalized through bargaining models (Maitra 2004). Women use their decision making power to allocate resources that protect their own and their children's well-being (Handa 1996; Hindin 2016). In the African context, resources may go to preventative health care, better nutrition, and increasingly, high quality child care (Hoddinott and Haddad 1995). Conversely, where they do not have power, they have little say in how resources are used, and, as a result, child well-being suffers (Antai 2012; Cunningham et al. 2015). To the extent that labor force participation is correlated with empowerment (Asaolu et al. 2018), there is some evidence of unintended negative consequences of women's employment. For example, evidence from West Africa shows that increased women's labor force participation may not necessarily lead to better outcomes for children because working mothers have few high quality options for child care (Glick and Sahn 2001). Similarly, migrant mothers who leave children behind with extended family may not be able to exercise full control over child care practices (Peng and Wong 2015). Even though these studies point to structural deficits such as satisfactory child care as the culprit, it is ultimately the mothers who are held accountable for their children's well-being.

Much of the scholarship on the relationship between women's empowerment and immunization shows a positive effect. Ebot's study in Ethiopia (2018) shows that high levels of decision-making power in household decisions for women is associated with complete vaccination for children. Similarly,

Ibrahim et al. (2015) find a strong positive relationship between decision making and immunization in both Nigeria and India. Interestingly, studies in which maternal education is used as an indicator of empowerment alongside decision-making, finds a positive effect of education on vaccination but not necessarily of decision making (Pandey and Lee 2012; Vikram et al. 2012). Much of this research treats access to health care as a structural factor controlled through indicators such as type of residence (Ebot 2015; Pandey & Lee 2012) or through fixed effects modeling (Vikram et al. 2012). The lack of clarity in the pathway of effects motivated Thorpe et al.'s (2016) systematic review of the literature on empowerment and vaccination. They say "the empowerment pathways of the "maternal resource-child vaccination" relationship are under-studied, including pathways capturing a mother's "agency" or capacity to influence and enact decisions that may enhance the vaccination coverage of children" (p. 173). While they conclude that decision making power is positively associated with complete immunization, the conceptual and empirical connection between empowerment and vaccination remains underdeveloped.

We draw on some key ideas from the mothering research to develop a latent construct of mothering that enables the identification of more nuanced differences in women's abilities to be effective mothers. We believe that this construct offers more conceptual purchase in appreciating the power and limits of decision making power and offers an innovative approach to reflecting the multiple dimensions of effective mothering.

### **"Mothering" as a Latent Construct**

For starters, we note a simple yet significant truism: except in the rarest of cases, mothers want their children to be healthy and succeed. However, they also bear a disproportionate share of responsibility for keeping children healthy and alive and, consequently, the blame, if children get sick and die. This is because care work is highly gendered such that women are not only responsible for their children's welfare but are socially and culturally obligated to do so (Folbre 2012). This is true globally and particularly in Africa and is at the core of the MCH approach of connecting the well-being of mothers and children. Our latent construct takes this as a starting point and brings together maternal decision-making

power with educational attainment and exposure to health messaging to identify different types of “mothering.” In doing so, we recognize both intrinsic and extrinsic factors that mothers draw on in caring for their children. Decision making power is linked to the ability to use resources effectively whereas knowledge acquisition through education and literacy can be seen as intrinsic human capital. The interaction of the two has been shown by Smith-Greenaway (2013) in her analysis of child survival in Nigeria. She shows that among children whose mothers have high decision-making power, mother’s literacy improves child survival compared to those whose mothers cannot read. Exposure to health information reflects the role of public health “scripts’ in influencing women’s child care strategies. In the same way as exposure to “intensive mothering” scripts influences child rearing decisions in some western contexts (Hays 1996), the consumption of public health messaging can affect how mothers prioritize health, in general, and the specific actions they take to protect children’s health.

There are likely mothers who draw on their decision making power to make optimum use of intrinsic endowments such as education and their exposure to public health messaging to care for their kids. For example, women who have decision making power may channel their efforts to immunize their children both to apply their education and in response to public health directives to do so. Alternatively, those with high decision making power but little else may have to employ different strategies to ensure the well-being of some children. This brings to mind Scheper-Hughes’s (1993) ethnography of poor women in Brazil who may have had high levels of decision making power but faced such severe economic constraints that they were forced to “neglect” certain children so others could survive. Lastly, women with high levels of power may be uniquely resourceful and driven to safeguard their children’s health despite deficits in intrinsic endowments and external resources.

What happens when women lack decision-making power and education/literacy but are exposed to health information? These women may use the available health messaging to compensate for a dearth in agency. In fact, it might be argued that the exposure to health knowledge enables women to secure their status as good mothers where they have few other options to do so. Moreover, having the means to



follow through on public health counsel offers women a visible and low risk means to safeguard health without any real alteration to their decision making power. Lastly, there are undoubtedly mothers who lack decision making power and education, and also have little exposure to health messaging. This is likely the case, for example, in contexts where community leaders actively discourage reproductive health messaging based on religious or cultural injunctions. There is increasing evidence that mental health is a critical contributing factor to effective mothering and is a significant factor in explaining poor child outcomes (Harpham et al. 2005; Patel et al. 2004). While we cannot examine mental health directly in this analysis, the mothering classification could be useful in identifying mothers who might be more likely to face mental health challenges.

## **Data and Methods**

Because this is a proof of concept analysis, we selected one country, Mali, because it has some of the worst child outcomes in Africa (WHO-UNICEF 2018) along with low levels of maternal empowerment. The data come from the 2012 Demographic and Health Survey (DHS) which are nationally representative, household-based surveys conducted about every 5 years with women and men of childbearing age (typically 15-49 years) in Africa, Asia and Latin America. The DHS uses a stratified two-stage cluster sampling design. Our analytical sample is comprised of mothers in union with at least one child aged 0 to 59 months. We restrict the sample to mothers in union with young children because the decision making questions are only asked of these women and our focus is on mothering in early childhood. The resulting sample size, after removing cases with missing data, is 6418 mothers.

### Constructing the Class Variable

We use latent class analysis to classify mothers in union according to their responses to selected questions on decision- making, education and literacy and exposure to health information. We tried including household structure as an additional item but found that it did not discriminate between classes. Appendix

A lists the 11 final items that were used to construct the latent class variable. Responses to all questions were transformed into a dichotomous outcome as follows: the decision-making questions are “you”/”joint” vs. mostly husband/partner; the education question, “primary or more” vs. “less than primary”; the literacy variable, “reads at any level” vs. “cannot read”; the newspaper and radio exposure, “yes” vs. “no”; the health information exposure variables are “yes” vs. “no.” There is some disagreement in the literature as to whether one should include more vs. less items in an LCA model. On the one hand it is argued that adding indicators to an LCA model will increase the number of combinations of responses that may spread out the data, negatively impact goodness-of-fit tests, and increase the number of boundary parameters estimated (Galindo-Garreand Vermunt 2006; Langeheine et al.,1996). However, Wurpts and Geiser (2014) conducted a Monte Carlo simulation of 2- and 3- class models using between 4 and 12 items. In general, they found that using a larger sample and more and higher quality items lead to more convergence and proper replications as well as fewer boundary parameter estimates and less parameter bias.

All items were entered into a latent class analysis (LCA) model using Mplus 8.4 The latent class model examines the relationships between a number of observed variables by assuming that these relationships are explained by an unobserved latent categorical variable under the assumption of conditional independence. This procedure produces a set of measurement parameters and a set of structural parameters. From these the most likely class membership is estimated. Given a set of r dichotomous items u that result in K classes, the marginal probability for item j being equal to 1 is given by the formula:

$$P(u_j = 1) = \sum_{k=1}^K P(c = k)P(u_j = 1|c = k)$$

where c is the latent class variable and k is a class within c. The structural part of this expression, P(c=k) describes the observations in terms of the probability of class membership.  $P(u_j = 1|c = k)$  describes

the measurement part of the model or the probability of endorsing the item conditional on the class or the conditional item probability. The joint probability of all items assuming conditional independence is:

$$P(u_1, u_2, \dots, u_r) = \sum_{k=1}^K P(c=k) P(u_1|c=k) P(u_2|c=k) \dots P(u_r|c=k)$$

These probabilities are then used to compute the posterior probabilities used in estimating most likely class membership:

$$P(c = k|u_1, u_2, \dots, u_r) = \frac{p(c=k)P(u_1|c=k)P(u_2|c=k)..P(u_r|c=k)}{P(u_1, u_2, \dots, u_r)}$$

#### Methods for Estimating Effects of Mothering on Immunization Status

We ran logistic regression models to examine the relationship between the class variable and a combined on time immunization status for polio, measles, DPT and BCG. We only include children aged 6 -59 months for these analyses to 1) establish the upper end of the minimum age of vaccine administration for most vaccines and 2) to minimize censoring of children who might have experienced delays in immunization but would eventually be immunized. This results in a sample size of 9, 101 children. We used the clustering command in SPSS to address non-independence of children from the same mother.

Each of the vaccine items was converted to a dichotomous outcome using WHO guidelines for establishing the correct age-specific exposure period (WHO 2018). The youngest age at which these vaccines can be administered varies from birth (BCG) to 6 months (measles). For example, polio should first be given 6-8 weeks after birth with two more doses following at 4-8 week intervals. Given that our sample includes children ages 6-59 months, each vaccine outcome was dichotomized as either vaccinated by the age specific recommendation (1) or not (0). For measles, the first dose should only be given no earlier than 6 months so we loosened the exposure period to allow mothers enough time to get the vaccine. Therefore, for children 6-11 months who are reported as not having been vaccinated, we undertook an imputation procedure to correct for overestimation of non-vaccination. First, we determined the proportion of children aged 12-18 months who are *not vaccinated*. Second, we generated a random value between 0-1 and then assigned a value of "0" (not vaccinated) if the value was below .274 and a "1"

if the value was above .274 (vaccinated). Approximately 7% of the children were in this age range and not vaccinated. About 73 % of these were randomly assigned a positive vaccination status.

We combined the four vaccines into a dichotomous outcome: 1 for all four on-time and 0 for anything less than four. We conducted a sensitivity analysis with an outcome dichotomized as 1 for three or four on-time and 0 for 0-2 on time and found no difference. Control variables include age of mother, employment status, household wealth, being in a polygynous marriage, children ever born, type of residence and perception of barriers to accessing care. Child level controls include age and sex.

## **Results**

Table 1 presents selected descriptives of the sample.

Describe Table 1

The largest percentage of women is in the 25-34 age group and the overwhelming majority live in rural areas. About 42% of women are employed and 32% in polygynous unions. Lastly, the rate for on time immunization for all four vaccines is low at 31%. We now move to results of the latent class analysis. We conducted a class enumeration to extract from 2 to 5 classes to determine which model best fits the data. Table 2 presents the model fit statistics for these models.

Insert Table 2

To ensure that the model being estimated was not using a log likelihood that was a local maxima, the model convergence statistics were examined to ensure that the best log likelihood value was replicated. If it was not, the number of random starts was increased and the model was re-run. This process was repeated until a replicated log likelihood value was obtained. These items were then evaluated for model fit using the Bayesian Information Criteria (BIC) statistic, the various log-likelihood function statistics, the summary classification statistic (entropy), and the individual item probabilities by class. There was no one combination of these statistics that provided a clear-cut choice of one class structure over another. In the end, we followed convention (Masyn 2013; Muthen 2001). We settled on a class solution where the

BIC statistic levels off, the convergence statistics show no local maximas, the entropy is relatively high, the item probabilities show maximum separation for the classes, and the plots of the conditional item probabilities revealed meaningful patterns. According to Masyn (2013), items that have a probability of .7 or higher should be retained. Due to the large sample size, the likelihood ratios are not useful in this process. Assessing these diagnostics, we arrived at a 4- class solution, as shown in Figure 1.

Insert Figure 1 here.

The x-axis shows the items that were used to extract the classes: 1-4 represents the four women's decision-making items, 5-8 the knowledge acquisition and the last three, exposure to health information. The y-axis shows the proportion of women giving the "positive" response for each of the items. For example, item 1 refers to the proportion of women who report that either they have decision making power in decisions about major household purchases or do so jointly with their husband. As is clear from Figure 1, there is a clear difference between one group of women, whom we term 'agentic,' who have very high percentages reporting yes to this question and the three other groups who have very low percentages reporting yes. Turning to the second set of indicators for knowledge acquisition, once again, we find one group standing out with higher levels of positive responses, whom we term "constrained." Lastly, for the exposure to health information, two groups exhibit similarly high levels of positive responses.

Bringing all eleven items together, we arrived at four classes of mothering: "agentic" who have high decision making power, low educational attainment and high exposure to information; "constrained" who have low decision making power but high educational attainment and exposure to information; "passive" who have low decision making power and education but high levels of exposure; and "disadvantaged" who score low on all items. It should be noted that these graphs display relative and not absolute differences. Therefore, the lack of complete consistency across items is not as much of a concern. Taken together, these distributional differences underscore the need to distinguish "mothering"

from empowerment in order to better understand child well-being outcomes. Who are the mothers in the classes? Table 3 shows the distribution of selected attributes by class.

Insert Table 3 here.

We find, not surprisingly, that socio-demographic attributes vary across mothering class but in somewhat surprising ways. Constrained mothers tend to be wealthier, less likely to be in polygynous unions, and have fewer children whereas agentic mothers are more likely to be employed and living in urban areas. The passive group shares attributes with both agentic (children ever born, polygyny and wealth) and constrained (employment). The attributes for the disadvantaged group are consistent with expectations (low wealth, high polygyny, high children ever born and rural).

#### Robustness Checks

In order to increase our confidence in both the need for and the robustness of the latent class analysis, we undertook several checks. First, we took advantage of the large sample size and divided the sample into two random groups. We then ran the LCA models separately in each group and found the recommended class structure to be similar (results available upon request). To confirm robustness further, we used a MIMIC model to test for measurement invariance (MI) across selected attributes. A MIMIC model is a structural equation model that tests for the existence of direct effects of the attributes on the individual items net of the effect on the construct itself. Most studies deem significance of 10%-20% of the direct paths as acceptable. When we tested for MI across the two random samples, we found 40% of the paths to be significant. Even though this exceeds the acceptable limits, we are relatively confident that class structure is similar across samples because the small variation in item probabilities is most likely compounded by the large sample size. When we tested for MI across rural and urban samples however, we found much more invariance (68.6%). These results suggest that while the 4-class structure is similar for rural and urban areas, the individual item response probabilities vary significantly by context.

Therefore, it is essential that we control for context in estimating effects of mothering class on immunization as we do in the final analysis.

Does Mothering Matter for Immunization?

Figure 2 present predicted probabilities of on time immunization by mothering class for four vaccines - BCG, measles, DPT and polio - averaging over all values of the covariates within classes.

Insert Figure 2

The probability of on time vaccine for all four vaccines is highest for children whose mothers are in the constrained category and lowest, not surprisingly, for children of disadvantaged mothers. As a reminder, the constrained women have low decision making power but relatively high levels of educational attainment and exposure to health information. What is even more surprising is that the children of “passive” mothers - those who only have high exposure to health information - do better than the children of agentic mothers. This would suggest that decision-making power does not translate into more effective mothering at least for on time immunization. What appears to really matter is having education/literacy to enact public health messaging. While perhaps surprising, it is consistent with recent work in other contexts that has also questioned the role of decision-making power in the use of health care (Adjiwanou and LeGrand 2014) and utilization of health care services (Ghose et al. 2017).

## **Discussion**

The relationship between women’s decision-making power and child outcomes has been studied extensively in the African context. There is fairly robust consensus in the academic scholarship that children do better when their mothers are empowered. Consequently, policies and intervention programs have been implemented in many developing countries to strengthen women’s empowerment and by extension, their children’s well-being (Malhotra and Schuler 2005). In this analysis, we took a different approach by conceptualizing decision-making power in conjunction with educational attainment/literacy

and exposure to health information as a latent construct reflecting “mothering.” We identified four classes of mothers: 1) those who have power and exposure but not high levels of education/literacy (agentic); 2) those who have little power but high levels of education/literacy and exposure (constrained); 3) those who have only exposure (passive) and 4) those who have little of anything (disadvantaged). We suggest that the “mothering” construct offers more conceptual leverage in capturing variation in strategies that women may use to protect children. Therefore, our approach better reflects the extent to which mothers are able to, or in some cases, willing to act on scripts of good mothering that are commonly promoted by MCH campaigns.

The mothering concept offers an important modification to the common public health strategies that prioritize dissemination of information. Our analysis demonstrates that, while exposure to information is indeed very important, the effects are strengthened not with decision making power but with education/literacy. Our approach also offers a valuable contribution to understanding the social determinants of child well-being. The four classes of mothering offer a more nuanced distinction of mothers’ positions beyond having high or low decision making power because the enactment of power is understood to be a function of intrinsic endowments and exposure to health information. Based on the results of the regression models predicting immunization effects, it is the constrained mothers who are most effective followed by their passive counterparts and, then, the agentic mothers. Why might this be? In the absence of direct measures of possible pathways, any answer is speculative but it does suggest that baseline education/literacy may be more important than decision-making power in translating public health messages into child rearing practices.

Taken together, these findings underscore the importance of understanding child well-being as a function of mothering rather than individual decision making alone. Differences in culture, prevailing gender norms and social policy -- none of which we have accounted for in this analysis -- are likely to explain some of the variation. More importantly, however, such differences should motivate more thought to how women across different countries, regions and perhaps class view their own empowerment



relative to their ability to perform the role of good mothers. With this in mind, scholars in demography and public health should approach mothering as a specialized set of activities separate from being empowered. From an intervention standpoint, this analysis suggests that improving women's empowerment alone may not translate into improvements in child well-being. The issue of child immunization has taken on new urgency in light of the COVID-19 pandemic which, according to the WHO and UNICEF, risks leaving at least 80 million children under age 1 at risk for preventable diseases such as measles and polio because of disruptions to vaccine schedules. Therefore, it is imperative that policy makers pay close attention to variation in mothering within and across countries in ongoing efforts to implement successful maternal and child health programs.

There are, of course, limitations that must be recognized. First, the class variable is only applicable to mothers in union because the decision-making questions were only asked to women in union in the DHS. It is highly likely that the mothering process operates differently for women not in union, resulting in a different number of classes. When we compared women who were in-union with those not in union on vaccination, we found that the children of mothers not in union had better outcomes. This is not expected to overly bias our results as there are just under 5% of the women who are not in union in the Mali DHS but it does suggest possible selection effects in our measurement of mothering classes. Second, we are limited by the items available in the DHS. It would be prudent to apply the concept with other data and examine cognitive development and educational attainment of children. This may illuminate additional strategies of mothering such as drawing on information to be “persuasive.” Third, this analysis was done as a proof of concept using data from one country. Therefore, we need to consider other countries in Africa and possibly beyond to identify how to adapt this approach to different social and environmental contexts. Lastly, future work should consider the role of non-biological mothers as well as fathers to further expand the “mothering” concept.

Appendix A. DHS Items Used for Latent Class Analysis

<b><u>Decision-Making Power</u></b>
1) Who usually makes decisions about making major household purchases?
2) Who usually makes decisions about visits to your family or relatives?
3) Who usually decides how your (husband's/partner's) earnings will be used: you, your husband/partner or you and your husband/partner jointly?
4) Who usually makes decisions about health care for yourself? You, your husband/partner, you and your (husband/partner) or someone else?
<b><u>Knowledge Acquisition</u></b>
5) Summary educational achievement
6) Literacy
7) Reads newspaper
8) Listens to radio
<b><u>Exposure to Health Information</u></b>
9) Know any type of FP method
10) Heard of AIDS
11) Heard of other sexually transmitted infections

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Table 1. Sample Descriptives for Mothers and Children, Mali DHS 2012

Age of Mother	
15-24	29.0%
25-34	47.4%
35-49	23.6%
% Polygynous Marriage	32.4%
% Employed	43.8%
Mean Number of Children Ever Born	3.96
Place of Residence	
Rural	74.8%
Urban	25.2%
N (mothers)	6,418
% of children with on time immunization for Polio, BCG, Measles, and TB	31.9%
N (children 6-59 months)	9,101



Table 2. Model fit statistics for one- to five-class specification of latent class analysis models, Mali DHS 2012

Number Classes	LLH	Change in BIC
1	-30444	---
2	-27533	5716
3	-25525	3910
4	-24035	2876
5	-23748	468

Figure 1. Probability of positive item response by mothering class, Mali DHS 2012

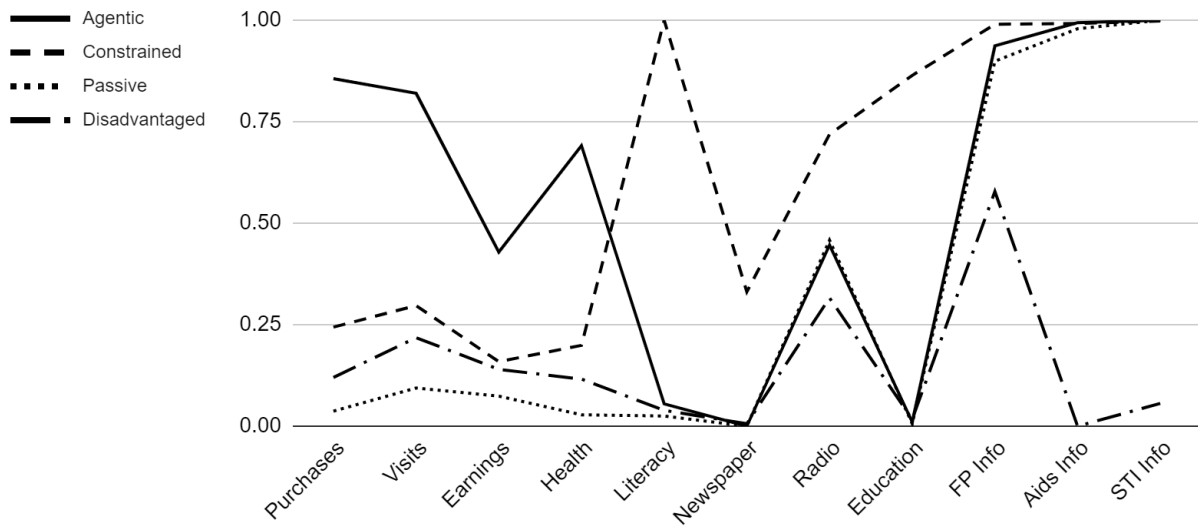


Table 3. Selected attributes of class, Mali DHS 2012

	Agentic	Constrained	Passive	Disadvantaged	Sig Level
Mean age of mother	29.66	26.84	28.66	29.05	.000
Mean children ever born	4.42	3.03	4.29	4.34	.000
% polygamous	31.8%	16.3%	33.6%	37.0%	.000
% currently working	62.4%	47.4%	42.4%	31.3%	.000
% in highest household wealth quintiles	26.0%	67.6%	20.9%	4.31%	.000
% urban	39.4%	29.0%	17.6%	16.1%	.000
Class Count	768 (12.0%)	729 (11.4%)	3877 (60.4%)	1044 (16.3%)	
Probability of most likely class membership	.943	.975	.965	.983	

Figure 2. Predicted Probabilities of Being Vaccinated for Measles, Polio, DPT, and TB by Mothering Class, DHS Mali 2012 (all 4 vs. less than 4)

