

# **Methodologies for Measuring Pregnancy Intention and Unintended Pregnancy and Birth: Summary Report on an IUSSP Scientific Workshop**

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## Contents

|  |           |
|--|-----------|
| Acknowledgments.....   | 3         |
| Acronyms and Abbreviations .....   | 4         |
| <b>Introduction .....</b>  | <b>5</b>  |
| <b>Overviews of Eight Approaches to Measuring Fertility Preferences</b>  |           |
| 1. Demographic Measures of Fertility Preferences from<br>Cross-Sectional Surveys (DHS, MICS, PMA)—John Casterline .....              | 7         |
| 2. Pregnancy Wantedness, Strength of Fertility Preferences and<br>Retrospective versus Prospective Measurement—Kazuyo Machiyama..... | 13        |
| 3. Approach to Measuring Pregnancy Intentions and Motivational<br>Strength—Aparna Jain.....  | 17        |
| 4. The Desire to Avoid Pregnancy (DAP) Scale for Pregnancy<br>Preferences—Corinne Rocca .....  | 20        |
| 5. The London Measure of Unplanned Pregnancy (LMUP)—presented<br>by Corinne Rocca, reviewed by Elizabeth Barrett .....               | 25        |
| 6. Measuring Fertility Desires, Predictability and Flexibility—Sara Yeatman .....  | 31        |
| 7. Measurement of Unintended Pregnancy and Fertility Intention:<br>Data and Approaches from European Surveys—Maria Rita Testa .....  | 37        |
| 8. Population Measures of Retrospective Pregnancy Orientations<br>in the US: National and State-Level Data—Kathryn Kost .....        | 42        |
| <b>Conclusions.....</b>  | <b>49</b> |
| Appendix A: Workshop Agenda.....   | 51        |
| Appendix B: Workshop Participants .....  | 54        |

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Subsequent to the workshop described here, an IUSSP seminar titled “Unintended Pregnancy and Key Outcomes: Improvements in Measurement and New Evidence” was held in Madeira, Portugal, in July 2022.

We thank all workshop participants for their contributions, whether as presenters, discussants, chairs or in other roles. The workshop agenda and list of participants are attached in Appendices A and B.

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## Acronyms and Abbreviations

|        |  |
|--------|--|
| ADAPT  | Attitudes and Decision-making After Pregnancy              |
| ANSIRH | Advancing New Standards in Reproductive Health             |
| APS    | Abortion Patient Survey, USA                               |
| CDC    | Centers for Disease Control and Prevention, USA            |
| CPR    | contraceptive prevalence rate                              |
| DAP    | Desire to Avoid Pregnancy                                  |
| DHS    | Demographic and Health Surveys                             |
| GGS    | Generation Gender Surveys                                  |
| HILDA  | Household Income and Labour Dynamics in Australia          |
| IUD    | intrauterine device  |
| IUSSP  | International Union for the Scientific Study of Population |
| LMICs  | low- and middle-income countries                           |
| LMUP   | London Measure of Unplanned Pregnancy                      |
| MICS   | Multiple Indicator Cluster Surveys                         |
| Natsal | National Survey of Sexual Attitudes and Lifestyles, UK     |
| NCHS   | National Center for Health Statistics, USA                 |
| NSFG   | National Survey of Family Growth, USA                      |
| p-DAC  | postpregnancy Desire to Avoid Childbearing                 |
| PMA    | Performance Monitoring for Action                          |
| TLT    | Tsogolo la Thanzi, Malawi                                  |
| UCSF   | University of California, San Francisco                    |

## **Introduction**

In May 2021, the International Union for the Scientific Study of Population's Panel on Abortion Research organized a virtual workshop on methodologies for measuring pregnancy intention and unintended pregnancy and birth. The goal was to provide a forum for researchers to discuss existing and new methodologies for measuring pregnancy intention, focused on unintended pregnancy, with the objective of identifying ways to improve the measurement of these important constructs. This report provides an overview of methodologies for measuring pregnancy intention based on presentations, discussant remarks and open discussion at the May 2021 workshop, as well as additional information from publications on these methodologies. The key audiences for this report are researchers, those who manage major survey series—such as the Demographic and Health Surveys (DHS), the Multiple Indicator Cluster Surveys (MICS) and Performance Monitoring for Action (PMA)—and other stakeholders, including donors who support related studies and programmatic interventions and those who are considering including pregnancy intention in their research.

### **Rationale and Objectives**

Fertility has continued to decline in most parts of the world, but the incidence of unintended pregnancy has remained high and is rising in some subregions. An important underlying reason for this situation is that increases in contraceptive use have not matched increases in the desire for small families and for controlling the timing of births. At the same time, the concept of unintended pregnancy continues to be assessed and reexamined, with the goal of ensuring that it accurately reflects individual-level preferences, subgroup differences and population-level variation. Innovative studies are needed to better understand and more accurately measure individuals' and couples' fertility preferences, intentions, attitudes and feelings, given their multiple dimensions and fluidity and the impact of changes in individuals' circumstances and in societal and environmental factors.

The objective of the workshop was to provide a forum for researchers whose expertise and focus is on methodological issues to critically review and assess existing approaches for measuring unintended pregnancy, as well as new approaches that have been developed. The goal of this body of research and of the workshop was to assemble evidence that would help improve the provision of sexual and reproductive health services and contribute to women's ability to achieve their fertility preferences.

To examine methodological advances worldwide and provide an opportunity for cross-fertilization of ideas and cross-learning, participants included researchers whose work has focused only on high-income countries, those who have only studied low- and middle-income countries (LMICs), and those whose work is global in scope. The workshop proved to be a productive mechanism for comparing methodologies and for better understanding the pros and cons of the various approaches and methodologies. This report is intended to inform and advance future research on the measurement of intention status of pregnancies.

### **Focus of the Workshop**

The methodologies presented at the workshop covered a range of dimensions of pregnancy intention status and fertility preferences and included theoretical or conceptual frameworks, study design, questions used and analytical approaches. Dimensions that the methods covered were: timing; desire/wantedness; attitude toward becoming pregnant; strength of motivation

about intention and preference; retrospective versus prospective approaches to measuring pregnancy intention and fertility preferences; assessment of the quality and representativeness of data collected; and comparison of data collection and analytic approaches across methods.

### **Guide to the Report**

Each section of the report focuses on one of the workshop's presentations. The first covers commonly used questions and indicators that have been applied in demographic and fertility surveys conducted in LMICs since the 1970s, as well as innovative approaches to analyzing these data to produce new measures. The next six sections each cover a methodology that seeks to advance measurement beyond the standard indicators. Some of these measures have been applied only in LMICs, some only in high-income countries, and some in both. The final section focuses on a range of approaches used in the United States that have evolved over time.

The eight sections are:

- Standard demographic measures of fertility preferences from cross-sectional surveys in LMICs (DHS, MICS, PMA)
- Pregnancy wantedness, strength of fertility preferences, and retrospective versus prospective measurement
- Approach to measuring pregnancy intentions and motivational strength
- The Desire to Avoid Pregnancy (DAP) measure
- The London Measure of Unplanned Pregnancy
- Measurement of fertility desires, predictability and flexibility
- Measurement of unintended pregnancy and fertility intention: data and approaches from European surveys
- Population measures of retrospective pregnancy orientations in the United States: national and state-level data

Each section follows the following outline, to the extent possible:

1. **Objectives:** What are the specific objectives of the method?
2. **Questions/Methods:** the questions used and, as needed, methods
3. **Context/Setting**
4. **Findings, Direction and Magnitude**
5. **Advantages and Disadvantages**
6. **Validation/Comparison with Other Methods**
7. **Next Steps:** based on ideas for advancing the methodology offered by the author, by the discussant or during open discussion
8. **Citations:** key published materials related to the method

For the preparation of this report, we used information from several sources for each methodology: authors' presentations at the workshop; articles or other written materials; notes from the workshop discussions (which captured the open discussion and discussant remarks); and audio recordings of the sessions.

## Overviews of Eight Approaches to Measuring Fertility Preferences

### 1. Demographic Measures of Fertility Preferences from Cross-Sectional Surveys (DHS, MICS, PMA)—John Casterline, Ohio State University

#### 1.1. Objectives

For both national and global monitoring purposes, cross-sectional national demographic surveys are the main source of estimates of fertility desires, unintended pregnancies, unintended births, and unmet need and demand satisfied for family planning.

#### 1.2. Questions/Methods

The Demographic and Health Surveys (DHS) include three sets of questions:

- *Ideal number of children*: This question ascertains the respondent's ideal number of children in her lifetime and provides an indicator of desired fertility that is comparable across settings.
  - *"If you could go back to the time when you did not have any children and could choose exactly the number of children to have in your whole life, how many would that be?"*
- *Retrospectively reported wantedness of births* (hereinafter, "retrospective wantedness"): Three questions are used to classify each of the respondent's recent births as wanted, mistimed (wanted two or more years later) or unwanted.
  - *"When you got pregnant with (NAME), did you want to get pregnant at that time?"* (answers: yes; no)
  - (If "no") *"Did you want to have a baby later on, or did you not want to have any (more) children?"* (answers: later; no more/none)
  - (If "later") *"How much longer did you want to wait?"* (answers: months; years; don't know)
- *Prospective preference*: These two questions are intended to measure future fertility preferences.
  - *"Now I have some questions about the future. Would you like to have another child, or would you prefer not to have any more children?"* (answers: yes; no; can't get pregnant; undecided/don't know)
  - (If "yes") *"How long would you like to wait from now before the birth of (a/another) child?"*

The exact wording of the questions above can vary across surveys, and selected variations are provided in subsections 1.3 and 1.8.

#### 1.3. Context/Setting

These three approaches to measuring fertility preferences are widely used in many large cross-sectional national demographic surveys:

- *Ideal number of children* is included in many national surveys in high-income countries and in LMICs, including in the DHS and the Eurobarometer surveys. The question was asked among men as well as women in some DHS instruments and in some other surveys.

- *Retrospective wantedness* is included with reference periods varying across surveys: The DHS asks about all births in the last five years, the MICS about the last birth in the last two years, and the PMA in cross-sectional and panel surveys about the last birth.
  - The DHS has varied over the years in how this information was collected. In Phase 1 (1984–1989), a single question was used: “*At the time you became pregnant with (name), did you want to become pregnant then, did you want to wait until later, or did you not want to have any (more) children at all?*” Phases 2–5 (1988–2008) used the above question and added a second question on how much longer the respondent wanted to wait. Subsequent phases (Phases 6–8, from 2009 to the present) have used three separate questions: “*When you got pregnant with (NAME), did you want to get pregnant at that time?*”; “*Did you want to have a baby later on, or did you not want any (more) children?*”; and “*How much longer did you want to wait?*”
  - The MICS has changed over the years, and in MICS-4 and MICS-5, three questions were asked concerning the last birth in the last two years: “*When you got pregnant with (name), did you want to get pregnant at that time?*”; “*Did you want to have a baby later on, or did you not want any (more) children?*”; and “*How much longer did you want to wait?*” However, MICS-6 (2017–2023) omits the question on how long the woman wanted to wait and reverts to asking only the first two questions.
  - Over the years, the PMA has included only one question: “*Now I would like to ask a question about your last birth. At the time you became pregnant, did you want to become pregnant then, did you want to wait until later, or did you not want to have any/any more children at all?*”
- *Prospective preference* is applied in many national surveys in high-income countries and LMICs, including the DHS, MICS, PMA cross-sectional and panel surveys, Generation Gender Surveys (GGS) and Eurobarometer surveys. The questions are asked among men as well as women in the GGS and Eurobarometer surveys and in those DHS surveys that included men.

#### **1.4. Findings, Direction and Magnitude**

Women’s mean ideal number of children varies considerably across populations, ranging from about two to about nine. The mean ideal often declines over the course of the demographic transition. Generally, the observed total fertility rate exceeds the reported ideal number of children in high-fertility settings, while the opposite pattern is often found in low-fertility countries, where the mean ideal family size is rarely less than two children.

In LMICs, the proportion of births that are unintended (unwanted or mistimed) ranges from approximately 10% to 66%. This percentage often increases over time, as ideal and desired family size decrease over time during the demographic transition.

The proportion of women who want to have a child/another child in the future tends to decrease during the demographic transition, and the proportion of women who want no more children (i.e., who want to stop childbearing) increases.

#### **1.5. Advantages and Disadvantages**

The question on ideal number of children is widely used and provides a measure of the *average* or *typical* preferred family size in a society. However, responses are influenced by social norms and by rationalization of existing children; because of the latter, children whose births may not have been wanted prior to conception are included in the ideal number,



producing an upward bias. The question is hypothetical and abstract, presenting respondents with a cognitively difficult task. Some people may not have a fixed target and instead may be more concerned about the timing of childbearing (e.g., after marriage, spacing between births) than about the number of children. In addition, some individuals may not think it is their prerogative to determine or indicate the number of children they want to have, although the proportion with this view is likely decreasing. Finally, childbearing ideals may be gender-specific totals, not an overall total.

While the retrospective approach classifies the intendedness of each child, it is vulnerable to ex post facto rationalization, because respondents are likely to be reluctant to report their existing children as unwanted or mistimed, leading to a downward bias in the estimate of unintended births (see Section 2). Although rationalization is often considered the reason for the seemingly inconsistent responses before and after the conception/birth, women and men may also truly change their feelings after the birth of a child, from an abstract preference against having another child toward a fondness for the child in their life (Cleland et al. 2020).

The prospective approach is not influenced by a reluctance to report existing children as unwanted and can ascertain mistimed births in the future. This question has a fairly high level of predictive power of whether a woman will have a child in the future, according to the limited numbers of longitudinal studies that have been conducted (Cleland et al. 2020). However, the measure assumes that preferences are stable over time, from the interview to the conception of a future pregnancy. Some individuals may provide seemingly inconsistent responses—e.g., saying that they have reached their ideal number of children in one section of the questionnaire, but reporting wanting to have another child in the future (Casterline & Han 2017).

### **1.6. Comparison with Other Methods**

In an effort to reduce rationalization bias, Casterline and Thomas (2022) developed an aggregate measure of ideal number of children using synthetic cohort data to estimate the desired number of children. The measure is derived from parity-specific prospective preferences (the percentage who want no more). The average desired number of children estimated by this measure is approximately 0.6–0.9 lower than the average ideal number of children in Sub-Saharan Africa, Latin America and Southeast Asia.

For retrospective wantedness, comparisons can be made at two levels—for individual births, and for a population. Here, we discuss estimates of unwanted and unintended (unwanted and mistimed) fertility at the population level; in Section 2 of this report, estimates of intendedness of each recent birth are compared at the time of conception and after delivery.

Proportions of recent births that are unwanted can be estimated using three approaches:

- Using direct responses to the question on wantedness of recent births (unwanted versus mistimed or wanted).
- Comparing the ideal number of children and the number of living children. A birth is defined as wanted if the number of living children at the time of conception of that birth is less than the respondent's ideal number of children (Lightbourne 1985).
- Combining data from the prospective approach, which is usually considered more valid and reliable, with data from the retrospective approach (prospective aggregate, Casterline & El-Zeini 2007).

A study compared these three measures for 317 national surveys conducted in 78 countries from 1981 to 2020. The median estimate from the first measure was approximately one-third lower than the second method (averages of 12.0% and 16.1% births unwanted, respectively), and the median estimate from the third measure was more than double, at 24.8% (Casterline 2022). When the comparison was confined to the most recent survey since 2005 in each country (69 surveys in 69 countries), the median estimate for the first measure was approximately 80% lower than the second measure (7.7% and 13.8% births unwanted, respectively), and the median estimate from the third measure was 19.5%, 2.5 times higher than the first estimate.

Similarly, two methods can be used to estimate the proportions of recent births that were unintended:

- Directly, using the proportion of births that were reported as unwanted or mistimed
- Indirectly, using the proportion of unwanted births from the “prospective aggregate” approach (Casterline & El-Zeini 2007), combined with the ratio of timed and mistimed births among those who want another child (Casterline 2021)

Among all surveys in the past four decades, the median proportion of unintended births was 8.2 percentage points lower with the first method than with the second (32.3% and 40.5%, respectively); this amounts to about a one-quarter lower percentage of births that were unintended. The differential for the most recent survey since 2005 was essentially the same, with the second method yielding an estimate that was 8.6 percentage points higher.

Regarding prospective measurement, the predictive power of the desire to have another child is considered fairly high, while nonnegligible proportions of women have unwanted children, based on findings from longitudinal studies (Cleland et al. 2020). A small number of longitudinal studies that assessed stability over time in the future desire for children have shown that individuals may change their preferences, demonstrating flexibility to adapt to their changing circumstances (see Section 6).

### **1.7. Comments/Recommended Next Steps**

Researchers continue to work on improving estimates of unwanted and unintended fertility, with the overall goal of increasing the accuracy of the estimates. In addition, the different indicators of family size preferences and unintended and unwanted fertility and wantedness have value and utility for different audiences and in different contexts.

### **1.8. Selected Additional Variations in Question Wording**

#### ***Ideal number of children***

- *“If you had the choice, how many living children would you like to have in your lifetime?”—Malawi Diffusion and Ideational Change Project (Malawi)*
- *“Generally speaking, what do you think is the ideal number of children for a family?”; “And for you personally, what would be the ideal number of children you would like to have or would have liked to have had?”—Eurobarometer surveys*
- *“The number of children people expect and want are not always the same. If you could have just the number of children you want, what number of children would you want to have when your family is completed?”—Relationship Dynamics and Social Life (USA)*
- *“The number of children people expect are not always the same as the number they would most like to have. Knowing how other things are for you and your husband, if you could*

*choose exactly the number of children to have in your whole life, how many would you choose now?”—National Survey of Family Growth (NSFG) (Cycle 2) (USA)*

- *“People often do not have exactly the same number of children they want to have. If you could have exactly the number of children you want, how many children would you want to have?”—Tsogolo la Thanzi (Malawi)*

### **Retrospective variations (see also Subsection 1.2)**

- *“Just before I became pregnant: I wanted to have a baby”; “I had mixed feelings about having a baby”; OR “I did not want to have a baby.”—London Measure of Unplanned Pregnancy (UK)*
- *“Just before this pregnancy, did you yourself want to have a/another baby at some time?” General Social Survey (USA)*
- *“Right before you became pregnant, did you yourself want to have a(nother) baby at any time in the future?”—NSFG and Abortion Patient Survey (see further information in Section 8.2)*
- *“Thinking back to just before you were pregnant, how did you feel about becoming pregnant?” (answers: “I wanted to be pregnant sooner”; “I wanted to be pregnant later”; “I wanted to be pregnant then”; OR “I didn’t want to be pregnant then or any time in the future.”)—Pregnancy Risk Assessment Monitoring System (PRAMS) (USA) (see further information in Section 8)*

### **Prospective**

- *“Do you intend to have a (another) child during the next three years?” (answers: certainly not; probably not; probably yes; certainly yes)—General Social Survey (USA)*
- *“In future do you intend to have a child?” (answers: certainly not; probably not; probably yes; certainly yes)—General Social Survey (USA)*
- *“How many children do you (still) intend to have?”; “Do you intend to have a (another) child in the next three years?”—Eurobarometer surveys*

## **1.9. Key References**

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## **2. Pregnancy Wantedness, Strength of Fertility Preferences and Retrospective versus Prospective Measurement—Kazuyo Machiyama, London School of Hygiene and Tropical Medicine**

### **2.1. Objectives**

The study includes the standard questions on prospective preferences and expands on them by adding supplementary questions to better measure the strength and stability of these preferences and to gain further understanding of reasons for unmet need for family planning. It was conducted in selected study sites in two countries over the period 2016–2018.

### **2.2. Questions/Methods**

#### ***Strength of desire to avoid pregnancy***

- “How important is it to you to avoid becoming pregnant now? Would you say very important, somewhat important, or not at all important?” followed by: “Would you like to have a/another child, or would you prefer not to have any (more) children?”

#### ***Certainty of the stated preference***

- “How certain are you about whether or not you want a child in the future?” (answers: very certain; somewhat certain; uncertain/unsure)

#### ***Likelihood of changing the stated preference***

- “How likely is it that you might change your mind regarding whether you want another child or not?” (answers: very likely; somewhat likely; very unlikely; don’t know/unsure)
- “How likely is it that you might change your mind regarding timing of having another child?” (answers: very likely; somewhat likely; very unlikely; don’t know/unsure) (asked only among women who wanted another child, following the standard question “How long would you like to wait from now before the birth of another child?”)

***Attitudes toward becoming pregnant within weeks*** (aimed at measuring perceived potential reactions of their partner and their parents, financial consequences on their households, and own health)

- “If you became pregnant in the next few weeks, would you be worried or not worried about telling your husband/partner?”
- “If you became pregnant in the next few weeks, would your parents be pleased or not pleased?”
- “If you became pregnant in the next few weeks, would you be worried or not worried about how you could afford to raise your children properly with an extra child?”
- “If you became pregnant in the next few weeks, would you be concerned or not concerned about the effect on your own health?”
- “If you became pregnant in the next few months, would you consider or not consider terminating the pregnancy?” (among women who wanted no more or wanted a child but not soon)

### **2.3. Context/Setting**

Approximately 7,800 women aged 15–39 living in union were interviewed at three study sites (Matlab Health Demographic Surveillance System, Bangladesh; and Nairobi Urban Health Surveillance System and Homa Bay, Kenya) in 2016 and 2017. The third interview was

conducted at the Homa Bay site 1.5 years after the baseline. These are high contraceptive use settings: The modern contraceptive prevalence rate (CPR) among all women interviewed was 56% in Matlab, 66% in Nairobi and 61% in Homa Bay.

#### **2.4. Findings, Direction and Magnitude**

Among a total of 3,927 nonpregnant women interviewed at the two Kenyan sites, more than half of women reported wanting no more children or wanting to wait five years or longer (60% in Nairobi and 54% Homa Bay). The proportion of women expressing the desire to avoid pregnancy was higher among those who wanted no more children and who wanted to wait two years or longer (over 80% in both groups) than among women who wanted to have a child sooner. There was little difference in the proportions who reported high levels of uncertainty or likelihood of changing their minds according to wantedness categories, based on the commonly used demographic measures of fertility preferences. More than 90% said they were certain about their stated preferences and unlikely to change their minds. The internal consistency across questions was supportive of the quality of the data. The likelihood of women's changing their preferred time increased with the stated preferred waiting time.

As expected, the proportion of women with worries or concerns about becoming pregnant very soon increased with increasing duration of preferred waiting time. Financial consequences were the most common reason for concern about becoming pregnant in the near term in Nairobi, with 65% of women who wanted to stop, 29% who wanted to wait two years and 11% who wanted a birth soon expressing this concern. In Homa Bay, this proportion was much higher: 54% among women who wanted to wait two years and 29% who wanted a birth within a year. Thirty-nine percent of women who wanted a child within a year worried about the consequences of an immediate pregnancy for their own health, suggesting a relatively high level of ambivalence in Homa Bay.

#### **2.5. Advantages and Disadvantages**

- *Advantages:* New questions were developed to measure additional dimensions of fertility preference, such as strength of the desire to avoid pregnancy; certainty about stated preferences; and attitudes toward becoming pregnant in the near term.
- *Disadvantages:* The questionnaire was longer than the standard questionnaire. The measures of certainty and the likelihood of changing stated preference showed little variation by fertility preferences. Conversely, these additional questions provided internal validation of stated fertility preferences.

#### **2.6. Comparison with Other Methods**

The predictive power of whether a woman would have a child within one year was assessed. Around 15% of women in Nairobi and 19% in Homa Bay became pregnant within a year. This likelihood decreased with the length of stated preferred waiting time. The standard preferences were predictive, and the additional questions did not add to the predictability. In multivariate analyses, once the preferred waiting time was included, the additional measures examined in this study (apart from the financial consequences in Nairobi) did not add predictive value. Women who wanted to wait four years or longer were as unlikely to become pregnant as were women wanting no more births. Women who reported concern about the financial consequences of becoming pregnant in the near term were 34% less likely to get pregnant than were those who did not report this concern.

In Homa Bay, women who wanted to wait for three years or longer were as unlikely to get pregnant as were those wanting no more births. Women who wanted to wait for six years or longer were over 50% less likely to become pregnant than were those wanting no more births. The lack of predictive power among the additional measures may be associated with the high CPR in these settings, as many women may be able to meet their contraceptive needs. However, results were different when a similar question was asked in Karonga, Northern Malawi, where the CPR is relatively low. (They were asked: “*If you have a child in the next year, will there be serious consequences? If yes, which consequences?*”) Women who considered that becoming pregnant very soon would have serious consequences for household finances or for their own or their children’s health had a 30% lower likelihood of becoming pregnant within three years; however, this difference was only borderline statistically significant (Machiyama et al. 2015).

Using the data from the Nairobi site, the intendedness of each recent birth at the time of conception and after delivery were compared, using prospective preference and retrospective wantedness measures. Among 27 children born to women who has said they wanted no more children but who became pregnant within a year, 26% were classified as unwanted in the prospective measure and similarly retrospectively. The agreement was similar among women who wanted to wait one year or longer: 29% of 118 women who became pregnant said the child was mistimed, based on both the prospective and retrospective measures. In northern Malawi, the prospective and retrospective measures agreed on classifying 14% of births as unwanted and 41% as mistimed in the 2008–2010 study period (Machiyama et al. 2015).

## **2.7. Next Steps**

Preferred waiting time is an important predictor of subsequent pregnancy and may help those who design service provision programs to adequately counsel on and provide family planning methods.

Regarding retrospective and prospective measures, discussion at the workshop suggested that next steps are: a) to focus on improving retrospective measures, because large-scale series of surveys ask the questions underlying these measures; or b) to improve both retrospective and prospective measures, as they are based on different concepts and capture feelings about becoming pregnant for different time periods (recent past and future). One measure is not necessarily better than the other: A prospective question is asking people to look forward and think about their lives going forward and about future pregnancies, while a retrospective question asks people to recall an experience, a feeling or an attitude that they had at the time of the conception of a previous pregnancy.

It is worth emphasizing that the different indicators of intention status and wantedness of pregnancies and births have value and utility for different audiences and in different contexts, especially to improve policy and programmatic decisions.

## **2.8. Selected Additional Variations in Question Wording**

None

## 2.9. Key References

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### **3. Approach to Measuring Pregnancy Intentions and Motivational Strength—Aparna Jain, Population Council**

#### **3.1. Objectives**

This prospective study examined pregnancy ambivalence and assessed whether adding a question on the strength of motivation to prevent pregnancy improves the predictability of contraceptive initiation and continuation. Four interviews of contraceptive users who adopted an intrauterine device (IUD), a hormonal injectable or oral contraceptives were conducted over a one-year period.

#### **3.2. Questions/Methods**

Additional measures (at three, six and 12 months):

- Motivational strength to prevent pregnancy: *“How important is it to you to avoid a pregnancy now?”* (on a scale of 1–10, where 10 is extremely important and 1 is not important at all)
- Feelings and emotions around pregnancy: *“Please tell me if you strongly agree, agree, disagree or strongly disagree with the following statement: If I found out I was pregnant in the next several weeks, I would be happy”* (answers: strongly agree; agree; disagree; strongly disagree). For analysis, answers were dichotomized into agree and disagree.

These demographic measures of fertility preferences were asked at the four interviews:

- *“Would you like to have a/another child?”*; and *“How long would you like to wait from now before the birth of a child? Would you like the birth of a child to take place within the next year, within 1–2 years from now, or more than two years from now?”* (analytic categories combining answers to these three questions are: not wanting any more children; wanting a child in more than two years; wanting a child within the next two years; undecided)

#### **3.3. Context/Setting**

The study was conducted in two states of India, Odisha and Haryana, in 2016–2017. Married women aged 15–49 who were attending a health facility or receiving services from community health workers and who started a new episode of IUD, injectable or pill use were enrolled into the study. Women were interviewed at baseline and at three, six and 12 months after their initial interview. The additional measures were asked at three, six and 12 months.

#### **3.4. Findings, Direction and Magnitude**

At baseline, more than 60% of women in the study wanted no more children. However, 35% of women wanting no more changed their intentions during the next 12 months. The women who reported “undecided” or “don’t know” fluctuated and moved in and out from the category. Motivational strength to prevent pregnancy was grouped into three levels—high (10); medium (8–9); low (1–7). At the population level, 65% of women had high motivational strength at all three time points, but at the individual level women moved to different categories.

Among 2,022 women followed up for 12 months, approximately 80% or more were using modern methods, with women who reported wanting no more children, who wanted a child in more than two years or who were undecided at three months being more likely to use a

modern contraceptive method at 12 months. The proportion using modern contraception at 12 months was higher among women who had medium or high motivational strength at three months than among those with low motivational strength.

Among the 259 women who had discontinued using their method three months after baseline, women who had medium or high motivational strength were more likely to be using contraception again when interviewed 12 months after baseline than were those who had low motivational strength, across all fertility preference categories. However, the additional effect of motivational strength varied depending on attitude about wanting the birth. Among women who wanted no more children, modern contraceptive method use at 12 months did not differ for those with low or medium/high motivational strength.

Among women who wanted to space the next birth, the proportion using a contraceptive method was nearly nine percentage points higher among women with high or medium motivational strength than among those with low motivational strength. This difference was also clear among women who said they were undecided about wanting another child at baseline: Eleven percent of those with low motivation were using a method at 12 months, compared with 40% among those with medium or high motivation.

Another study assessed the relationship between the two measures of attitudes toward pregnancy—happiness (affective, involving beliefs, feelings and emotions) and motivational strength to avoid pregnancy (cognitive) (Tobey, Jain & Mozumdar 2020). Results showed that 72% of all respondents were “anti-pregnant” (i.e., they reported that it was very important to them to avoid pregnancy and disagreed with the statement “*If I found out I was pregnant in the next several weeks, I would be happy*”), while 18% were “positive ambivalent” (that is, they reported that it was very important to avoid pregnancy but also agreed with the above statement of being happy). There was no difference between these two groups in their likelihood of using contraception at 12 months after the baseline interview.

### **3.5. Advantages and Disadvantages**

- *Advantages:* Using two straightforward additional questions may make it easier for the respondent to understand the concepts and therefore improve measurement of ambivalence.
- *Disadvantages:* Responses were skewed to 10, and most women scored 10 (highly motivated); there was relatively little variation. This is likely because for the women to be enrolled, they had to be using modern reversible contraceptives, so their motivation to prevent pregnancy was high to begin with. The respondents were married women who started using a method within a month of the beginning of the study, so there may be little variation in the fertility intentions and motivational strength among this group. In addition, these results are not generalizable to unmarried women.

### **3.6. Comparison with Other Methods**

Respondents’ answers to the motivational strength question were consistent with their fertility preferences: The proportions of women with a high motivation to avoid pregnancy were higher among women wanting no more children than among those wanting to wait two years or longer and those who wanted the next child soon.

### 3.7. Recommended Next Steps

Workshop participants discussed the utility of adding these measures to cross-sectional surveys and agreed that since motivational strength to avoid pregnancy predicted initiation of and continuation of contraceptive use, it could be a useful addition to cross-sectional studies.

### 3.8. Selected Additional Variations in Question Wording

- “How important is it for you to avoid pregnancy now?” (answers: very important; important; not important; not important at all)—Chace Dwyer et al. 2002
- “How much of a problem would it be if you found out you were pregnant in the next few weeks?” (answers: no problem; small problem; big problem)—DHS Phase 4
- “How happy would you be if you found out you were pregnant in the next few weeks?” (answers: happy; doesn’t matter; unhappy)—DHS Phase 3
- “If you got pregnant now, how would you feel?” (answers: very happy; sort of happy; mixed happy and unhappy; sort of unhappy; very unhappy)—PMA cross-sectional and panel surveys
- “When you found out you were pregnant, how did you feel?” (answers: very happy; sort of happy; mixed happy and unhappy; sort of unhappy; very unhappy)—PMA cross-sectional and panel surveys

### 3.9. Key References

Chace Dwyer, S., S. Baruwa, E. Okafor et al. 2002. How do changes in motivation to prevent pregnancy influence contraceptive continuation? Results from a longitudinal study with women who receive family planning services from Community Pharmacists and Patent and Proprietary Medicine Vendors in Nigeria. *Reproductive Health* 19(1):39, [doi: 10.1186/s12978-022-01326-9](https://doi.org/10.1186/s12978-022-01326-9).

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Tobey, E., A. Jain & A. Mozumdar. 2020. The relationship between attitudes towards pregnancy and contraceptive continuation: results from a longitudinal study of married women in India. *PLOS ONE* 15(2):e0229333, [doi: 10.1371/journal.pone.0229333](https://doi.org/10.1371/journal.pone.0229333).

#### 4. The Desire to Avoid Pregnancy (DAP) Scale for Pregnancy Preferences—Corinne Rocca, University of California, San Francisco

##### 4.1. Objectives

The objectives for the development of the Desire to Avoid Pregnancy (DAP) scale, developed by Rocca et al. (2019), were to:

- Develop a rigorous measurement instrument that prospectively captures multiple domains of pregnancy preferences along a continuum
- Balance measurement precision with validity in selecting items
- Evaluate the psychometric performance of the DAP items using classical and item response theory-based approaches

The Attitudes and Decision-making After Pregnancy (ADAPT) Study is a prospective longitudinal study in the United States that is employing the DAP scale to:

- Assess how pregnancy preferences change over time and the associations of pregnancy preferences with contraceptive use, incident pregnancy and feelings about a pregnancy after discovery
- Examine how pregnancy and abortion decisions are made and the types of care that people seek and are able to obtain
- Investigate the impact of “unintended” or “less preferred” pregnancy on women’s health, well-being and socioeconomics

##### 4.2. Questions/Methods

The DAP scale is a prospective measurement instrument comprised of 14 items capturing three conceptual domains:

- Domain 1: Cognitive desires and preferences (D1)
- Domain 2: Affective feelings and attitudes (D2)
- Domain 3: Anticipated practical consequences (D3)

The introductory text and instrument read as follows:

*“The following statements have to do with your thoughts and feelings about the idea of becoming PREGNANT in the next three months. Even if you do not think you can become pregnant, please imagine how you would feel about becoming pregnant.”*

- I wouldn’t mind it if I became pregnant in the next three months. (D1)
- It would be a good thing for me if I became pregnant in the next three months. (D1)
- Thinking about becoming pregnant in the next three months makes me feel unhappy. (D2)
- Thinking about becoming pregnant in the next three months makes me feel excited. (D2)
- Becoming pregnant in the next three months would bring me closer to my main partner. (By main partner, we mean **the romantic partner that is the most serious to you**. If you don’t have a romantic partner, please think about the person with whom you last had sexual relations.) (D3)

*“The following statements have to do with your thoughts and feelings about the idea of having a BABY in the next year. Even if you do not think you can have a baby, please imagine how you would feel about having a baby.”*

- I want to have a baby within the next year. (D1)

- If I had a baby in the next year, it would be bad for my life. (D1)
- It would be a positive addition to my life to have a baby in the next year. (D1)
- It would be the end of the world for me to have a baby in the next year. (D1)
- Thinking about having a baby within the next year makes me smile. (D2)
- Thinking about having a baby within the next year makes me feel stressed out. (D2)
- I would feel a loss of freedom if I had a baby in the next year. (D3)
- If I had a baby in the next year, it would be hard for me to manage raising the child. (D3)
- I would worry that having a baby in the next year would make it harder for me to achieve other things in my life. (D3)

Respondents respond to each of the 14 items on a five-point Likert scale (strongly agree to strongly disagree, with a “neither” option). Each item is coded 0–4, with higher scores reflecting a higher desire to avoid pregnancy. A total DAP score is calculated by averaging scores across the 14 items (final range: 0–4, the sum of the scores on all items divided by 14). (Researchers can, alternatively, fit items to a partial credit item response model.) The DAP is intended to be used as a continuous measure; rounding scores is not recommended.

### 4.3. Context/Setting

Ample research illustrates that while some women strongly desire to become pregnant or to prevent pregnancy, others hold mixed feelings or are uncertain how they feel. Evidence shows that many women do not hold clear “intentions” about pregnancy or intuitively apply categorizations like “planning” or “intending” to their pregnancies. Some view pregnancy as only partially under their control, and for some, preferences can be vague or underspecified or uncertain. Preferences can also change over short time periods, based on life circumstances. Yet these nuances are not captured well by the simple categorical questions often employed in research. Latent variable measure development and psychometric approaches, widely used in fields like education and psychology, are also useful for the development of measures for pregnancy preferences.

**DAP Development Study:** The DAP scale was developed at the University of California–San Francisco/Advancing New Standards in Reproductive Health (UCSF/ANSIRH) using a construct modeling approach. A library of 60 draft items was developed based on existing qualitative literature on how women conceptualize a potential pregnancy and input from experts. After cognitive interviews and item honing, items were field-tested (n=600 English- or Spanish-speaking women) in five diverse U.S. states (Arizona, New Jersey, New Mexico, South Carolina and Texas) in 2016–2017. (See Rocca et al. [2019] for the steps and processes involved in the psychometric evaluation of the instrument and <https://www.ansirh.org/research/ongoing/desire-avoid-pregnancy-dap-scale> to download the instrument.)

**Global Use of the DAP scale:** The DAP scale has been used or is in use a number of studies in the United States and globally. In the United States, DAP has been applied in studies among women with substance use disorders, adolescents seeking emergency contraception, community college students, and patients in primary care, among others. The DAP scale is included in NORC’s Statewide Surveys of Women, which are state-representative longitudinal surveys of around 18,000 women across nine U.S. states. Globally, the measure has been or is being adapted and evaluated in such countries as Brazil, Botswana, Ghana, Kenya, the Philippines and the United Kingdom (UK).

**ADAPT Study:** The ADAPT Study is a multiyear longitudinal study launched by investigators at UCSF/ANSIRH (principal investigators, Corinne Rocca and Diana Greene Foster) in March 2019. Recruitment has been completed, and longitudinal data collection is currently underway. The study has recruited 2,200 women aged 15–34 years of age who can become pregnant from 25 primary care and reproductive health care facilities in the southwestern United States (Arizona, southwestern California, Nevada, New Mexico and western Texas). Participants will complete surveys that include the DAP scale quarterly for one year. Participants who become pregnant, as well as a subsample of nonpregnant participants (matched to pregnant participants on time at risk and DAP score) will be followed for an additional three years through pregnancy resolution. (For more information, see: <https://clinicaltrials.gov/ct2/show/NCT03888404>.)

#### 4.4. Findings, Direction and Magnitude

**DAP Development Study:** The final 14-item DAP scale exhibited robust psychometric performance, fitting a unidimensional item response model, with a separation reliability of 0.90 (Cronbach's  $\alpha$ : 0.95). Items met established criteria for internal validity, including correspondence between each item's response categories and the overall scale score. No important differential item functioning was found by respondent characteristics. Respondent DAP scores covered the full 0–4 range of the scale (mean 2.2, SD 1.1) and were strongly associated with the use of a contraceptive method, but not with the individual method types used.

The DAP scale is currently being used in studies across the United States, as well as in Ghana, Kenya, and the UK. It is being tested in Brazil, Botswana and the Philippines. (For more information, see: <https://www.ansirh.org/research/ongoing/desire-avoid-pregnancy-dap-scale>.)

**ADAPT Study:** In preliminary analyses among 1,875 participants contributing 11,317 survey observations:

- *Contraceptive use:* There was a curvilinear relationship between the DAP score and current use of a modern contraceptive method. Odds of contraceptive use increased about 2.3 times with each increasing point on the DAP scale; the predicted probability of contraceptive use was 25% for DAP=0 and 85% for DAP=4.
- *Probability of pregnancy:* The pregnancy rate was 15 per 100 person-years. Odds of pregnancy over the course of one year were much higher among those who were more open to pregnancy at baseline (adjusted odds ratio: 0.40; predicted probability of pregnancy 31% at DAP=0 and 4% at DAP=4).
- *Comparison with feelings postconception:* Among participants experiencing an incident pregnancy (n=228 in the preliminary data), investigators assessed scores on a modified DAP scale—the postpregnancy Desire to Avoid Childbearing (p-DAC) scale—for use after people have first discovered they are pregnant (e.g., “happy surprises” or where it is less preferred). Among those who prospectively had a higher desire to avoid pregnancy, p-DAC responses varied after pregnancy: Some continued to feel unfavorably about their pregnancy, while others viewed their pregnancy more favorably after conception. Among those whose DAP scores indicated higher openness to pregnancy prospectively, their scores remained favorable after pregnancy also.

#### **4.5. Advantages and Disadvantages**

Advantages of the DAP scale are:

- The measure is theory-based. Preference construction theory posits that individuals do not often have clear preferences, particularly around complex or context-specific choices. If, however, individuals are called on to express a preference when they are uncertain, they will often construct one.
- The DAP items were developed directly from qualitative research on how women conceptualize pregnancy, which garners evidence for its construct validity.
- The DAP scale includes items that cover a range of domains (cognitive, affective, practical consequences) and are worded in both directions (i.e., agreement with an item could mean either a high or low desire to avoid pregnancy, depending on the item). It also addresses pregnancy and childbearing.
- By including a middle response category (neither agree nor disagree), the DAP scale acknowledges that feeling ambiguity, being uncertain or not having a preference regarding an item is a legitimate stance.
- The DAP items reflect a relatively short time frame (three months for a possible pregnancy and one year for a new baby), given preferences can change based on life circumstances.
- The DAP scale focuses on desire to avoid pregnancy, rather than desire for pregnancy. This is more relevant for contraceptive and abortion care.

Disadvantages of the DAP scale are:

- The DAP measure is long and in its full 14-item form is likely not feasible for use in most large-scale research. Also, it may not be suitable for use in low-literacy contexts (or will need greater adaptation than has been done so far).
- Scores on the DAP scale have not yet been empirically converted into a clear outcome measure akin to “unintended” pregnancy.
- Researchers who wish to differentiate indifference from ambivalence among respondents need to score the positively and negatively worded DAP items separately.

#### **4.6. Comparison with Other Methods**

Two analyses (Stulberg et al. 2020; Gonzalez et al. 2020) compared the DAP measure with “One Key Question” (a commonly used clinical screening tool in the United States that asks women “do you want to become pregnant in the next year?” to guide preconception and contraceptive care). Responses to the One Key Question and the DAP scale were similar at the low end (i.e., those who had a low DAP score tended to respond “yes” on the One Key Question). However, respondents who responded “no” to the One Key Question had a wide range of preferences on the DAP scale.

#### **4.7. Next Steps**

Planned next steps to advance pregnancy preference measurement using the DAP scale include:

- Developing a shorter measure that maintains measurement precision
- Identifying cut points for a standardized outcome measure (e.g., “what is an unintended pregnancy using this scale?”), using item response theory
- Evaluating this measure across different populations

Planned next steps also include continued longitudinal data collection for the ADAPT study through 2025 and conduct of analyses outlined above.

#### **4.8. Selected Additional Variations in Question Wording**

Testing of the DAP scale is underway in different contexts, but adaptations and variations in item wording are not yet available, with one exception. In the forthcoming UK version of the DAP scale, the statement introducing Item 5 about the partner was changed to read: “*The next question asks you to think about your main partner. By main partner, we mean the romantic partner that is the most serious to you. If you don’t have a romantic partner, please think about the last person with whom you were physically intimate (anything from kissing and cuddling to sex) or think of a person you know who you would consider being physically intimate with.*” (Hall et al. 2022).

#### **4.9. Key References**

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## **5. The London Measure of Unplanned Pregnancy (LMUP)—presented by Corinne Rocca, University of California, San Francisco and reviewed by Geraldine Barrett, University College London**

The London Measure of Unplanned Pregnancy (LMUP) (also known as the “Circumstances of Pregnancy” questionnaire) was briefly discussed at the workshop, but not separately presented. [Note: At the request of the workshop organizers, Corinne Rocca mentioned key points about this method. That presentation was expanded based on published work on the method, and the draft was reviewed by Geraldine Barrett, who led the method’s development.] To provide a comprehensive overview of key methodologies for measuring pregnancy intention status, key aspects of this measure are summarized in this report.

### **5.1. Objectives**

The objective for the development of the LMUP scale, developed by Barrett, Smith and Wellings (2004), was to create a measure of pregnancy planning/intention that is psychometrically validated, reliable and appropriate in the context of contemporary demographic trends and social norms. The measure was developed for use in research and for use in calculating population prevalence estimates and, more recently, potential clinical use.

### **5.2. Questions/Methods**

The LMUP is a retrospective, continuous measure of degree of pregnancy planning prior to a conception. The LMUP was developed based on rigorous formative qualitative research (Barrett & Wellings 2002) among UK women who planned to either continue or terminate their pregnancies. The measure consists of six items, each with a set of responses scored 0, 1 or 2, with total summed scores ranging from 0 to 12. A higher score represents increasing degree of pregnancy intention/planning. The six items were designed to capture three dimensions: context, stance and behavior. Where possible, the developers recommend using the full scale for analysis, but they have recommended provisional cut-points for interpreting the scale (0–3, unplanned; 4–9 ambivalent; 10–12, planned; or a cut-point of 9/10 for unplanned/planned) (Barrett et al. 2004; Hall et al. 2017).

The introductory text and instrument read as follows:

- *“Below are some questions that ask about your circumstances and feelings around the time you became pregnant. Please think of your current (or most recent) pregnancy when answering the questions below. (Please tick the statement which most applies to you):”*
  - 1) Contraceptive use: *“In the month that I became pregnant: I/we were not using contraception; I/we were using contraception, but not on every occasion; I/we always used contraception, but knew that the method had failed (i.e. broke, moved, came off, came out, not worked, etc.) at least once; and I/we always used contraception.”*
  - 2) Timing: *“In terms of becoming a mother (first time or again), I feel that my pregnancy happened at the...: right time; ok, but not quite right time; wrong time.”*
  - 3) Intention: *“Just before I became pregnant...: I intended to get pregnant; my intentions kept changing; I did not intend to get pregnant.”*
  - 4) Wantedness: *“Just before I became pregnant...: I wanted to have a baby; I had mixed feelings about having a baby; I did not want to have a baby.”*

- *“In the next question, we ask about your partner. This might be (or have been) your husband, a partner you live with, a boyfriend, or someone you’ve had sex with once or twice.”*
- 5) Partner discussions/agreement: *“Before I became pregnant...: my partner and I had agreed that we would like me to be pregnant; my partner and I had discussed having children together, but hadn’t agreed for me to get pregnant; we never discussed having children together.”*
  - 6) Pregnancy preparatory behaviors: *“Before you became pregnant, did you do anything to improve your health in preparation for pregnancy? (Please tick all that apply): took folic acid; stopped or cut down smoking; stopped or cut down drinking alcohol; ate more healthily; sought medical/health advice; took some other action, please describe; or I did not do any of the above before my pregnancy.”*

The researchers, including those involved in development of the LMUP, conducted a study to test an amendment to the LMUP to reflect a growth in the number of same-sex couples having children, women choosing to become mothers without a partner, and nonromantic partners choosing to become parents together. An amendment to Item 5 (partner discussion)—to add the category “I chose to become pregnant without a partner”—was proposed from the study, and it was recommended to use this amended item in the UK (Barrett et al. 2020).

### 5.3. Context/Setting

**LMUP Development Study:** The tool was developed using inductive qualitative methods to describe and understand lay accounts of the circumstances under which women became pregnant. Forty-seven women who were pregnant and either were about to have an abortion or were continuing their pregnancy to term were recruited from health providers around the UK and took part in interviews. Twenty women were reinterviewed in the year after birth to explore their ongoing experiences and the changes to, or stability of, their accounts of the circumstances of their pregnancy. A conceptual model of pregnancy planning/intention derived from the qualitative work then informed the development of an item pool. Items were tested in cognitive interviews with 26 women. Subsequently, two sets of psychometric field tests were carried out among 390 and 651 women to establish the means of measurement. The tool has been used in the UK’s nationally representative National Survey of Sexual Attitudes and Lifestyles (Natsal).

**Global Use of the LMUP:** In the 20 years since its development, the LMUP scale has been widely integrated into research globally. It has been translated into at least 18 languages and has undergone cultural adaptation and psychometric evaluation in those contexts. It has been used in several dozen studies globally, producing approximately 100 peer-reviewed papers to date. (See [lmup.org.uk](http://lmup.org.uk) for a full list.) The tool has been validated well in these studies and has demonstrated high face and construct validity and high reliability. Cultural adaptations are recommended. For example, cultural adaptation of the item on pre-pregnancy health behaviors (Item 6) is well-established: An option “saved money for healthcare” was included in the studies in India and Malawi (Rocca et al. 2010; Hall et al. 2013). Furthermore, a validation study in Malawi in 2012 modified the item on contraception and provided additional information to ensure that respondents took into account different methods of family planning.

#### **5.4. Findings, Direction and Magnitude**

In the qualitative study that led to the LMUP's development, participants tended not to use terms such as "planned," "unplanned," "intended," "unintended," "wanted" or "unwanted" spontaneously when talking about the circumstances of their pregnancies (Barrett & Wellings 2002). When asked, women understood and explained the terms, but the explanations varied considerably. There was no uniform agreement about the definition of any term. When asked toward the end of the interview if they could apply any of the terms to their own pregnancy, most (but not all) were able to do so. Women only applied the term "planned" when four key criteria in their main accounts were met: intending to become pregnant; stopping contraception; having partner agreement; and reaching the right time in terms of life stage. In contrast, "unplanned" was a widely applied term. The other terms, especially "unwanted," were less favored.

As a result of the qualitative work, the research team believed that it was not possible to rely on a single question—such as "Was your pregnancy planned?"—in isolation to collect information about pregnancy circumstances. Instead, they moved forward with a latent-trait model of measurement. Therefore, the qualitative research was used to develop a conceptual model through which women's circumstances of pregnancy could be understood. The model comprised three domains (stance, context and behavior) and six thematic areas: (1) expressed intentions; (2) desire for motherhood; (3) contraceptive use; (4) preconception preparations; (5) personal circumstances/timing (e.g., timing in terms of relationship, stage in life and material resources); and (6) partner influences. The question items developed covered all six thematic areas and were then tested.

The first field test showed the items within each theme to be homogenous, so psychometric item analysis was used to reduce the number of items, resulting in a six-item measure (one item per thematic area). The six-item measure was then tested in the second field test for its validity and reliability. That psychometric field test showed high face, content and construct validity and high reliability (Cronbach's  $\alpha=0.92$ ; test-retest reliability= $0.97$ ). A longer term test-retest, before and after childbirth, also showed high reliability/stability ( $0.86$ ).

#### **5.5. Advantages and Disadvantages**

##### *Advantages*

- The instrument was developed based on lay views and rigorous qualitative research, providing evidence for the validity of the measure.
- The tool is relatively short, easy to administer and highly acceptable to respondents.
- The measure can be used with any pregnancy, regardless of outcome (e.g., birth, abortion, miscarriage).
- The measure reflects the complexities of women's pregnancy-related stances and behaviors, allows interviewees to express mixed feelings (e.g., positive, negative, ambivalent) and does not assume women have clearly defined intentions or behaviors, nor that these are congruent.
- The tool has been adapted and tested across many settings, including in Asia, Africa, North America and Latin America, after small cultural modifications were made to accommodate population and context, when necessary.

##### *Disadvantages*

- The measure consists of six items, which is sometimes considered too long for surveys.

- Some researchers have commented that the LMUP may not adequately differentiate individuals' feelings about pregnancy at the lower end of the spectrum. However, some studies have shown differentiation in outcomes depending on scores on the measure. One study of women attending a clinic for assessment for abortion found that women with higher scores were less likely to have an abortion than were women with lower scores (Cameron & Glasier 2013). Another study found that among women who had an abortion, those with higher scores were more likely to experience negative emotions at one week postabortion compared with those who had lower scores (Rocca et al. 2013).
- The contraceptive use item may function differentially across settings based on other factors affecting contraceptive use, including access to methods, social acceptability of method use, scepticism about method use, etc.
- Cut points for unplanned pregnancy (Hall et al. 2017) are provisional.

Distributions of LMUP scores vary by settings and composition of study populations. The score distribution in the original UK validation study showed a negatively skewed distribution (toward higher planning/intention) among pregnancies that were continued to term and a more normal, possibly positively skewed distribution at the lower end of the scale (toward less planned/intended) among pregnancies ending in abortion. Similar distributions have been seen since in other UK studies, including in Scotland (Lakha & Glasier 2006), and in recent analysis using the data from the third National Survey of Sexual Attitudes and Lifestyles (Natsal-3) in 2010–2012, which was negatively skewed and had more than 25% scoring the maximum of 12. In countries where there is access to legal abortion (e.g., Australia, Belgium, the UK), it is usual to see negatively skewed LMUP distributions among antenatal/pregnant populations. In countries where abortion is not legal, very restricted or not well-established (e.g., Malawi, Mozambique, Pakistan or Sri Lanka,), it is usual to see a more bimodal distribution of LMUP scores among antenatal/pregnant populations. To use the scores as a patient-reported outcome measure in clinical settings, for example, data collection and score calculation are required. Guidance on how to use the LMUP as an outcome measure is available (Hall et al. 2017).

### **5.6. Comparison with Other Methods**

Hall et al. (2019) compared the reliability of the DHS question and the LMUP for the first year after childbirth among women in Malawi. The LMUP was more reliable than the DHS question over the first postnatal year. The DHS's lack of reliability was associated with marital status, number of children and postnatal depression; the LMUP scores, which were more stable, were not affected by any of these factors. The study also found that the prevalence of intended pregnancy according to DHS was consistently higher than the LMUP estimates of unplanned pregnancy.

Aiken et al. (2016) compared the LMUP and a timing-based single question of unintended pregnancy, "Did you plan on becoming pregnant now?" The results showed 76% of pregnancies were unintended according to the timing-based measure, compared with 39% in the LMUP. Nevertheless, 24% and 17% were classified as intended and planned according to the two measures, respectively—a much closer agreement between the two sources.

Yeatman and Smith-Greenaway (2018) used the LMUP with women and men who had (or whose partners had) pregnancies resulting in live births in the prior two years. They found that distributions on the LMUP scores were similar among men and women and were bimodal: The majority of births were clearly unplanned (scores of 0–3) or planned (10–12),

but a substantial minority (28% of women and 20% of men) fell in the middle (scores of 4–9). The study also assessed subjective well-being and self-rated health before and after the births. Self-rated health before the births was similar among the three groups of women. However, women who had planned births experienced improvement of self-rated health after the births, while there was a slight decline in the other two groups. Subjective well-being increased modestly among all women, irrespective of their planning status. In contrast, subjective well-being declined among men who were ambivalent about the planning status of their pregnancies (i.e., with LMUP scores of 4–9).

### 5.7. Next Steps

- Further work in updating the LMUP is ongoing by the developers.
- In clinical contexts, the LMUP is being (and should continue to be) used under its original title “Circumstances of Pregnancy.”
- The LMUP handbook ([www.lmup.org.uk](http://www.lmup.org.uk)) is continually updated and provides information to support LMUP users.

### 5.8. Selected Additional Variations in Question Wording

See LMUP.com for a list of adaptations across settings, some of which contain minor variations in item wording.

### 5.9. Key References

LMUP website: <http://www.lmup.co.uk>

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## 6. Measuring Fertility Desires, Predictability and Flexibility—Sara Yeatman, University of Colorado, Denver

### 6.1. Objectives

The Tsogolo la Thanzi (TLT) study aimed to measure the orientations of 15–25-year-old women to fertility, the correspondence between fertility desires and pregnancy, and whether fertility timing desires are predictive of pregnancy. Data on the young women’s partners were also collected.

The study was originally designed to focus on HIV and fertility. Young women aged 15–25 experience rapid life transitions (marriage, parenthood), shaping their fertility orientations and desires.

### 6.2. Questions/Methods

In 2009, the TLT interviewed a simple random sample of 1,505 women between the ages of 15 and 25 and a smaller sample of men (n=574). In the first phase (2009–2011), there were eight waves of TLT data, each spaced four months apart. In each wave, women were offered pregnancy testing after they completed the survey, and there was high uptake of testing (84–94% acceptance rate).

The study questions included:

- Ideal number of children:
  - *“People often do not have exactly the same number of children they want to have. If you could have exactly the number of children you want, how many children would you want to have?”* (answers: number; nonnumeric/up to God; don’t know)
- Retrospective preferences:
  - If women confirmed their pregnancy during the survey or through postsurvey pregnancy testing, the pregnancy questionnaire asked:
    - *“Was the pregnancy planned?”* (answers: yes; no)
    - *“Was the pregnancy wanted?”* (answers: yes; no)
    - *“When you first found out about this pregnancy, how did you take the news?”* (answers: very good; good; neither good nor bad; bad; very bad)
- Prospective fertility desire questions (includes family size, due to young age of respondents)
  - *“Would you like to have a(nother) child?”* (Respondents who were currently pregnant were asked: *“Would you like to have another child after the child you are expecting is born?”*) (answers: yes; no)
  - *“If you found out today that you were pregnant by [NAME], would that news be...?”* (answers: very bad; fairly bad; neither good nor bad; fairly good; very good; don’t know)
  - *“How long would you like to wait before having your first/next child?”* (answers: as soon as possible; less than two years; two to three years; three to four years; four to five years; five or more years; no preference/whenever; don’t want a(nother) child; don’t know)

**Flexible orientations**

In Wave 1, one of the questions asked was:

*“Earlier, you told me about how many children you want to have and when you want to have your next child. Now I’m going to read you a list of things that could happen and might change your mind.”*

Eighteen hypothetical scenarios were then introduced (see Table 1 below). Responses looked at the number of children (more children; fewer children; no change) and timing (sooner; later; no change). Using these responses, an index was created—any change reported (i.e., more/fewer, sooner/later) was coded 1 (each item), without consideration to the direction of change.

**Table 1. Wave 1, Women's Questionnaire, Section C: Conditionalities**

|  |
|--|
| C1. Your sister passed away and her three young children came to live with you?                        |
| C2. Your partner tells you he is leaving to work in South Africa?                                      |
| C3. You win 1,000,000 kwacha in the lottery?   |
| C4. Your partner wants fewer children than you do?   |
| C5. Your partner wants more children than you do?  |
| C6. A new government program will provide free uniforms and materials for all primary school students? |
| C7. The Malawian government decides to remove all secondary school fees?                               |
| C8. Your husband gets a job with a good steady salary?   |
| C9. You get a job with a good steady salary?   |
| C10. You hear rumours that your partner is sleeping with other women?                                  |
| C11. Your crops failed this year and there will be a severe maize shortage?                            |
| C12. You start losing weight and you are worried you might have HIV/AIDS?                              |
| C13. Your partner starts losing weight and you are worried he might have HIV/AIDS?                     |
| C14. Your youngest child is seriously ill?   |
| C15. You have only male children?  |
| C16. You have only female children?  |
| C17. Your mother becomes ill?  |
| C18. Your mother passes away?  |

**6.3. Context/Setting**

TLT is a longitudinal study conducted in and around Balaka, a growing town and district capital in Southern Malawi.

TLT comprises of two phases: TLT-1 (2009–2011) and TLT-2 (2015). In 2015, the TLT study introduced the LMUP [not covered in the presentation; see LMUP Section 5.6. for more information].

The study approached the notion of “flexibility” in fertility desires as an orientation toward fertility. Rather than being fixed statements of plans, flexibility reflects desires that evolve with life circumstances (partnerships, economic conditions, age, etc.). This flexible orientation toward fertility may be practical, particularly in environments characterized by high levels of uncertainty.



The fertility module has not been used elsewhere, to our knowledge. The Kenya Life Panel Survey asked a somewhat similar set of questions more recently (Müller et al. 2022).

#### **6.4. Findings, Direction and Magnitude**

##### ***Flexible orientations***

Wave 1 respondents with the “most flexible” orientations were those who reported that they would change their desires in response to all circumstances and were not holding fertility desires very rigidly. Those with the “most fixed” orientations reported that they would not change their fertility plans in response to any of the various scenarios presented. Most women fell between these two orientations.

Respondents indicated movement in fertility preferences on six of the 18 conditions for desired number of children and the desired timing of pregnancies. Ten percent of young women reported no movement in their numeric preferences for any of the conditions, while 3.5% anticipated a change for every one of the conditions presented; 14.5% reported no movement on timing preferences, and 4.7% anticipated movement in response to every condition presented (Trinitapoli & Yeatman 2018).

More flexible orientations were associated with:

- Younger age (where family formation was a more distant goal)
- Lower socioeconomic status

Using these data as a baseline, we:

- Observed actual changes in desires over time
- Found that they were associated with lower contraceptive use and lower unintended pregnancies

The responses reflect that fertility desires are dynamic and flexible over time:

- Women change their desired fertility timing and their ideal family size.
- There are fairly predictable responses to shifts in peoples’ lives, such as partnership changes (e.g., a new partner, which may accelerate the next birth) or economic changes

Rigidity or flexibility around ideal family size is contextually situated and dynamic over the life course.

##### ***Predictability of desired fertility timing***

Despite the flexibility of preferences, study data show that fertility timing desires are highly predictive of pregnancy in the short term.

The question “How long would you like to wait before having your first next child?” was highly predictive of subsequent pregnancy. In Wave 1, of those who responded “as soon as possible,” 35% were pregnant four months later, and nearly 60% were pregnant within the year. The desire to delay a birth was associated with a lower likelihood of becoming pregnant. Indeed, there was a gradient wherein women who expressed the desire to delay a birth the longest were the least likely to become pregnant (Yeatman et al. 2020).

##### ***Predictability of modern contraceptive use***

In addition to a relationship between desired birth timing and subsequent pregnancy, there was also a relationship between desired birth timing and modern contraceptive use. Each additional year a woman wants to delay her next birth was associated with increased prevalence of contraceptive use. This relationship was somewhat less clear than for pregnancy, however, as many women who sought to delay a birth were not having sex. When abstinence was included as contraceptive use, the relationship was stronger and more linear. The original nonlinear relationship between contraception and desired fertility timing could be interpreted as unmet need for contraception. In contrast, however, the linear relationship, including abstinence, may instead highlight the lack of contraceptive demand, as women may not have a need for contraception (Senderowicz & Manning 2022).

### ***Emotional reaction to pregnancy***

The study also included a question for women who were pregnant (half of whom learned that they were pregnant during the study process) on how they took the news when they first found out about the pregnancy.

Based on the prospective measure of desired timing four months earlier, the pregnancy was categorized as intended or unintended. Approximately 40% of respondents in this study had positive feelings toward their unintended pregnancy, while 22% reported neither good nor bad feelings. A non-negligible minority of respondents who had an intended pregnancy reported negative feelings about that pregnancy.

Not all unintended pregnancies were met with negative emotions, but those that do evoke negative emotions are perhaps the most problematic and push us to ask how we can refine our tools to identify those pregnancies (Yeatman & Smith-Greenaway 2021).

## **6.5. Advantages and Disadvantages**

The TLT study has the ability to measure:

- Flexible orientation to pregnancy
- Flexibility of desires over time
- Predictability of a prospective measure of desired fertility timing over the short term
- Emotional reaction to pregnancy within weeks (or less) of learning of it

The collection of data using a longitudinal study design can yield very insightful findings, but also poses significant time and cost challenges.

- It creates challenges for measurement, given how frequently desires change.
- Because of costs or logistics, sometimes longitudinal studies cannot reinterview participants as frequently as desired. For this method, having interviews at intervals of four months was found to be highly predictive, but lengthening the interval between interviews may weaken this approach's ability to differentiate between intended and unintended pregnancies, because the respondent is likely to experience more changes in life circumstances between interviews if the interval between data collection points is lengthened. However, cost remains an important consideration for implementing this measurement approach.

In general, while a longitudinal design is very informative, it is difficult and expensive to scale up or to replicate. For these reasons, this study design is perhaps not the best way forward in many situations. However, it may be feasible to incorporate some of its questions and use a longitudinal design that covers a shorter time period.

## 6.6. Comparison with Other Methods

Drawing on eight waves of the TLT data, Yeatman & Sennott (2015) generated seven different estimates of unwanted and unintended pregnancy based on fertility preferences measured at different points in time. These estimates were compared with standard retrospective and prospective approaches when fertility preferences are measured prospectively within months of conception.

The researchers found that the standard retrospective measures slightly underestimated unwanted and unintended pregnancies compared with findings from the prospective approach when measured close to conception, while the lagged prospective measures overestimated unwanted and unintended pregnancies. Most estimates were similar in the aggregate, suggesting that frequent changes in fertility preferences need not lead to dramatically different estimates of unwanted and unintended pregnancies at the population-level. Greater disagreement among measures emerged when classifying individual pregnancies (Yeatman & Sennott 2015).

## 6.7. Recommended Next Steps

New areas of study include exploring how “flexibility” translates across contexts, especially within high-income countries/contexts, and whether findings from the TLT approach can help to develop better retrospective questions.

## 6.8. Selected Additional Variations in Question Wording

None are suggested. Note: Questionnaires and instruments for each wave are available at [the project website](#).

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## **7. Measurement of Unintended Pregnancy and Fertility Intention: Data and Approaches from European Surveys—Maria Rita Testa, LUISS, Italy (Libera Università Internazionale degli Studi Sociali)**

### **7.1. Objectives**

Using data from the Generations and Gender Survey (GGS), the study objectives include:

- Conducting cross-country comparative research on fertility intentions in countries characterized as “low fertility”
- Investigating the differences between fertility intentions and actual fertility
- Understanding reasons for discrepancies between fertility intentions and actual fertility
- Contributing to and expanding existing theories on fertility intentions

### **7.2. Questions/Methods**

The GGS, part of the Generations and Gender program, is a longitudinal panel survey conducted in several European countries as well as in Australia and Japan.

The first round of data collection (GGS-I, 2004–2012) included data on more than 200,000 individuals aged 18–79 from 20 countries (in three waves). The second round of data collection (GGS-II) is ongoing. Data include Harmonized Histories, which focus on fertility and partnership histories, and the Contextual Database, which contains comparable, aggregated contextual data that can be linked to individual-level GGS data. The Contextual Database contains demographic, economic and policy indicators for around 60 countries.

#### ***Relevant questions from the GGS***

##### *Measures of fertility intentions*

- Childbearing intentions:
  - “Do you intend to have a/another child during the next three years?” (answers: definitely not; probably not; probably yes; definitely yes)
  - “Supposing you do not have a/another child during the next three years, do you intend to have any (more) children at all?” (answers: definitely not; probably not; probably yes; definitely yes)
- Child number intentions:
  - “How many (more) children in total do you intend to have?” (\_\_\_ children)
  - For only pregnant women and men with a pregnant partner: “Not counting your current pregnancy, how many more children in total do you intend to have?” (\_\_\_ children)

Here, the question requests a response to the *additional* intended number of children (not counting a current pregnancy) *or*, for those who do not have any children as of yet, the question asks for the respondent’s intended total number of children.

Questions also include intention to adopt/foster or apply for adoption.

#### ***Household Income and Labour Dynamics in Australia***

The Household Income and Labour Dynamics in Australia (HILDA) survey, a part of the GSS, is a nationally representative household-based panel survey that collects information yearly from each person aged 15 and older living in the household at the time of interview. Identical sets of questions are addressed to both partners.

In addition to the GSS questions (see above), HILDA also captures the strength of intendedness. Relevant HILDA questions (not all of them covered in the presentation) include:

- “Now a question about any future children. Using the scale (show card), I now want you to pick a number between 0 and 10 to show how you feel about having (more children/a child) in the future (on a scale of 0–10, with refused and “don’t know” options). The more definite you are that you would like to have a child/more children, the higher the number you should pick. The more definite you are that you do not want to have a child/more children, the lower the number.”
- “And how likely are you to have more children/a child in the future? (on a scale of 0–10, with “refused” and “don’t know” options). Pick a number between 0 and 10, the more likely it is that you will have a child/more children, the higher the number you should pick. The less likely it is, the lower the number.”
- “How many (more) children do you intend to have?” (answers: intended number of children excluding any already had; refused; don’t know.)

### 7.3. Context/Setting

In low-fertility contexts, the focus has been on fertility intentions rather than on unmet need. The GGS is a longitudinal panel survey that collects micro- and macro-data. Twenty countries have conducted at least one wave of data collection, and 12 have conducted at least two waves.

Many studies related to unintended births have been published utilizing data from the GGS surveys. However, all of them have focused on countries where fertility is below replacement level. This presentation provides data and results from surveys for Austria, Bulgaria, France, Hungary, Lithuania and the Netherlands, in addition to data from Australia.

The key concepts and measures utilized included:

- Birth intentions, understood as an intention to have a/another child
- Child number intention, which is the intensity of intention to have a(nother) child, given family size
- Child timing intention, which is the intention to have a child during a given temporal frame (Including the temporal frame is important, as it elicits more accurate responses.)

When measuring fertility intentions, attention to the meanings is important, as small shifts in language can significantly alter meaning.

### *Theoretical frameworks*

Three commonly used theoretical frameworks in the study of fertility intentions in low-fertility settings are:

- The *traits-desires-intentions-behaviors theoretical framework* (Miller 1994; Miller 2011), which considers the dyadic nature of reproduction and the interactions between partners at each stage.

This theory suggests that the motivational forces driving individuals’ and couples’ fertility-related behaviors unfold sequentially. The process begins with nonconscious motivational dispositions (*traits*) to have or not have children, leading to conscious *desires* to have children or not, which in turn lead to conscious *intentions* to have children or not, and, lastly, to the performance of behaviors instrumental to achieving or avoiding

childbearing. Motivational traits can be positive or negative; desires and intentions can be divided into childbearing, child number, and child timing desires and intentions; and behavior can be divided into proceptive (i.e., steps taken to conceive) or contraceptive, resulting in the outcomes measures (e.g., births) (Miller 2011).

- The *theory of planned behavior* (Ajzen 1991; Ajzen & Klobas 2013), which considers three groups of factors that influence intentions to be proximate determinant of fertility.
  - (1) Personal positive or negative attitudes toward having a child, either now, as soon as possible, or within a temporal range (e.g., three years, as used in the surveys).
  - (2) Perceived norms (e.g., what relevant others would say if I were to have a child)
  - (3) Perceived behavioral controls (i.e., the possible obstacles to carrying out fertility intentions, such as availability of housing)
- The *conceptual life course model* (Testa, forthcoming), which aims to enlarge the set of decisions that are linked to and surround the intention to have a child. The model includes an understanding that people make decisions in different life domains (e.g., education or career) that may be closely related to family formation. It is important to investigate the transition from the intention to have a first, second or third child and link it to other decision domains (e.g., education, work, health, partnership).

#### 7.4. Findings

The decision to have a child is a dyadic decision (Testa & Bolano 2021). The investigators pooled three waves of HILDA data (2005, 2008 and 2011)—which included 6,981 heterosexual couples, including those married or in a de facto relationship living together at the time of interview—to examine the intention-outcome link for fertility, taking a couple-level approach.

- Disagreement over having *a first child* is located between “agreement on yes” and “agreement on not,” with half of disagreeing couples having a child.
- Disagreement on having *another* child shifted more toward “agreement on not” and most often prevented birth of child.
- Women prevailed in decisions on having a first child and on the transition to parenthood.
- A symmetric double-veto model is evident in decisions on a second or additional child.
- The results highlight an additional element: partners’ disagreement, which could be included within existing theoretical frames (e.g., the theory of planned behavior) as an element of perceived behavioral control (i.e., if the partner sees the disagreement as an obstacle in the realization of their plans).

#### 7.5. Advantages and Disadvantages

*Advantages* (Testa & Bolano 2021):

- The predictive power of fertility intentions is more accurate in models that include both partners’ views.
- Couple disagreement contributes to understanding reasons why birth intentions do not always match subsequent outcomes.

*Disadvantages* (Testa & Bolano 2021):

- The model’s high-level data requirements cannot be fully met by the existing dataset (e.g., the length of the observation period does not allow detection of whether the lack of childbirth reflects temporary postponement or a definitive abandonment of childbearing intentions).

- The approach is unable to treat the intention to have a second child and that of having a third or higher order birth separately.
- Limited information on couples' contraceptive behavior prevents disentangling whether partners have already changed their contraceptive behavior aimed at achieving their pregnancy intentions, or just intended to do so at time of interview.
- Uncertainty, an important factor in birth intentions, is hard to measure using a binary scale and potentially underestimates disagreement between partners.

## 7.6. Comparison with Other Methods

No information is readily available.

## 7.7. Next Steps

Even though introducing a temporal framework (three years) is useful, unexpected events may occur during this time (e.g., partnership, work, etc.), influencing the ability to implement fertility intentions.

- An additional question may be needed to identify those who have stopped contraceptive use among those who reported intending to have a child in the next three years.
  - Studies showing that those who reported intention to have a child in the next three years did not also report they had stopped using contraception suggests that they may have not yet implemented the behavior that aligns with their intentions. There is room for improvement in the measurement of intention.

Couple disagreement is one of the reasons explaining difference between individual intention and final outcome.

- Surveying only one individual in a couple may miss information, particularly on intentions. There is a need to account for both partners' intentions.
  - Dyadic intention is reported independently by partners, but it misses information about negotiations that may have occurred previously. (HILDA has these data.)
    - Researchers may need to account for *why* partners report the same intention and potentially need to improve data on how this context and negotiation is captured/understood, to enable a more in-depth understanding of couple agreement and disagreement.
    - Another way to capture this may be to gather objective information on intentions and then on the partner's perceived view on childbearing decisions (which could account for discordant views).

## 7.8. Selected Additional Variations in Question Wording

None are readily available.

## 7.9. Key References

*Note:* For information on GGS Waves 1, and 2 (doi: 10.17026/dans-z5z-xn8g, and doi: 10.17026/dans-xm6-a262), see Gauthier, A.H., S.L. Farinha Cabaço & T Emery. 2018. Generations and Gender Survey study profile. *Longitudinal and Life Course Studies* 9(4):456–465, doi: 10.14301/lcs.v9i4.500, or visit the GGP website (<https://www.ggp-i.org/>) for methodological details.



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## **8. Population Measures of Retrospective Pregnancy Orientations in the US: National and State-Level Data—Kathryn Kost, Guttmacher Institute**

### **8.1. Objectives**

The value of continuing to measure unintended pregnancy has been called into question in the United States, particularly because of the large body of research critiquing the measure and because it is considered a poor indicator of reproductive autonomy (Potter et al., 2019). Others argue that the primary issue is not with the concept of unintended pregnancy—the experience of having a pregnancy one did not want to have, whether at the time it occurred or ever—but with how to measure it (Kost & Zolna, 2019). Too often, research has relied on a binary measure of pregnancy intentions (unintended and intended) and erroneous assumptions that “intentions” and plans (or lack thereof) were being measured. A large body of research to date has demonstrated the need to expand measurement beyond the conventional categories currently used in retrospective surveys. As a first step toward widening consideration of other attitudes and feelings that individuals had toward a pregnancy they experienced, the term pregnancy “orientations” can be used, rather than pregnancy “intentions,” to examine the opportunities and limitations in current data sources.

This workshop presentation focused on national data sources that are available to measure pregnancy orientations in the United States. Measurement of pregnancy orientations for state populations are based on data from the Pregnancy Risk Assessment Monitoring System (PRAMS) state-level surveys; national estimates are based on data from the NSFG. The objective of the presentation was to report on retrospective measures of pregnancy orientations in these two sources, to understand what they provide and their limitations, and to identify ways to improve measurement of pregnancy orientations going forward.

### **8.2. Questions/Methods**

This work focused on obtaining population-level measures of the incidence of pregnancy in the United States, characterized by differing pregnancy orientations at the time the pregnancies occurred. As such, data are needed on how individuals had felt about becoming pregnant or having a baby prior to the pregnancy (retrospective information).

#### ***Representative survey data with pregnancy orientations measures***

A number of different data sources are available in the United States, some nationally representative and some representative at the state level. Data used to estimate distributions of pregnancy outcomes by pregnancy orientation categories come from:

- *National estimates among births:* The NSFG, which is conducted by the National Center for Health Statistics (NCHS), is an interviewer-led, door-to-door household-based survey. (Questionnaires are available at [https://www.cdc.gov/nchs/nsfg/nsfg\\_questionnaires.htm](https://www.cdc.gov/nchs/nsfg/nsfg_questionnaires.htm))
  - It is representative of all U.S. women aged 15–44 (recently expanded to ages 15–49).
  - At one time a periodic survey, the NSFG now conducts near-continuous data collection, with results released every two years.
  - It includes a pregnancy history.
  - The latest NSFG release covers interviews from 2017–2019.
- *State-level estimates among births:* The PRAMS surveys are conducted by the U.S. Centers for Disease Control and Prevention (CDC). Questionnaires are available at <https://www.cdc.gov/prams/questionnaire.htm>.
  - Data are representative of all state residents giving birth in a calendar year.

- Samples are drawn from birth certificates; questionnaires are sent to all eligible participants within six months of the birth.
- Forty-six states participate, covering 81% of all U.S. births.
- PRAMS is fielded annually.
- *National (and used for state-level) estimates among abortions:* The Abortion Patient Survey (APS) is conducted by the Guttmacher Institute. The 2014 questionnaire is available at <https://www.openicpsr.org/openicpsr/project/163962/version/V1/view>.
  - APS is a nationally representative survey of patients obtaining abortions in clinics.
  - Questions on pregnancy orientation are similar to those used in the NFSG and PRAMS.
  - The survey is conducted periodically (approximately once every six years).

All of these sources of retrospective survey data include slightly different wordings of questions about pregnancy desires and timing.

### ***NSFG measures***

- Pregnancy wantedness question:
  - “*Right before you became pregnant (with your (nTH) pregnancy which ended in (DATE)/this time), did you yourself want to have a(nother) baby at any time in the future?*” (answers: yes; no; not sure/don’t know)
    - If response was not sure/don’t know, respondents are directed to a follow-up question: “*It is sometimes difficult to recall these things but, right before (this/that) pregnancy began, would you say you probably wanted a(nother) baby at some time in the future or probably not?*” (answers: probably yes; probably not; didn’t care]
- Pregnancy timing question:
  - [If YES]: “*So, would you say you became pregnant too soon, at about the right time, or later than you wanted?*” (answers: too soon; right time; later; didn’t care)
    - [If TOO SOON]: “*How much sooner than you wanted did you become pregnant?*” (number and months/years)
    - [If LATER]: “*How much later than you wanted did you become pregnant?*” (number and months/years)

### ***PRAMS measures***

- Pregnancy wantedness and timing (obtained in a single question):
  - “*Thinking back to just before you were pregnant, how did you feel about becoming pregnant?*”
    - In survey questionnaires through 2011, there were four answer options: I wanted to be pregnant sooner; I wanted to be pregnant later; I wanted to be pregnant then; I didn’t want to be pregnant then or any time in the future.
    - Beginning in 2012, a fifth answer option was added: I wasn’t sure what I wanted.

### ***Guttmacher Institute’s 2014 APS (Module A) measures***

- Pregnancy wantedness question:
  - “*Right before you became pregnant, did you want to have a(nother) baby at any time in the future?*” (answers: yes; no; not sure, don’t know; didn’t care)
- Pregnancy timing question:
  - “*So would you say you became pregnant...?*” (answers: too soon; at the right time; later than I wanted; didn’t care)

Note that in all surveys, the questions do not ask specifically about “intentions” or pregnancy planning; they ask about desire or wanting a pregnancy or a baby, and how the individual felt about the timing of the pregnancy that occurred. This is one of the reasons we prefer to use the term pregnancy “orientations” rather than “intentions” in characterizing these measures. We recognize that the questions do not capture all “orientations” and that this term itself may not be ideal.

### 8.3. Context/Setting

To measure the incidence of pregnancy (nationally and for individual states), data sources needed include:

- *Births*: NCHS and Vital Records (birth certificates)
- *Abortions*: Guttmacher Institute’s Abortion Provider Census
  - Near continuous data collection, released every three years
  - Number of abortions occurring annually nationally and to residents of each state
- *Fetal loss*: There is no U.S. national registry or source of reliable population-level data. Fetal loss is estimated from relative incidence of births and abortions (Maddow-Zimet & Kost, 2021).

These data are combined with pregnancy orientations data from the NSFG, PRAMS and the APS to produce estimates of unintended and intended pregnancies. Details on the calculations are available at Kost et al. 2022 and Kost et al. 2021.

### 8.4. Findings, Direction and Magnitude

#### *Effect of changes in response options on pregnancy desires (PRAMS measures)*

Using the 2012 addition of “I wasn’t sure what I wanted” response option to the PRAMS survey question as a natural experiment, Maddow-Zimet & Kost (2020) examined the effect of this change in the answer options provided on the distribution of births across categories of pregnancy orientations. They used a regression discontinuity-in-time design to test for differences in the proportion of women choosing each response option in three-year periods before and after the question change. Key findings included:

- After introduction of the additional answer option, 13–15% of individuals across states with available data chose the new response option.
- The additional response option drew responses *away* from all other response categories except “I wanted to be pregnant then.”
- The impact of the new response option was not associated with predictable patterns. Effects were not uniform across age, parity or race/ethnicity; the shift away from other answer options differed across states as well.
- This raises additional questions about how survey questions are asked, how respondents interpret them and how researchers interpret them.
- The “not sure” answer option was an important addition and is a significant improvement to the measurement of pregnancy desires.
- Expanding the number of answer options will influence estimated levels and trends of the proportion of births that are characterized as wanted at the time they occurred, wanted later or unwanted, as well as estimates of differences between demographic groups. This means that new estimates cannot and should not be compared with those from surveys that do not include the additional answer option (i.e., earlier PRAMS surveys).

### ***Limitations and constraints in construction of pregnancy desire measure using national level data***

NSFG data are used to classify pregnancy orientations of births only and cannot be used for analyses that include abortion—for example, estimation of indicators for all pregnancies—because of sizable underreporting of abortions in the NSFG. Indeed, the latest research shows that incomplete reporting of abortion remains a shortcoming of several major U.S. surveys, including the NSFG (Lindberg et al. 2020). Researchers estimate that nearly 11% of all pregnancies were missing from the 2006–2015 NSFG data because of abortion underreporting (Desai et al. 2021).

NSFG questions on wantedness and timing of all pregnancies are asked in a detailed calendar history of pregnancies and contraceptive use. Kost et al. (2022) focused on understanding *how* these questions are asked in the survey, who is or is not asked, and what happens if a respondent responds with uncertainty, as well as on producing estimates that are closely aligned with the survey’s measures. To that end, they avoid applying conventionally used terms such as “intended” and “unintended” for pregnancies and used the language of the survey response options respondents chose (e.g., “pregnancies wanted later than they occurred” rather than “mistimed”). This analysis identified some important limitations in the NSFG:

- Tracing the interview questions in the NSFG illuminates that determining pregnancy orientations is not just tied to two questions on the wantedness of a baby prior to a pregnancy and the timing of the pregnancy.
  - Most of the pregnancies ending in birth in the NSFG are categorized as wanted because respondents reported that they had stopped using, or were not using, contraception because they wanted to get pregnant. Such respondents are skipped past the wantedness question and never asked if they had wanted to have a baby prior to the pregnancy. However, asking if you were not using contraception because you wanted to get pregnant is not the same as asking “Right before you became pregnant, did you yourself want to have a baby at any time in the future?”
- The NSFG does not provide response options for uncertainty or ambivalence. If respondents reply they are unsure or don’t know or give any other response other than “yes” or “no,” they are directed to follow-up questions to encourage them toward one of the existing response options.
- The timing question does not specifically ask respondents to think back and recall their feelings toward the pregnancy’s timing (as the wantedness question does). The interviewer introduces the set of questions by telling respondents that they will be asked about the time just before they became pregnant. Still, given the framing of the question (“*So, would you say you became pregnant too soon, at about the right time, or later than you wanted?*”), some respondents may interpret it as asking what they think about the timing now.
  - This calls into question the interpretation of the timing responses; some respondents may be reporting on how they felt about the pregnancy prior to its occurrence, some at the time it occurred and others their current feelings about the timing.

### ***Abortion Patient Survey***

The APS survey questions on determining wantedness and desired timing of pregnancies that ended in abortion mirror those in the NSFG. The APS directs all respondents who answer the wantedness question to the timing question, except for those who replied “No.” However, respondents were not offered the option of “not sure” in relation to timing.

### **8.5. Advantages and Disadvantages**

The addition of the uncertainty response option to PRAMS offers a more refined measure and broadens understandings of pregnancy orientation. It can also influence estimated levels and trends of the proportion of births that are characterized by other pregnancy desires (e.g., unwanted, or occurred too soon), as well as estimates of differences between demographic groups. This illustrates the need both to include uncertainty as a valid answer option in surveys and to explore additional characterizations of feelings about prior pregnancies that better align with survey respondents' affective orientations toward them.

In contrast, the NSFG and APS measures are not designed to fully enable respondents' pregnancies to be characterized by uncertainty. Findings from PRAMS and other surveys indicate that uncertainty should be included as a valid answer option.

In addition, assumptions about how pregnancies are characterized by pregnancy desires in the NSFG need to be questioned. The framework of "intended" and "planned" pregnancies is not consistent with the questions used or the response options recorded.

A deep dive into what is and is not measured in each survey is essential for understanding limitations of measurement of the concept of "unintended" pregnancy. Dropping the traditional language is an important first step in inviting innovation in measurement.

### **8.6. Comparison with Other Methods**

No information is readily available.

### **8.7. Next Steps**

Findings from a number of surveys, including state-level PRAMS data and a large body of qualitative research, show that uncertainty and ambivalence are important response options. Surveys should explicitly add the "not sure" answer option. In addition, researchers should consider how questions may or may not clearly indicate the reference period. The NSFG question on timing could be misinterpreted. In contrast, the PRAMS data not only include the "not sure" answer option, but the questionnaire also makes it clear the reference period matches the time reference (i.e., "I wasn't sure what I wanted").

In communicating research on pregnancy desires or pregnancy orientations, we should represent the data as accurately as we can. Language that matches what respondents have been asked ought to be used (e.g., the answer options that respondents chose—"later than wanted," "at about the right time," etc.) instead of terms like "mistimed" or "unintended." This would be cumbersome, but it would align how findings are discussed with what is measured in the survey.

The language of "pregnancy orientations" is an attempt to describe more accurately what the survey is measuring and draw attention to a break with language of "intentions" or "plans" in relation to a pregnancy. A wide body of literature exists critiquing the narrowness of the concept of pregnancy "intentions." Within our field, we may be somewhat fixated on categorizing pregnancies as "unwanted," "unintended," "mistimed" or "intended," but we are increasingly learning that we may not be measuring what we need to measure. Additionally, qualitative research finds that many of these terms do not resonate with respondents.

## 8.8. Key References

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## Conclusions

The discussions around next steps and the critical provocations offered in each panel covered recommendations on improving measurements and estimates, including surveying new populations, drawing on theories and approaches from other disciplines, and contending with questions of language and meanings.

### Thinking Across Levels

The various indicators of family size preferences, intention status (intended or unintended) and wantedness—and how they are deployed—hold differing value and utility for different audiences and across contexts. For example, different kinds of methods may be required to capture individuals' attitudes and preferences regarding pregnancy and birth to best address relevant service needs through policy formulation and implementation.

### Improving Measurements, Indicators and Estimates: Next Steps?

Participants broadly agreed that retrospective and prospective measures are underpinned by different concepts and purposes, but these need to be improved and finessed further to produce more accurate estimates in support of policy and programming. Further reflection is needed on considering how prospective questions can be applied to retrospective issues—i.e., how can data gathered prospectively be applied to what occurs at the time of the event and the interplay of factors that impacts them? While prospective items are generally preferred, how can change in desires over time be addressed?

Regarding the recommendation to add one or more questions to cross-sectional surveys on motivational strength to avoid an unintended pregnancy, to help improve prediction of contraceptive initiation and discontinuation, workshop participants expressed diverse opinions. An important point here is that some published studies do not confirm the predictive value of this question. Workshop participants also called for innovation in measurement at the individual level using person-centered approaches. In addition, participants agreed that there is value and need for researchers to compare questions and measures—both innovative and standard—to each other, to better assess which questions and measures are most useful for improving measurement of pregnancy intention and unintended pregnancy. One valuable output from such assessments is development of recommendations for additional questions that better capture reality to be proposed to large-scale survey programs like the DHS, MICS and PMA.

Further discussions around the development of monitoring indicators questioned whether the fluidity of fertility preferences mattered. These were considered at two levels: implications for policy and programs; and improved understanding of women's needs. Incorporating the fluidity of preferences may create more demand for providers to be trained and be able to respond to these shifting needs (e.g., facilitating more frequent changes in contraceptive use and method choice) and thus require adjustments in training programs. It could also allow for an understanding of these changing preferences as a form of flexibility, instead of framing contraceptive discontinuation as something negative.



### **Including a Range of Populations**

Discussions included the need for instruments to be measured across different populations and to reflect the heterogeneity of populations and family formations. For example, the DAP study respondents are a heterogeneous group that included women with substance use disorders, adolescents seeking emergency contraception, community college students, patients in primary care and transgender individuals, among others. The LMUP tested an amended instrument to capture same-sex couples having children, women having children without a partner, and nonromantic partners parenting together.

A potential new direction to better understand fertility preferences and intentions was also suggested with respect to the population group that wants a child (or more children) and who are contending with infertility and may need assisted fertility services. This group is included in standard survey questions on future fertility preferences, and some surveys can also measure the likelihood of infertility. Analysis of existing survey data can help to assess what is known about this population group and identify evidence gaps and additional questions that may be needed. Additionally, suggestions were made about potentially articulating new, specific questions for individuals and/or couples who do plan and intend their pregnancies.

### **Timing**

As Machiyama's work (Section 2) underscores, preferred waiting times are an important predictor of subsequent pregnancy and may help in the design of service provision and family planning programs.

Workshop participants also questioned if the strong focus on "timing" was warranted. Some argued that "timing" has different meanings in different contexts and may also point to the measurement of *expectations* of peoples' approach to childbearing. In the United States, for example, "postponement," rather than resulting from a goal of achieving ideal timing of a birth, may be the result of several different events or decisions over the life course.

### **Language**

Across the two days and all of the panels, participants reflected on the language used to measure, describe or communicate complex concepts and measures, as well as its relevance to and applicability for policymaking.

Yeatman (Section 6) and Kost (Section 8) use the language of "orientations," reflecting the flexibility and changeability of desires, timing, wantedness, uncertainty, ambivalence and other characterizations of individuals' feelings toward pregnancy, which current measurement approaches may or may not capture. In particular, survey questions often do not recognize uncertainty as a valid answer option for one's orientation toward pregnancy.

In addition, interpretation of data on "mistimed" and "unwanted" pregnancy or birth does not always accurately reflect what the questions measured. In addition, these concepts and questions may not be applicable to individual life circumstances or experiences or account for flexible "orientations."

Kost (Section 8) advocates for improving the alignment of researchers' descriptions of the findings with the wording of the survey instruments and response options. Use of the terms "intended" and "unintended" often do not reflect what has been measured.

While the shifts in language and in how pregnancy intentions are described are important, there are also implications for providers and for policy. Here, participants underscored the need to ensure that survey instruments include specific questions that capture women's needs, but that are not necessarily tied to the intention status of their pregnancies. The resulting information could be utilized in designing and delivering relevant policies and programs that are responsive to individuals' service needs.

The workshop brought together expert researchers to critically review and assess existing approaches for the measurement of unintended pregnancy, as well as to reflect on new and emerging approaches. This report reflects the rich presentations around a number of dimensions linked to pregnancy intention status and fertility preferences, including study design, survey questions and analytical approaches. It also underscores the importance of these approaches for meeting the needs of individuals and couples, as well as their key role in policy and program design and delivery.

## Appendix A

### Workshop Agenda

#### **International Workshop on methodologies for measuring pregnancy intention, and unintended pregnancy and birth**

*Location: Online    Dates: May 13–14, 2021*

Organized by the IUSSP Scientific Panel on Abortion Research,

*Programme*  
*Times stated are for Paris*

### **Thursday 13 May 2021: Day 1**

#### **16:00–16:10 Welcome and Introduction to Objectives**

Welcome—IUSSP (Mary Ellen Zuppan) [3 mins]

Introduction to Objectives of meeting (Organizers—Susheela/Fatima) [5 mins]

#### **Chairperson for Day 1    Ndola Prata**

#### **16:10–16:30 Session 1**

##### **John Casterline**

**Overview of measures of unintended pregnancies/births from cross-sectional surveys of MLDC (DHS, MICS, PMA2020) [15 mins]**

[Clarifying questions 5 mins]

#### **16:30–17:05 Session 2**

##### **Kazuyo Machiyama**

**Pregnancy wantedness, strength of fertility preferences and retrospective versus prospective measurement [10 mins]**

Harriet Birungi, Discussion Leader

Open Discussion

#### **17:05–17:40 Session 3**

##### **Aparna Jain**

**Approach to measuring pregnancy intentions and motivational strength [10 mins]**

Akinrinola Bankole, Discussion Leader

Open Discussion

#### **17:40–17:50 BREAK**

**17:50–18:25 Session 4**

**Corinne Rocca**

**The Desire to Avoid Pregnancy (DAP) Scale for pregnancy preferences and London Measure of Unplanned Pregnancy (LMUP) [10 mins]**

Ilene Speizer, Discussion Leader

Open Discussion

**18:25–18:35**

**Wrap-up of Day 1**

— — — —

**Friday 14 May 2021: Day 2**

**Chairperson for Day 2 Harriet Birungi**

**16:00–16:05 Welcome—Day 2**

**16:05–16:40 Session 5**

**Sara Yeatman**

**Measuring fertility desires, predictability and flexibility [10 mins]**

Rishita Nandagiri, Discussion Leader

Open Discussion

**16:40–17:15 Session 6**

**Maria Rita Testa**

**Measurement of unintended pregnancy and fertility intention: Data and approaches from European surveys [10 mins]**

Fatima Juárez, Discussion Leader

Open Discussion

**17:15–17:30 BREAK**

**17:30–18:05 Session 7**

**Kathryn Kost**

**Population measures of retrospective pregnancy orientations in the US: National and state level data [10 mins]**

Ndola Prata, Discussion Leader

Discussion

**18:05–18:50 Session 8**

**General Discussion**

John Casterline, Discussion Leader

**18:50–19:00**

**Wrap up and Next Steps**

Susheela Singh and Fatima Juarez

## Appendix B

### Workshop Participants

#### **International Workshop on methodologies for measuring pregnancy intention, and unintended pregnancy and birth**

*Location: Online Dates: May 13–14, 2021*

### List of Participants

#### **Presenters:**

John Casterline, Ohio, USA  
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