Title: Developing and testing measures of reproductive decision-making agency in Nepal

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ABSTRACT

Conceptual ambiguity in how we define reproductive empowerment has left the field with inconclusive evidence of its relationship to key reproductive outcomes. Our study aimed to develop and test a measure of reproductive decision-making agency, a critical component of reproductive empowerment, in a sample of married women from two Nepalese districts. Initial measures were developed based on theory and previous literature. Next, cognitive interviewing techniques were used to explore local meanings of reproductive empowerment and decision-making through eight focus group discussions and 24 in-depth interviews. Based on the insights gained, we finalized a set of quantitative measures of reproductive decision-making agency that were imbedded in a quantitative survey conducted with 1000 women. Our results suggest that our measures are internally consistent within the data, link well conceptually and statistically with key reproductive outcomes, and provide insight into the nuances of joint versus sole decision-making beyond those provided by standard measures. With better measures of reproductive agency, we can better design interventions for men and women to meet their reproductive needs.

BACKGROUND

In recent decades, the development field has seen an increased recognition of the role that women's empowerment plays in shaping reproductive outcomes, particularly in the areas of the world where women are more disempowered relative to men. While several studies have found a positive association between increased empowerment and a range of reproductive outcomes—including lower fertility, longer birth intervals, use of contraception, and lower rates of unintended pregnancy (e.g. Upadhyay and Hindin, 2005)— the overall empirical evidence for this association is more mixed than the theoretical consensus would suggest (Upadhyay et al. 2014, James-Hawkins et al. 2016; Pratley 2017). This to a significant extent reflects an ambiguity regarding how empowerment is defined, measured, and operationalized in the reproductive sphere (Malhotra and Schuler, 2005; Upadhyay et al. 2014; Pratley 2017). For example, it is unclear whether authors using the terms "reproductive autonomy", "women's agency", "reproductive rights", or "reproductive control" are referring to the same or related concepts, particularly as these are often measured in different ways. As a result, researchers, policy makers, and practitioners have struggled to fully understand the conditions under which women's empowerment shapes specific reproductive outcomes, limiting the ability to develop effective interventions.

Edmeades et al. (2018) propose a conceptual framework for reproductive empowerment that aims to address these challenges through positioning reproductive empowerment as a distinct dimension of overall empowerment, building on, among others, conceptual frameworks of women's empowerment (see, for example, van Eerdewijk 2017; Kabeer 2001). Within this approach, reproductive empowerment results from the interaction of three interrelated, multi-level processes: *voice*, or the capacity of individuals to assert their interests, articulate their opinions and desires, and meaningfully participate in decision-making processes related to their reproductive lives; *choice*, or the ability of individuals to meaningfully contribute to reproductive decisions; and *power*, which refers to the ability of individuals to shape reproductive decision-making processes by exerting influence over others and acts as a key enabler of both voice and choice. Three key expressions of empowerment are particularly relevant in the reproductive sphere: *collective action*, or the ability of groups to shape reproductive policy and practice through group advocacy; *leadership*, which refers to the degree to which individuals and groups play a lead role in debates about reproduction; and *decision-making*, which refers to the ability of individuals to meaningfully engage in the decision-making process.

Of these three expressions of empowerment, decision-making has received the most attention from researchers focused on reproductive outcomes, with a substantial literature exploring the influence of women's engagement in, and control over, specific decisions on a range of reproductive outcomes. As is the case for empowerment more generally, the evidence for the effect of decision-making on reproductive outcomes is more mixed than the theoretical consensus would suggest (Upadhyay et al. 2014; Pratley 2017). This inconsistency reflects a lack of consensus in the field about which aspects of the decision-making process are most reflective of empowerment and how to measure agency and empowerment within the context of reproductive processes.

Much of the evidence on decision-making has focused broadly on decisions related to household functions (e.g. from the Demographic and Health Surveys (DHS)), rather than those specific to

reproduction, implicitly assuming reproductive decisions follow similar process (Malhotra and Schuler 2005). When focused more specifically on reproduction, these questions have tended to rely on a single question aimed at understanding who typically makes the final decision on a specific topic. An example of this is the cross-national Performance Monitoring and Accountability 2020 (PMA2020) questionnaires, which ask specifically about decisions related to contraceptive use.

While the latter approach allows for direct measurement of decision-making rather than relying on proxies, it remains unclear how these measures are related to the broader concepts of agency and empowerment or how to interpret the responses, which often are dependent on the judgment of individual researchers. This is particularly the case when responses are categorized into the usual categories (mainly husband, mainly respondent, or joint). Often it is not clear whether sole or joint decision-making represents greater agency for any given decision. For example, women who make reproductive decisions alone may include women with high agency along with those forced to make decisions alone due to a lack of broader agency (as could be argued for covert use, for example). Alternatively, women reporting joint decision-making may be either only peripherally involved in the decision due to power imbalances in their relationship or fully engaged as equal partners. In the absence of additional information on the decision-making process, the researcher is forced to make assumptions about which responses represent empowerment, or to adopt simplified measures of decision-making, both of which are problematic for accurate measurement.

Finally, much of this research has focused on linking decision-making agency to outcomes assumed, rather than proven to be, consistently influenced by shifts in women's agency, such as current use of modern contraception. Edmeades et al. (2018) suggest that more appropriate outcomes are those that explicitly seek to understand how individuals want to be involved in decisions and how closely the outcomes match their reproductive desires, hewing closely to the role of voice, power and choice in understanding empowerment. When viewed from this perspective, the choice *not* to use a contraceptive method may be as reflective of agency as a decision *to* use. As a result, some of the inconsistency in the predictive ability of measures of agency may reflect erroneous assumptions about the relationship between decision-making agency and specific reproductive behaviors or outcomes.

In this study, we aimed to address these issues by developing and testing measures that capture women's decision-making agency across multiple domains of reproductive health. We explicitly aimed to capture core components of empowerment in the decision-making process by including elements of voice, power and choice in our measures (Edmeades, 2018). We used these measures to understand the relationship of empowerment in decision-making to key reproductive outcomes, to understand the advantages our measures have compared to standard measures, and to shed light on the meaning behind joint versus sole decision-making for women.

METHODS

Setting

The data for this study come from Morang and Kaski districts in Nepal, which we purposively selected with an emphasis on obtaining a diverse sample for measure testing rather than broader generalizability

and to capture the significant variation in the cultural, economic, social and migration contexts within which reproductive decisions are made in Nepal. Morang is in Province 1 in Nepal's lowland area, while Kaski is in Province 4, located in the Nepal's hill areas. Both are predominantly rural districts with relatively large urban centers and large numbers of migrants from surrounding areas. Both provinces have low fertility rates (2.0 and 2.3 for Provinces 1 and 4 respectively), with relatively high rates of modern contraceptive use (55% and 49% of women aged 15-49 in Province 1 and 4 respectively), compared to the national average of 43%. Around a quarter of women have an unmet need for contraception. In both provinces, according to the DHS, around two-thirds of women reported that their contraceptive decisions were made jointly with their husbands, though the percentage was slightly higher in Province 1 (Ministry of Health et al., 2017).

Study design and data

We used a mixed-method approach to develop and refine measures of reproductive decision-making. Respondents for the qualitative and quantitative samples were drawn from the same areas to ensure comparability, though no individuals were included in both samples. Both the qualitative and quantitative samples included men and women of reproductive age, with the quantitative sample further restricted to women ages 20-35 who had been married for at least six months and who currently lived with their partners. We restricted age to capture people who were likely to be actively engaged in a range of decisions about childbearing and contraceptive use. Participants for FGDs and IDIs were purposively selected in consultation with community leaders.

For both the qualitative and the quantitative research activities, site selection and sampling were based on a four-stage process. In the first stage, one municipality was purposively selected from each district based on their socio-demographic and economic characteristics. In second stage, 20 wards were purposively selected on the same basis as the municipality. Individuals for the qualitative sample were recruited within two of these wards. These same wards were divided into 3-10 individual segments based on the number of households in each segment. Finally, for the quantitative sample, respondents were selected randomly within each segment, with 25 individuals interviewed in each segment. We screened 2782 households to find 1000 eligible women to participate.

In total, we conducted eight focus group discussions (FGDs), 20 in-depth interview (IDIs), evenly split between men and women, and 1000 quantitative surveys with women[1], all equally split between the two sites. We conducted this work between June and August 2017. Thirteen women refused to participate in the quantitative survey and were replaced to reach the total sample.

Ethical approval was obtained from the International Center for Research on Women's Internal Review Board (IRB) and the Nepal Health Research Council.

[1] In addition, we conducted 200 exploratory quantitative surveys with men using the same tools. They are not included in this analysis except as a comparison to the women's data for internal consistency checks

Analytic approach

We conducted this study in two phases. In the first phase, we developed a draft set of quantitative measures of reproductive decision-making and then refined them using insights drawn from our qualitative sample. In the second phase, we assessed the internal consistency and validity of these measures through a series of exploratory statistical analyses, using our quantitative survey data.

Phase 1: Developing and refining the quantitative reproductive decision-making measures

We sought to develop measures that would adequately capture the degree to which individuals are *meaningfully* engaged in the decision-making process, and their level of satisfaction with their own influence over the decision itself, building on the reproductive empowerment framework developed by Edmeades et al. (2018). To do so, we built on several existing approaches to decision-making in areas other than reproductive behavior, such as the Women's Empowerment In Agriculture survey (WEIA), the measures used in the DHS and other questionnaires that examine reproductive autonomy or decision-making (e.g. Upadhyay 2014) to expand on standard approaches used in the field.

As we wanted our measures to capture a range of commonly-made reproductive decisions, we centered the decision-making process on five domains of reproductive behavior. These domains were developed based on the literature. In this analysis, we focus on three domains of reproductive decision-making that the qualitative research and preliminary analyses of the quantitative data found were of particularly relevance to the married women in our sample: when to have children, whether to use family planning, and which method of family planning to use.

Eleven questions were initially developed for each domain, collectively designed to capture key components of the decision-making process from start to finish. These questions, which we refer to as a 'question set', aimed to elicit information on the topic of the discussion (e.g. when to have children), who was involved in the discussion, which individuals had an influence on the decision, whether there was a difference in opinion between the woman and her spouse, who made the final decision, and the outcome of the decision (e.g. had a child, or not). The goal of the question set was to collect information on voice, power and choice within the process of making decisions.

To assess how these questions directly related to core elements of the conceptual framework and to examine how the question set was interpreted in the Nepalese context prior to applying them in a quantitative survey, we collected qualitative data from the same groups as we wanted to include in the quantitative component of the study. We first elicited information on general perceptions of empowerment within the reproductive sphere, what the 'typical' decision-making process for each domain involved, and what was viewed as an optimal decision-making process through FGDs. We used findings from these discussions to inform the IDIs, during which we utilized cognitive interviewing techniques to explore in greater depth how respondents interpreted the nuances of the questions. For each question set administered during the IDI, respondents were asked open-ended questions to

explore the cognitive process they engaged in when answering questions, including their understanding of specific meanings of terms/words, key concepts, and how they recalled past events.

This analysis resulted in several changes to the wording and structure of the question set for each domain, as well as the addition of questions to the set. Based on the qualitative analyses and theory, we identified four core questions as best capturing key components of the decision-making process, particularly in terms of voice, power and choice: whether the respondent shared their opinion on the decision (and, if not, why not); whether the respondent felt her opinion was considered when the decision was made; who made the final decision; and whether the respondent was satisfied with the decision-making process (See **Annex 1** for these questions for Domain 1: When to Have Children).

Finally, the revised question set was applied to each domain and incorporated into a quantitative survey that included questions on demographic, relationship, contraceptive and fertility characteristics, among other topics.

Phase 2: Testing and validating reproductive decision-making agency measures

We used several methods for testing and validating measures. Once data were collected and cleaned, we conducted internal consistency and validity tests in three stages, beginning with assessing the internal consistency of the question set across and within domains, with other variables in the data set, against the men's data, and as compared to our qualitative findings (Stage One). Based on these findings, we created measures of reproductive decision-making agency for each domain and for all the domains in combination (Stage Two). Next, we explored to what extent our measures were associated with key reproductive outcomes related to contraceptive use and feelings of reproductive control (Stage Three). Finally, we sought to understand what advantages and disadvantages our measures had over existing measures (Stage Four). Each of these stages is described in greater detail below.

Stage One: Assessing internal consistency of the individual decision-making agency questions

We assessed our question set by examining response patterns within and across domains, their relationship with other relevant factors, and by comparing the patterns of responses within each domain to those identified in the qualitative phase of the research. We assessed whether there was an intuitive, consistent pattern of responses across these different data sources. For example, that women who report their husbands were the decision-makers in one domain were likely to report that their husbands were the main decision-makers in other domains.

Stage Two: Developing reproductive decision-making agency measures

We combined the four core questions into a three-category variable indicating low, medium or high agency within each domain. Decisions on which combinations of responses corresponded to these levels of agency were based on the theoretical framework and insights from the qualitative data, with a priority placed on capturing meaningful engagement in the decision process, the level of satisfaction with the process and the level of direct involvement in the decision. The criteria used to categorize these levels is found in **Table 1**.

[Insert Table 1 here]

Next, we combined the three domain-specific decision-making agency measures into a single measure by constructing an additive scale from the three domain-specific categorical variables. This resulted in a single continuous variable with values ranging from three to nine, with three indicating low agency on all three domains, and nine indicating high agency on each. We then created a three-category variable based on this continuous measure, classifying women as high, medium and low reproductive decision-making agency, with those scoring three or four categorized as having low agency, those scoring five, six or seven categorized as having a medium level of agency, and those scoring eight or nine categorized as having high agency.

Within each domain, we assessed the internal consistency of the combined agency variable using a similar process to the individual questions. Overall, the combined measure correlated closely with expected outcomes and determinants of agency and showed the expected relationships across domains (results not shown).

Stage Three: Understanding relationship between reproductive decision-making agency, demographic and relationship characteristics, and key reproductive outcomes

We first assessed the statistical relationship between the decision-making agency measures and our demographic and relationship characteristics using bivariate regressions. To assess the external validity of the combined measure of agency in decision-making, we looked at how our measures were correlated with two key outcomes expected to be related to the agency in reproductive decisions. The first outcome of interest was met contraceptive need, which we calculated in the same manner that is used in the DHS[2]. We chose this outcome because it is frequently used in analyses that address empowerment and women's agency, and because of its close conceptual link to empowerment. The second outcome we examined was current use of modern contraception, which is often assumed to be tied to women's empowerment and has a clear potential effect on reproductive behavior. We hypothesized that greater decision-making agency would lead to both higher met need and use of contraception.

Secondly, we explored how our measures were associated with three different measures of feelings of reproductive control: how hopeful respondents were about their ability to have control over how many children they have, and when; how hopeful respondents were about their ability to control fertility using a method of contraception if and when they want to; and if the respondent felt she had been able to achieve their desires about when to have children up to that point in their lives, including when to stop having children. For each of these three outcomes, we hypothesized that having decision-making agency would lead to a higher belief in reaching one's reproductive desires and intentions.

[2] DHS definition includes currently pregnant women's level of wantedness for their pregnancy (wanted the pregnancy at that time; wanted the pregnancy later; did not want the pregnancy) in addition to the disconnect between reproductive desires and use of contraception by non-pregnant women.

While we did examine the relationship between our measures and contraceptive use, we ultimately concentrated much of the analyses on these three outcomes and unmet needs because we feel these outcomes better reflect agency and empowerment, particularly in terms of the expression of voice and choice. We fit logistic regression models to see whether each of the decision-making agency domains—separately, and in combination—were associated with these reproductive health outcomes. All models adjusted for socioeconomic and demographic variables related to reproductive decision-making agency, including site, age, parity, education, wealth, religion, caste, women and husband's education, and contraceptive use, with standard errors corrected for clustering.

Stage Four: Comparing our measures of reproductive decision-making agency with more standard approaches

Following this analysis, we examined how the findings compared to those generated using the PMA2020-style questions. Because the PMA2020 survey does not ask questions about each of the domains we identified for reproductive empowerment, the wording and response categories used for the question on contraceptive use were adapted to each domain. In PMA2020 surveys, respondents are asked who has the final decision in each of the domain topics, using the following question formulation: "Would you say that deciding [*outcome of interest*] is mainly your decision, mainly your husband/partner's decision or did you both decide together?" with the response categories of mainly respondent, mainly husband, joint decision, or others. In our survey, we maintained the question and response structures of these questions but adapted the scenarios to match our domains. As there is no firm consensus in the literature about whether joint or sole decision-making represents greater agency, we rely on women's expressed preference in the qualitative work for joint decision-making and regarded this as the highest form of agency when categorizing these questions.

To create the composite PMA2020-style measure for each of the first three domains, we followed the same process as for our own reproductive decision-making agency measure, also resulting in a continuous variable scored between three and nine. We considered women who reported that their husband or other mainly made decisions on the PMA-style questions to have the lowest agency, with those reporting joint decision-making to be the highest and women making decisions alone representing a middle ground, following the approach most often used in the literature. From this variable, we created a categorical variable of low, medium and high composite PMA-style decision-making agency.

To compare our composite agency measure with the PMA2020-style questions for each domain, we examined the distribution of the responses on both sets of measures, followed by a bivariate assessment of the level of association between the two variables for each domain. Next, we compared the PMA2020-style composite variable with our measure, exploring the areas of concordance and discordance between the two variables.

Results

Our results are displayed according to the order of the analytic process described above for Phase 2. We highlight findings from the assessment of internal consistency of the measures, followed by the results

of how our measures link to key reproductive outcomes, and comparison of our measures to the PMA2020 measures.

Table 2 shows the distribution of responses for each of the four core items for each of three domains. Generally, levels of agency varied in the ways that we expected, based on the findings from our qualitative analyses. For each domain, most women reported that they shared their opinion about what they wanted (76.3% on decision about when to have children; 79.5% on whether to use contraception, and 81.0% on which method to use), and the majority of those who shared their opinion felt that it was valued (78.0% for Domain 1, 82.4% Domain 2 and 78.6% for Domain 3). Women were most likely to report that their husband alone made the final decision regarding when to have children (38.2%), with contraceptive decisions more likely to be joint or sole decisions. Lastly, roughly one-third of women wanted more influence in the decision in each domain (33.3%, 30.7%, and 29.9% respectively).

[**Insert Table 2 here**]

Internal consistency of our agency measures

We found high levels of internal consistency both within the four core questions and across the other questions in the set. For example, most women who said their mother-in-law influenced the final decision were also more likely to report that they wished they had more influence in the process. In addition, reporting across domains was also consistent, with response patterns distributed in an intuitive way. For example, women who reported that the husband was the final decision-maker on when to have children (Domain 1) were also more likely to report that husband was final decision-maker on other domains. This was also the case when comparing the measures against key socioeconomic and demographic characteristics of the respondents, such as educational attainment, age, parity, or employment status (results not shown).

Data from our question sets were also consistent with the qualitative findings. For example, qualitative findings indicated that proof of fertility, parity, and the sex of living children were the main determinants of who made decisions for the when to have children and whether to use family planning, while women mostly decide which method of family planning to use (Domain 3). In addition, the data from our question sets also suggested greater complexity and ambiguity about what represents true joint decision-making than would be suggested by solely looking at responses to the question on who made the final decision.

Relationship of reproductive decision-making agency to demographic characteristics

Table 3 presents the results of bivariate regressions testing the relationship between a range of socioeconomic and demographic variables and the agency measures for each domain. The general patterns of responses were consistent with *a priori* expectations. There was much higher agency among women in Kaski compared to women in Morang (72.3% of women in the former region were categorized in highest agency group and only 27.7% in the later, P<0.001). There was slightly higher agency among older women (27.5% in highest agency group for women aged 31-35, compared to 25.9% (low group) and 21.3% (middle group), p=0.040), among those with more education (p=0.020) and those with formal

employment (versus unemployed, p<0.001). Women who had no children, and women who had three or more children, were much more likely to be in the lowest agency group (p=0.006).

[**Insert Table 3 here**]

Relationship of reproductive decision-making agency to met need and feelings of reproductive control

Figure 1 presents the results of the multivariate logistic regressions modelling the determinants of met need for family planning and feelings of reproductive control. Women in the highest agency group were significantly more likely to have hope that they could achieve their reproductive desires or that they had actually achieved those to date, compared to women in the lowest agency group. Women in the highest group had over a two-fold higher odds of being hopeful they could achieve their fertility desires (aOR=2.88, CI 1.45-5.74, p=0.002) and had three times higher odds of being hopeful (aOR=3.01, CI 1.53-5.94, P=0.001) compared to women with low agency. Lastly, women in the highest agency group had nearly five times the odds of feeling like they had achieved their fertility desires to date (aOR=4.98, CI 2.52-9.83, P<0.001). While not statistically significant, the direction of the effect of the agency variable on met need was in the expected direction, with those in higher agency groups having higher odds of met need.

[Insert Figure 1 here]

Comparability with other measures of reproductive decision-making

Table 4 presents the levels of concordance between the PMA2020-style composite variable with our composite measure of decision-making agency. While there are clear areas of concordance between the two measures, as expected, there are several areas of discordance. For example, in Domain 1, only 72.1% (n=315) of women reporting mainly joint decision-making on this topic based on the PMA2020-style questions were categorized as having high agency in this domain using our measure. Moreover, one in ten women (10.3%) who reported making a decision mainly themselves, often assumed to imply high agency, were classified as having low agency using our measure – overall, more than a quarter of women who reported either joint decision making (27.9%, N=122) or making the decision about when to have children themselves (25.6%, N=30) were classified as having low or middle agency using our measure. Similar patterns were also evident in other domains, suggesting that the two measures do in fact differ in important ways.

[Insert Table 4 here]

Across all three domains, a major area of discordance between the two measures was among women who in the PMA2020-style questions reported that mainly the husband made decisions, usually considered to be the lowest level of agency in decision-making. With the exception of Domain 3, roughly a third of these women were categorized in the highest agency group for our measure (Domain 1: n=165 (38.7%), Domain 2: n=117 (35.2%), Domain 3: n=94, 27.0%). In Domain 2, whether to use contraception, there were 59 women (13.5%) who reported joint final decision-making using the PMA2020-based measure but who we categorized as having low agency. In Domains 1 and 2, 47.4% (n=87) and 71.3%

(n=201) of women who reported that mainly the respondent herself is the decision-maker using the PMA202-based measure were categorized in the middle agency category in our categorization. Finally, for Domain 3, 58.6% (n=204) of women reporting that the husband mainly makes decisions related to which method of contraception using the PMA2020-based measure were in the middle agency group using our measure.

Across all three domains, roughly three-fourths of women who reported they alone were mainly the decision-makers were categorized in the high agency group: for Domain 1, 74.4% (n=87), 71.3% (n=201) for Domain 2, and 75.1% (n=323) for Domain 3.

DISCUSSION

In our sample of Nepalese women, we found relatively high levels of agency across our three primary reproductive domains of inquiry: female respondents generally felt like they shared their opinion, that their opinions were valued, and that they were ultimately satisfied with the process, in many cases regardless of who made the final decision in each domain. It is possible that these high levels of agency were due to our sampling approach. However, in contexts like Nepal where women are expected to accommodate a husband's and/or family's expectations, especially around childbearing (Basnyat, 2012), the high agency may reflect her satisfaction at fulfilling that expectation, even if it was not the expectation she personally desired.

Internal consistency and validity of our reproductive decision-making agency variables

Our reproductive decision-making measures were found to be internally consistent within and across domains, and with key demographic and reproductive health measures. In areas where we expected women to exercise higher levels of decision-making in the reproductive sphere—such as at higher levels of education, employment, in geographic areas with higher socio-economic status, and in the middle of the parity spectrum—we saw higher levels of agency.

Furthermore, the revised measures proved to be strongly related with several reproductive outcomes, particularly those we felt were theoretically closest agency and empowerment, even when controlling for a range of factors related to both agency and the outcomes themselves. The close relationship between agency and feelings of reproductive control suggest that the measure is effective in capturing key components of agency that we argue reflect the essence of empowerment.

Interestingly, the measures were less predictive of met need, which is puzzling and suggests a need for further validation and testing in different contexts and populations. The lack of association may be due to a range of reasons, including the relatively low levels of unmet need and high levels of contraceptive use in our sample, or the salience of factors other than agency that shape contraceptive use in this context and for this population.

Comparison with the PMA2020-style questions

Our main objective of the comparison analyses with the PMA2020-style questions was to understand the advantages our measures have over those standardly administered on quantitative surveys in the

field. Concordance between the two approaches was strongest when discussing when to have children and whether to use family planning, where both measures generally categorized those making joint decisions as having high agency. In contrast, women were more likely to report being the sole decision-maker (and be classified as having high agency using our approach) when selecting which contraceptive method to use.

However, there were areas of disagreement between our decision-making questions and the PMA2020-style questions that merit further discussion. First, across all three domains, a sizeable proportion of women who reported joint decision-making in the PMA2020-style questions were categorized as having low agency in our measure. This discordance was due primarily to two factors. First, many of these women reported in our set of questions that the husband made the decision even when reporting a joint process for the PMA2020-style questions. This may be due to inconsistent reporting among respondents or differences in how women respond to single questions around a decision versus a broader set that allow for a more nuanced response. Secondly, many of these women reported wishing they had more influence in the process, suggesting a relative lack of empowerment that is not captured in the PMA2020-syle questions. There are several potential explanations for this discrepancy. This may be due to the different framing of the questions (with the PMA2020-style questions asking about decision-making in general while our measures focused on the last time the issue was discussed) may lead respondents to conceptualize the decision-making process in different ways. Both approaches have significant potential limitations – for instance, focusing on specific points in the past, as our approach does, likely introduces elements of recall bias and post-hoc rationalization in reporting that may bias the results[3]. On the other hand, the PMA2020 approach relies on a more hypothetical line of questioning that is less anchored in a specific event and may therefore lead to over-reporting of negative or positive experiences, or women reporting the ideal rather than the more typical experience.

Our analyses suggest that our approach has some significant advantages over other approaches to exploring reproductive decision-making agency. Our approach allows for the role of voice and power to be explicitly included in the measures of agency in decision-making, rather than having to assume what choice looks like for agency, as is often required with other measures. This allows for greater nuance in measurement and for variation across different reproductive domains. It also makes the approach less reliant on researchers' decisions about how to prioritize joint or sole-decision-making in terms of agency. In our measure, for example, women classified as having high agency under our classification include both those who made the decision alone and jointly, depending on their level of engagement in and satisfaction with the decision-making process. In addition, the strong theoretical bases for the domains and measures suggests that they should have strong potential for broad applicability across other cultures and contexts, even to those that have vastly different power structures and relationship dynamics (e.g. informal, polygamous, and/or age disparate unions). Furthermore, this framework should be equally applicable to women and men, including those at different life course stages, though the importance of a domain may vary depending on the population to which the measures are being

[3] We conducted several tests to assess the sensitivity of the results to the length of the recall period (i.e. time since the last discussion about the topic) and found no systematic evidence that this influenced the findings.

applied. Finally**,** our measures are also relatively parsimonious, which is an important consideration in large scale surveys such as the DHS or PMA2020.

However, there are some considerations still to be made related to our measures. First, these findings suggest further research is needed, both to establish the reliability of our measures in other contexts and to assess how these compare to existing measures. It is clear however, that efforts to more comprehensively assess feelings of satisfaction with the decision-making process and incorporate those into measures of decision-making such as those used by PMA2020 should be explored. This will ensure that these measures more closely match the theoretical foundations for empowerment and agency and improve the ability of these measures to effectively predict feelings of reproductive control. It may also prove useful in disentangling the ways in which sole and joint decision-making are related to agency, thus addressing an important debate in the field. Additional research with couples and men may also shed light into this dynamic.

To be transferable to other contexts, formative reseaWrch should inform decisions around the wording of specific questions, which may need to be modified to reflect cultural nuances. In addition, these questions are reliant on a couple having discussed an issue; in contexts where verbal communication is minimal or for some issues for which there is less verbal discussion (e.g. having sexual intercourse), these questions may not work well. Relatedly, these measures only capture one singular component of empowerment—decision-making agency—and should be further assessed and understood as related to other elements of empowerment, such as critical consciousness, and other external factors, such as cultural and gender norms, whenever possible.

Finally, the findings from this study provide further support for the need to consider a broader range of reproductive domains in measurement and a reconsideration of the types of outcomes that we can expect to be strongly related to agency. Researchers must consider the ways in which agency varies depending on the type of reproductive decision being made and the suitability of focusing solely on outcomes such as use of contraception. We argue that focusing on the ability of individuals to exert control over their reproductive lives are more appropriate outcomes and should be included in more surveys.

CONCLUSION

These analyses suggest that our measures of agency in reproductive decision-making may provide additional information that current measures do not, allowing for a more accurate measurement of agency that in turn may help address some of the challenges the field has faced understanding how agency in reproductive decisions influences behavioral outcomes. These analyses suggest that these measures may be particularly effective in predicting the ability of women to exert control over their reproductive lives and is strongly related with feelings of reproductive control. However, further replication in different social contexts is required to fully understand how effective these measures are more broadly and what value they add, if any, to existing approaches.

References

Basnyat I & Dutta M.J. (2012) *Reframing Motherhood Through the Culture-Centered Approach: Articulations of Agency Among Young Nepalese Women*. Health Communications, 27, 3: 273-283

Edmeades, J.C., Mejia, J. Parsons and M Sebany. (Forthcoming, 2018) *Reproductive Empowerment: A Conceptual Framework and Measurement Review.* Washington D.C., International Center for Research on Women.

James-Hawkins L, Peters C, VanderEnd K, Bardin L, & Yount KM. (2016). *Women's agency and its relationship to current contraceptive use in lower-and middle-income countries: A systematic review of the literature.* Global Public Health, 1-16.

Kabeer N. (2001) *Reflections on the Measurement of Women's Empowerment.* In: Discussing Women's Empowerment: Theory and Practice. Stockholm: SIDA: Swedish International Development Cooperation Agency.

Malhotra A and Schuler SR. (2005). *Women's empowerment as a variable in international development. In* Measuring empowerment: Cross-disciplinary perspectives, 71-88. Washington DC: World Bank.

Ministry of Health, Nepal; New ERA; and ICF. (2017). Nepal Demographic and Health Survey 2016. Kathmandu, Nepal: Ministry of Health, Nepal.

Pratley P. (2016). *Associations between quantitative measures of women's empowerment and access to care and health status for mothers and their children: A systematic review of evidence from the developing world.* Social Science & Medicine, 169: 119-131.

Upadhyay UD, and Hindin MJ. (2005). *Do higher status and more autonomous women have longer birth intervals?: Results from Cebu, Philippines*. Social Science & Medicine, 60: 11: 2641-2655.

Upadhyay UD, Dworkin SL, Weitz TA, and Foster DG (2014). *Development and Validation of a Reproductive Autonomy Scale.* Studies in Family Planning 45: 19–41.

van Eerdewijk A, Wong F, Vaast C, Newton J, Tyszler M and Pennington A. (2017). *White Paper: A Conceptual Model of Women and Girls' Empowerment*. Amsterdam: Royal Tropical Institute (KIT).

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Annex 1: Reproductive decision-making questions (applied to three domains: when to have children, whether to use contraception, and which method of contraception to use)

Question	Response options
1. When discussing *[insert topic from base question],* I want to know if you shared your opinion about what you wanted with your husband. Would you say that you *(read aloud options):*	Shared your opinion Wanted to share your opinion but did not feel comfortable so did not share Wanted to share your opinion but did not think opinion would be valued so did not share You had the same opinion as husband You did not share your opinion because the issue did not matter to you Don't recall/don't know Refused
2. Do you think your opinion was valued?	Was valued Was not valued Don't recall/don't know Refused
3. Who had the final say on *[insert topic from base question]*?	Myself Husband Myself and husband My mother in law Other (specify_____ No decision made Refused
4. Would you prefer to have had more influence in the decision about *[insert topic from base question]* less influence, or were you happy with your level of influence?	More influence Less influence Satisfied Unsure Refused

Table 1: Criteria for categorization of reproductive decision-making agency based on four core decision-making questions

Category	Criteria
High Agency	Anyone who reported that she (a) shared her opinion and felt her opinion was valued, and (b) was the final decision-maker, or it was joint; and (c) was satisfied (or wanted less influence) with final decision; OR anyone who reported that she (a) did not share opinion because she did not care about the issue or agreed already with husband on the outcome, (b) was the final decision-maker, or it was joint; and (c) was satisfied (or wanted less influence) with final decision.
Low Agency	Anyone who reported that she (a) did not share opinion because she did not feel comfortable or did not think it would be valued and/or shared but felt opinion was not valued (or was unsure if it was valued), (b) was not involved in the final decision (i.e. it was husband or others), and (c) wanted more influence in the final decision.
Middle Agency	Everyone not included in high or low agency groups

Table 2: Four core decision-making agency questions for three reproductive health domains, among all respondents who had discussed that topic with their partner, Nepal, 2017

	When to have children (Domain 1) n = 991		Whether to use family planning (Domain 2) n = 966		Which family planning method to use (Domain 3) n = 958	
	No.	%	No.	%	No.	%
Did you share your opinion?						
Shared	756	76.3%	768	79.5%	776	81.0%
Didn't share: uncomfortable or did not think would be valued	86	8.7%	72	7.5%	77	8.0%
Had same opinion as husband (or didn't care about issue)	149	15.0%	126	13.0%	105	11.0%
Total	*991*	*100.0%*	*966*	*100.0%*	*958*	*100.0%*
IF THE RESPONDENT SHARED THEIR OPINION:						
Did you think your opinion was valued?						
Not valued or unsure	166	22.0%	135	17.6%	166	21.4%
Valued	590	78.0%	633	82.4%	610	78.6%
Total	*756*	*100.0%*	*768*	*100.0%*	*776*	*100.0%*
Who had the final say?						
Husband (or other)	374	38.2%	336	35.0%	339	35.8%
Respondent	258	26.3%	348	36.3%	398	42.1%
Joint	348	35.5%	276	28.7%	209	22.1%
Total	*980*	*100.0%*	*960*	*100.0%*	*946*	*100.0%*
Did you want more influence in decision?						
No, satisfied (or wanted less)	654	66.7%	665	69.3%	663	70.1%
Yes, wanted more	326	33.3%	295	30.7%	283	29.9%
Total	*980*	*100.0%*	*960*	*100.0%*	*946*	*100.0%*

Note: response option in parentheses had fewer than 12 respondents within a single domain and were therefore collapsed

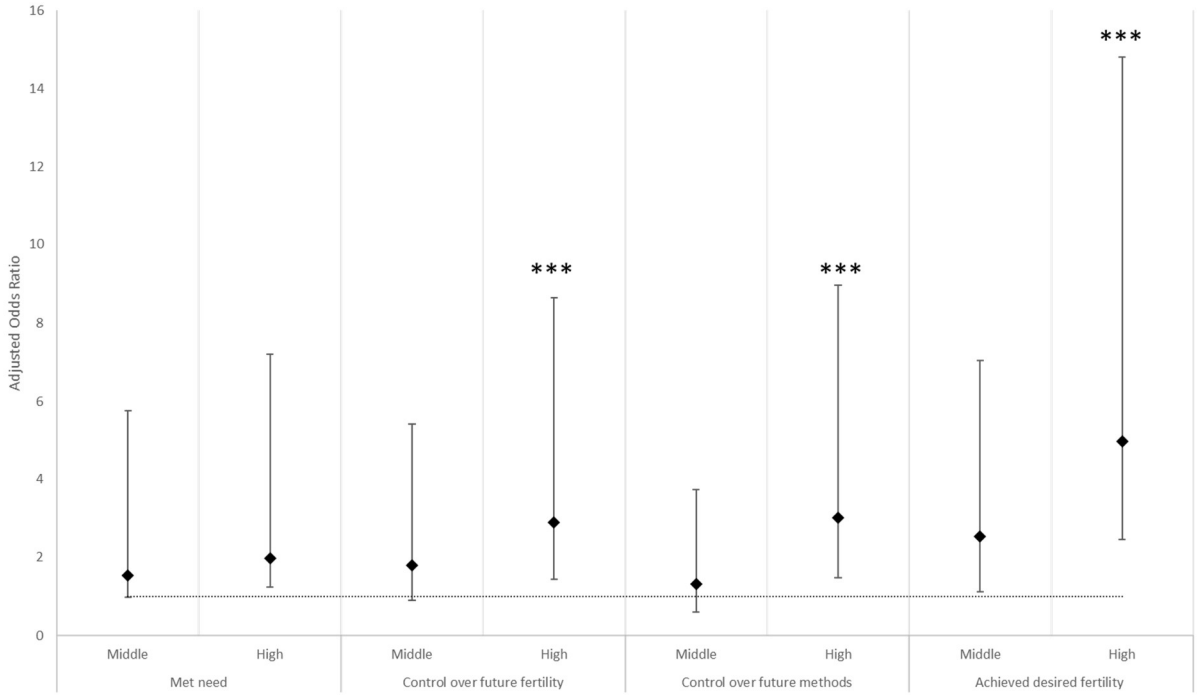
Table 3: Level of reproductive decision-making agency by demographic characteristics, Nepal, 2017

	Low agency n = 85		Middle agency n = 362		High agency n = 488		Total n = 935	
	No.	%	No.	%	No.	%	No.	%
Site* **								
Morang	72	84.7%	251	69.3%	135	27.7%	458	49.0%
Kaski	13	15.3%	111	30.7%	353	72.3%	477	51.0%
Age**								
20-25	41	48.2%	174	48.1%	188	38.5%	403	43.1%
26-30	22	25.9%	111	30.7%	166	34.0%	299	32.0%
31-35	22	25.9%	77	21.3%	134	27.5%	233	24.9%
Education**								
No education/informal	14	16.5%	55	15.2%	43	8.8%	112	12.0%
Primary only	15	17.6%	63	17.4%	73	15.0%	151	16.1%
Lower secondary	36	42.4%	166	45.9%	224	45.9%	426	45.6%
Higher secondary	16	18.8%	55	15.2%	96	19.7%	167	17.9%
Bachelor's degree or above	4	4.7%	23	6.4%	52	10.7%	79	8.4%
Wealth tertile* **								
Poorest	30	35.3%	146	40.3%	133	27.3%	309	33.0%
Middle	38	44.7%	143	39.5%	213	43.6%	394	42.1%
Richest	17	20.0%	73	20.2%	142	29.1%	232	24.8%
Employment* **								
Not employed	70	82.4%	262	72.4%	293	60.0%	625	66.8%
Employed	15	17.6%	100	27.6%	195	40.0%	310	33.2%
Parity* **								
No children	17	20.0%	38	10.5%	44	9.0%	99	10.6%
One child	25	29.4%	140	38.7%	182	37.3%	347	37.1%
Two children	25	29.4%	125	34.5%	200	41.0%	350	37.4%
Three or more children	18	21.2%	59	16.3%	62	12.7%	139	14.9%
Has had a son								
No son or no children	30	35.3%	123	34.0%	145	29.7%	298	31.9%
Has a son	55	64.7%	239	66.0%	343	70.3%	637	68.1%
Religion**								
Not Hindu/other	4	4.7%	19	5.2%	47	9.6%	70	7.5%
Hindu	81	95.3%	343	94.8%	441	90.4%	865	92.5%

Caste* **								
Dalit	9	10.6%	44	12.2%	94	19.3%	147	15.7%
Janajati-hill	14	16.5%	70	19.3%	152	31.1%	236	25.2%
Janajati-terai	24	28.2%	91	25.1%	44	9.0%	159	17.0%
Madhesi/Muslim	14	16.5%	56	15.5%	22	4.5%	92	9.8%
Brahaman/chettri	24	28.2%	101	27.9%	176	36.1%	301	32.2%
Husband's education **								
No education/informal	3	3.5%	36	9.9%	17	3.5%	56	6.0%
Primary only	12	14.1%	51	14.1%	57	11.7%	120	12.8%
Lower secondary	40	47.1%	162	44.8%	244	50.0%	446	47.7%
Higher secondary	12	14.1%	63	17.4%	95	19.5%	170	18.2%
Bachelor's or above	18	21.2%	50	13.8%	75	15.4%	143	15.3%

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Figure 1: Adjusted odds ratios and 95% confidence intervals of four key outcomes by level of reproductive health decision-making agency, Nepal 2017 (reference category: low agency)



* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Table 4: Comparison of reproductive decision-making agency with PMA2020-style question on main decision-maker for three domains of reproductive health, Nepal, 2017

	Measure based on PMA2020 style: Who makes decision?							
	Mainly husband or other		Mainly respondent		Joint		Total	
Decision-making agency measure	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Domain 1: Agency around when to have children								
Low agency	164	38.5%	12	10.3%	59	13.5%	235	24.0%
Middle agency	97	22.8%	18	15.4%	63	14.4%	178	18.2%
High agency	165	38.7%	87	74.4%	315	72.1%	567	57.9%
Total	426	100.0%	117	100.0%	437	100.0%	980	100.0%
Domain 2: Agency around whether to use contraception								
Low agency	123	37.0%	34	12.1%	30	8.7%	187	19.5%
Middle agency	92	27.7%	47	16.7%	53	15.3%	192	20.0%
High agency	117	35.2%	201	71.3%	263	76.0%	581	60.5%
Total	332	100.0%	282	100.0%	346	100.0%	960	100.0%
Domain 3: Agency around which method of contraception								
Low agency	50	14.4%	15	3.5%	5	3.0%	70	7.4%
Middle agency	204	58.6%	92	21.4%	26	15.5%	322	34.0%
High agency	94	27.0%	323	75.1%	137	81.5%	554	58.6%
Total	348	100.0%	430	100.0%	168	100.0%	946	100.0%