

Comparison of a Timing-Based Measure of Unintended Pregnancy and the London Measure of Unplanned Pregnancy

CONTEXT: Unintended pregnancy is a universal benchmark for reproductive health, but whether variations reflect differences in measurement and how well measures predict pregnancy outcomes warrant further examination. U.S. and British measures of unintended and unplanned pregnancy offer a useful comparison.

METHODS: Some 220 women seeking pregnancy testing at the Columbia University Medical Center in 2005 responded to three pregnancy measures: a binary timing-based measure of unintended pregnancy (TMUP); a multi-item measure of timing-based intentions and planning behaviors, the London Measure of Unplanned Pregnancy (LMUP); and a measure combining intentions (from the TMUP) and how women would feel about a positive pregnancy test. Six-month pregnancy status was assessed among 159 respondents. Estimates of unintended and unplanned pregnancy were calculated using the TMUP and the LMUP, and receiver operating characteristic (ROC) curves were generated to assess congruence.

RESULTS: According to the TMUP, 76% of pregnancies were unintended; by contrast, LMUP scores categorized 39% as unplanned. The ROC curve indicated that expanding the range of scores for classifying pregnancies as unplanned on the LMUP would achieve greater congruence between these measures. At six months, the proportion of pregnancies that had ended in abortion was 42% of those classified as unintended using the TMUP, 60% of those classified as unplanned using the LMUP and 71% of those that women said they had not intended and were very upset about.

CONCLUSIONS: U.S. and British measures of unintended pregnancy are not directly comparable, and a measure combining intentions and feelings may better predict pregnancy outcomes.

Perspectives on Sexual and Reproductive Health, 2016, 48(3):139–146, doi: 10.1363/48e11316

By Abigail R.A. Aiken, Carolyn L. Westhoff, James Trussell and Paula M. Castaño

Abigail R.A. Aiken is assistant professor, LBJ School of Public Affairs; and faculty research associate, Population Research Center, University of Texas at Austin. Carolyn L. Westhoff is professor, and Paula M. Castaño is assistant professor, both at the Department of Obstetrics and Gynecology, Columbia University Medical Center, New York. James Trussell is emeritus professor of public and international affairs, Office of Population Research, Princeton University, Princeton, NJ.

In the United States, 45% of pregnancies in 2011 were unintended.¹ In Britain, only 15% of pregnancies in 2010–2012 were unplanned.² Unintended pregnancy is a benchmark for women's reproductive health worldwide, and its reduction is a national goal in the United States.³ Thus, comparison of the British and U.S. estimates and the underlying reasons for the large difference between them is of considerable interest to public health practitioners and policymakers.

Yet meaningful comparison of national estimates is challenging. Direct comparison may be misleading because country-specific estimates may be based on different measures. In the United States, the measure is of unintended pregnancy, whereas in Britain, it is of unplanned pregnancy. The two terms are used synonymously in Britain, and the U.S. Department of Health and Human Services makes no distinction between them.³ However, a large body of research has demonstrated that “plans,” “intentions,” “feelings” and “desires” are not interchangeable terms. Rather, each represents a different aspect of women's perspectives regarding pregnancy and the translation of those perspectives into behaviors.^{4–9}

In the United States, the proportion of pregnancies that are unintended is estimated using the classic timing-based measure from the National Survey of Family Growth

(NSFG).¹⁰ Pregnancies are classified as unintended if they occurred sooner than wanted, and are subclassified into unwanted (not intended at any time) and mistimed (intended sometime, but not when they occurred). In Britain, the proportion of pregnancies that are unplanned is estimated using the London Measure of Unplanned Pregnancy (LMUP), which was developed in response to the observation that women often use different language than do researchers when talking about pregnancy intentions.¹¹ The LMUP consists of six questions, each of which assesses a different aspect of thoughts and behaviors prior to pregnancy (e.g., stopping the use of contraceptives, discussing pregnancy with a partner and health behavior changes prior to getting pregnant). Each response is scored 0, 1 or 2, and responses are summed to obtain a composite score between 0 and 12. Pregnancies are then classified as unplanned (for scores of 0–3), ambivalent (4–9) or planned (10–12).^{2,11} Thus, the U.S. and British measures are comparing different aspects of women's thoughts and behaviors toward pregnancy.

These differences in measurement reflect a wider paradigm shift in the literature on pregnancy intentions and the conceptualization of unintended pregnancy. Prior research has demonstrated that pregnancy intentions are often complex and nonbinary.^{12–14} Many women express ambivalence

about avoiding pregnancy, in that they are neither explicitly trying to get pregnant nor explicitly trying to avoid it.^{15,16} As new measures are developed to reflect this complexity, it becomes necessary to understand how single-item timing-based measures compare with more detailed and inclusive multi-item measures. Such understanding will illuminate the relationship between existing measures and new ones, facilitate comparisons across contexts and help identify the elements of new measures that offer advantages over traditional ones for predicting pregnancy outcome. For example, emotional orientations toward pregnancy may matter more than timing-based intentions for women's decision making on whether to continue a pregnancy, as well as for health and social outcomes if the pregnancy is continued.¹⁷ Whether an unintended pregnancy is viewed and experienced as a positive event depends on social and cultural context.^{18,19} Similarly, an unintended pregnancy that is greeted with happiness may result in very different outcomes than one that is greeted with unhappiness.²⁰

Prior comparative work has identified differences in estimates of unintended and unplanned pregnancy between different measurement methods. Kavanaugh and Schwarz compared two three-category measures of pregnancy intentions, one based on answers to a single question and the other based on combined answers to multiple questions (a modified LMUP).²¹ Among a sample of women in Pittsburgh awaiting pregnancy test results, they found that 68% of responses to the two measures were concordant, and that the proportion of pregnancies reported as unintended or unplanned was higher according to the single-item measure. Moreau et al.²² randomly assigned participants reporting on prior pregnancies in a French national survey to answer a question either about whether they had planned their pregnancy or about whether they had wanted their pregnancy. Some 34% of pregnancies were "unplanned," and 27% were "unwanted." Kaufmann et al.²³ compared question formats on pregnancy intentions from the NSFG and Demographic and Health Surveys among a sample of women reporting on prior pregnancies in Arizona, and found that 25% gave discordant responses to the two formats regarding their most recent pregnancy. These empirical differences between measures are supported by insights from qualitative work exploring women's conceptualizations of pregnancy.^{24,25}

A major barrier to elucidating the relationship between the U.S. and British measures is that no surveys have collected responses to both measures from the same group of women. We addressed this research gap with a view to guiding comparison between the two measures and gaining insight into the power of a single- versus a multi-item measure to predict pregnancy outcome. We employed a survey of women presenting for a pregnancy test at a single site in New York City; a subset of the sample responded to both types of questions. This survey also included a measure of women's emotional orientations toward pregnancy, which, in conjunction with the timing-based intentions measure, allowed us to go a step further and construct a

measure combining intentions and feelings. Our goals were to evaluate congruence between the binary timing-based measure of unintended pregnancy (TMUP) and the three-category LMUP; determine the categorizations of scores in the LMUP that maximized congruence between the two measures; and evaluate the ability of the TMUP, the LMUP and the measure combining intentions and feelings to predict pregnancy outcome and status.

METHODS

Sample

This analysis used a subset of data from a cross-sectional study of 1,539 women of reproductive age who presented for pregnancy testing at the Family Planning Center of the Columbia University Medical Center between July 2004 and May 2005. The clinic serves mainly low-income, urban, medically underserved, Latina patients—predominantly of Dominican origin—and is the point of entry for prenatal and abortion care in this health care system. The primary purpose of the main study was to examine pre-conception health behaviors. Women were eligible if they spoke either English or Spanish and did not have a chronic medical condition. Among those invited to participate, 90% were enrolled. Of those not enrolled, 53% declined and 47% were ineligible. The institutional review board of the Columbia University Medical Center approved the study.

A bilingual research assistant approached women presenting to the clinic for pregnancy testing, asked if they were willing to participate and obtained written informed consent while they awaited their test results. The assistant then administered a questionnaire in either English or Spanish regarding demographic characteristics, reproductive history, intention to become pregnant (the TMUP) and feelings about the potential pregnancy. Between March and May 2005, women also completed the LMUP. The medical center's Hispanic Research and Recruitment Center translated the questionnaire into Dominican Spanish. The original British version asked participants to "tick" the selected answer; this was changed to "select." Respondents who completed the study received a subway fare card equivalent to two rides for travel expenses incurred on the day of their participation. We conducted a chart review six months after the initial interview, using electronic medical records to determine patients' pregnancy status.

In all, 248 women completed the LMUP component; of those, 220 were included in our baseline analytic sample. We excluded those who identified themselves as black (12 women), white (four) or Asian (two), because attitudes toward pregnancy may vary considerably by race or ethnicity,^{26,27} and these groups were too small to be analyzed separately. We also excluded those who reported not knowing how they would feel if they found out they were pregnant (five women), since this group was also too small to be analyzed separately and did not obviously belong in any other category. Finally, five women reported getting negative results from home pregnancy tests and presented

for confirmation of this result; these women also were excluded.

Among the 220 women in our baseline analytic sample, we obtained data on pregnancy outcome or status at six months for 173 (representing 79% follow-up). No women reported having had an ectopic pregnancy. Fourteen women reported having had a miscarriage and were excluded, as they did not make a decision about the outcome of their pregnancy. Thus, our six-month analytic sample included 159 women.

Variables

•**Intentions and feelings.** At the baseline survey, all women in the analytic sample answered the TMUP, LMUP and emotional orientation questions with respect to their current possible pregnancy.

Women were first asked the TMUP question: “Did you plan on becoming pregnant now?” They were then asked the six LMUP questions, which covered their contraceptive use in the month they became pregnant (always used, sometimes used, never used); their perception of the timing of potentially becoming a mother (“wrong time,” “ok but not quite right time,” “right time”); their intention about potentially becoming pregnant (“did not intend,” “intentions kept changing,” “intended”); their feeling about having a baby (“wanted to,” “had mixed feelings,” “did not want to”); discussion with a partner about potentially becoming pregnant (no discussion, discussion but no agreement, agreement on pregnancy); and any measures they had been taking to prepare for pregnancy (took folic acid, stopped or reduced smoking, stopped or reduced drinking, ate more healthily, sought medical or health advice, other; responses were categorized as none, one, or two or more).

Finally, women were asked how they would feel if their test turned out to be positive; response options were “very happy,” “somewhat happy,” “somewhat upset,” “very upset” and “don’t know.” We combined women’s answers to this question with their answers to the TMUP to create an eight-category measure of feelings and intentions with the following classifications: “unintended and very happy,” “unintended and somewhat happy,” “unintended and somewhat upset,” “unintended and very upset,” “intended and very happy,” “intended and somewhat happy,” “intended and somewhat upset” and “intended and very upset.”

•**Background characteristics.** Because prior work had identified variables that may be associated with the likelihood of experiencing unintended pregnancy,¹ women were also asked to provide baseline information on their age, race or ethnicity, parity, education level, relationship status, nativity and—as proxies for economic resources—insurance status and employment and work status.

•**Pregnancy outcome and status.** At the six-month chart review, we recorded whether the pregnancy was ongoing or whether an abortion (available within the same medical center), miscarriage or ectopic pregnancy had occurred. We combined ongoing pregnancies and births into a single

category called “continued pregnancy.” Hereafter, this variable is referred to as “pregnancy status.”

Analysis

Using the TMUP and LMUP approaches, we calculated estimates of the prevalence of unintended and unplanned pregnancy. We then generated receiver operating characteristic (ROC) curves to assess congruence between the TMUP and LMUP findings and to examine graphically how to maximize congruence. An ROC curve is a plot of “true positives” against “false positives” for different cut points of a measurement scale, usually a diagnostic test.²⁸ It displays the trade-off between sensitivity (i.e., the proportion of true positives that are correctly identified) and specificity (i.e., the proportion of true negatives that are correctly identified); any increase in one will be accompanied by a decrease in the other.

We examined which category of scores in the LMUP best matched the unintended category in the TMUP, and which category in the LMUP best matched the intended category in the TMUP. True and false positives were therefore defined with respect to the TMUP. For example, the LMUP uses a 13-point scoring system, and if we classified scores of 0–12 as unplanned, then all pregnancies would be classified as unplanned, including 100% of pregnancies classified as unintended by the TMUP. Thus, the true positive rate would be 100%. Unfortunately, the false positive rate would also be at its maximum. As we narrow the LMUP range of scores classified as unplanned to 0–11 and 0–10 and so forth, both the true positive and the false positive rates will progressively decline, reaching their lowest values when only an LMUP score of 0 is classified as unplanned. By plotting the true and false positive rates for each possible classification of LMUP scores to define unplanned, we can visually identify the LMUP classification that maximizes the true positive rate while simultaneously minimizing the false positive rate. However, by defining true and false positives with respect to the TMUP, we do not mean to imply that the TMUP is the better measure or that it yields the truth. Rather, we used these ROC curves to provide a simple but effective graphic representation of the relationship between the two measures.

Finally, we compared the proportions of pregnancies that were continued to prenatal care or delivery with the proportion that ended in abortion by TMUP and LMUP category. Neither measure assesses women’s feelings about getting pregnant, yet feelings may be more relevant to the eventual outcome of pregnancy than either intentions or plans.¹⁷ Therefore, we also compared the six-month status of pregnancies using the measure combining intentions and feelings.

All analyses were performed using Stata version 12.0.

RESULTS

Our sample was diverse with respect to age, parity and education level. Nearly two-thirds of women were in their 20s, and equal proportions of the remainder were aged 16–19

and 30–44 (Table 1). Forty-six percent were nulliparous, 30% had had one child, and 25% had had two or more. Forty-one percent of women had more than a high school education, 21% had completed high school or a GED, and 38% had less schooling. Some 54% were in a romantic relationship but not living with their partner, 41% were married or cohabiting, and 5% were not in a romantic relationship. Sixty-six percent were foreign-born, and about equal proportions were covered by Medicaid and had no health insurance. Sixty percent of respondents were either working, in school or both.

The proportion of possible pregnancies that were unintended according to the TMUP was almost double the proportion that were unplanned according to the LMUP (76%

vs. 39%). The proportions that were classified as intended and planned according to the two measures were more similar (24% vs. 17%).

Of those possible pregnancies classified as unintended according to the TMUP, 49% were classified as unplanned according to the LMUP; a further 49% were classified as ambivalent, and 2% as planned (Table 2). For pregnancies classified as intended according to the TMUP, 65% were classified as planned according to the LMUP, while 31% were classified as ambivalent; only 4% were classified as unplanned.

On the ROC curve that shows concordance between the TMUP's measure of unintended pregnancies and the LMUP's measure of unplanned ones, a score of 5 on the LMUP represents the best trade-off between maximum vertical height and minimal lateral displacement (Figure 1). In other words, LMUP scores of 0–5 would make the measures most comparable. The curve comparing the TMUP's measure of intended pregnancies and the LMUP's measure of planned ones shows that a cut point of 9 on the LMUP (i.e., scores of 9–12) would make the measures most comparable (Figure 2). These new categories would change the estimated prevalence of unplanned pregnancy in the sample to 61% using the LMUP (compared with 76% using the TMUP), and the estimated prevalence of planned pregnancy using the LMUP to 22% (compared with 24% using the TMUP).

Among the 159 women with known pregnancy status at six months, the proportions of pregnancies classified as unintended or intended and as unplanned or planned were similar to those identified in the baseline sample. According to the TMUP, the proportion unintended declined from 76% to 73%, and the proportion intended rose from 24% to 27%; according to the LMUP, the proportion unplanned dipped slightly, from 39% to 38%, and the proportion planned increased from 17% to 21%. Overall, 34% of pregnancies had ended in abortion and 66% either were ongoing or had resulted in a live birth (Table 3). The large majority of pregnancies classified as intended or planned were continued (88% in each case). By contrast, 40% of pregnancies identified as unplanned by the LMUP were continued, compared with 58% of pregnancies identified as unintended by the TMUP. Among pregnancies classified as ambivalent

TABLE 1. Percentage distribution of a sample of Latina women receiving pregnancy testing at a family planning clinic, by selected characteristics, New York City, 2005

Characteristic	% (N=220)
Age	
16–19	19.1
20–24	33.2
25–29	28.6
30–44	19.1
Parity	
0	45.5
1	30.0
2	15.5
≥3	9.1
Education level	
<high school	37.7
High school/GED	20.9
>high school	41.4
Relationship status	
Married/cohabiting	41.4
In romantic relationship	53.6
Not in romantic relationship	5.0
Nativity	
U.S.-born	34.0
Foreign-born	66.0
Insurance	
Medicaid	45.9
None	54.1
Work/school status	
Working	29.5
In school	16.4
Both	14.5
Neither	39.5
TMUP classification of possible pregnancy	
Unintended	76.4
Intended	23.6
LMUP classification of possible pregnancy*	
Unplanned	38.6
Ambivalent	44.6
Planned	16.8
Total	100.0

*Scores for unplanned, ambivalent and planned categories are 0–3, 4–9 and 10–12, respectively. Notes: Percentages may not add to 100.0 because of rounding. TMUP=timing-based measure of unintended pregnancy. LMUP=London Measure of Unplanned Pregnancy.

TABLE 2. Percentage distribution of pregnancies by LMUP planning classification, according to TMUP intention classification

LMUP classification*	TMUP classification	
	Unintended (N=168)	Intended (N=52)
Unplanned	49.4	3.9
Ambivalent	48.8	30.8
Planned	1.8	65.4
Total	100.0	100.0

*Scores for unplanned, ambivalent and planned categories are 0–3, 4–9 and 10–12, respectively. Notes: Percentages may not add to 100.0 because of rounding. TMUP=timing-based measure of unintended pregnancy. LMUP=London Measure of Unplanned Pregnancy.

by the LMUP, 79% were continued. The proportion of pregnancies that ended in abortion was 60% of those classified as unplanned using the LMUP, and 42% of those classified as unintended using the TMUP. The overall difference in pregnancy status between these two categories appears to be accounted for by the 22% of ambivalent pregnancies that were resolved through abortion.

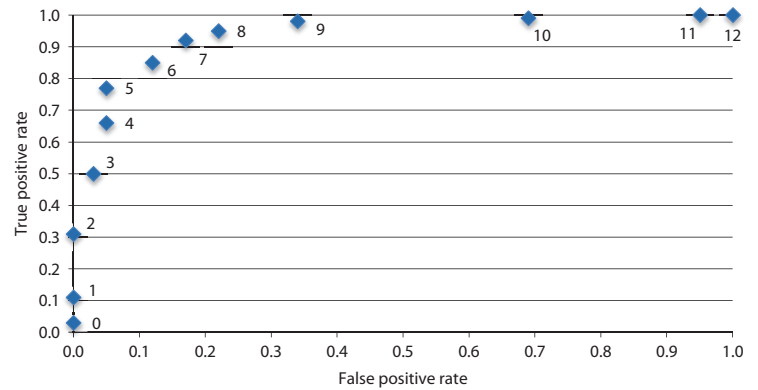
For pregnancies classified as unintended according to the TMUP, women reported a range of feelings, from very upset to very happy. Pregnancies that women said were unintended and that they professed feeling very upset about often ended in abortion (71%), as did those that women said were unintended and felt somewhat upset about (66%—Table 4). Twenty percent of pregnancies that were unintended but women felt somewhat happy about ended in abortion, whereas all of those that were unintended but respondents were very happy about were continued. For pregnancies classified as intended, no women reported feeling either very or somewhat upset. Eighty-seven percent of pregnancies that women classified as intended and were somewhat happy about, and 100% of those that were intended and women were very happy about, were continued. Thus, regardless of whether a pregnancy was classified as unintended or intended, all pregnancies that women professed feeling very happy about were continued.

DISCUSSION

Our study afforded a rare opportunity to compare different measures of unintended and unplanned pregnancy within the same sample of women. We found that the TMUP and the LMUP were not commensurate, and thus estimates of unintended pregnancy in the United States and unplanned pregnancy in Britain cannot be directly compared. For policymakers and public health practitioners who might consider drawing a lesson from Britain or from other country-specific contexts to reduce unintended pregnancy in the United States, our results indicate that apparent differences should not be taken at face value. We do not mean to suggest that one measure is superior to or more accurate than the other in terms of calculating unintended pregnancy estimates. We can, however, offer some insight into how to maximize their comparability.

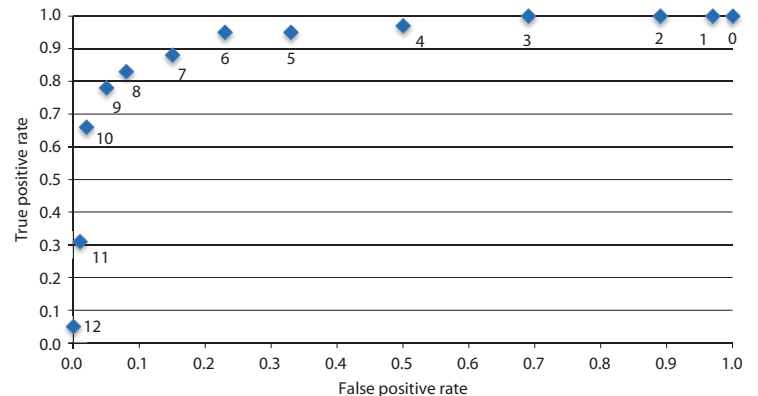
Our results also have important implications for the conceptualization of unintended pregnancy and how best to understand the complexity and diversity of women's perceptions of pregnancy. We suggest that the TMUP, the LMUP and the measure combining intentions and feelings are capturing different constructs of women's pregnancy perceptions, including plans, intentions, feelings and desires. The LMUP, by virtue of the various aspects of its six-item scoring method, captures greater nuance in women's thoughts about the possibility of being pregnant. Indeed, a substantial proportion of women in Britain and in our sample fall into the ambivalent category according to the LMUP. The difference in estimates between the TMUP and the LMUP highlights the importance of recognizing that women's attitudes toward pregnancy are multifaceted

FIGURE 1. ROC curve showing how each classification of LMUP scores relates to the identification of unintended pregnancies by the TMUP



Notes: The number accompanying each diamond is an LMUP score and indicates that any score up to that one would signify an unintended pregnancy on the TMUP. ROC=receiver operating characteristic. TMUP=timing-based measure of unintended pregnancy. LMUP=London Measure of Unplanned Pregnancy.

FIGURE 2. ROC curve showing how each classification of LMUP scores relates to the identification of intended pregnancies by the TMUP



Notes: The number accompanying each diamond is an LMUP score and indicates that any score up to that one would signify an intended pregnancy on the TMUP. ROC=receiver operating characteristic. TMUP=timing-based measure of unintended pregnancy. LMUP=London Measure of Unplanned Pregnancy.

and that estimates of unintended pregnancy may vary widely depending on the wording of the measurement. This finding also calls into question how best to classify U.S. women who are ambivalent, whom the timing-based measure does not recognize, and how to interpret the obvious heterogeneity in the ambivalent category of the British measure.

One of the key strengths of our study is the linking of all three measures to six-month pregnancy status obtained from medical records. In our New York City-based sample, difficulties accessing abortion would have been unlikely to limit women's choices.²⁹ A valuable insight from our findings is that the measure combining intentions and feelings appears to be better than either the TMUP or the LMUP at predicting actual pregnancy outcomes. One of the main motivations for public health professionals and policymakers to monitor the prevalence of unintended pregnancy in the United States is to understand the potential link to adverse health and social outcomes.³⁰

TABLE 3. Percentage distribution of pregnancies by status six months after women were surveyed, according to TMUP and LMUP classifications

Pregnancy status	All	TMUP classification		LMUP classification*		
		Unintended (N=116)	Intended (N=43)	Unplanned (N=60)	Ambivalent (N=65)	Planned (N=34)
Continued†	66.0	57.8	88.4	40.0	78.5	88.2
Abortion	34.0	42.2	11.6	60.0	21.5	11.8
Total	100.0	100.0	100.0	100.0	100.0	100.0

*Scores for unplanned, ambivalent and planned categories are 0–3, 4–9 and 10–12, respectively. †Includes ongoing pregnancies and those that had resulted in births. Notes: TMUP=timing-based measure of unintended pregnancy; LMUP=London Measure of Unplanned Pregnancy.

TABLE 4. Percentage distribution of pregnancies by status six months after women were surveyed, according to combined measure of women's intentions and feelings

Pregnancy status	Unintended/very upset (N=28)	Unintended/somewhat upset (N=29)	Unintended/somewhat happy (N=46)	Unintended/very happy (N=13)	Intended/somewhat happy (N=38)	Intended/very happy (N=5)
Continued*	28.6	34.5	80.4	100.0	86.8	100.0
Abortion	71.4	65.5	19.6	0.0	13.2	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0

*Includes ongoing pregnancies and those that had resulted in births. Note: Intentions are based on the timing-based measure of unintended pregnancy.

But do timing-based measures correlate closely with the resolution of pregnancy by abortion, and thus predict the pregnancies that women do not want to continue? To date, such measures have not been consistently or convincingly shown to predict negative outcomes for women or infants.³⁰ Our findings suggest that women's emotional orientations toward pregnancy may be a better predictor of whether a pregnancy will end in abortion. Women who professed happiness about their pregnancies, regardless of whether they classified those pregnancies as intended or unintended, were more likely to continue their pregnancies. By contrast, pregnancies that women professed unhappiness about were more likely to end in abortion than were pregnancies that women classified as unintended according to the TMUP or unplanned according to the LMUP. Interestingly, the story was not straightforward in every case, as some women who were classified as ambivalent according to the LMUP or as somewhat happy according to the measure combining intentions and feelings opted to have an abortion. This minority demonstrates that the link between unintended pregnancy and pregnancy outcome is nuanced and deserves further attention.

We believe that these findings demonstrate the need to shift the policy conversation regarding unintended pregnancy, which is currently dominated by the desire to prevent adverse outcomes by preventing all unintended pregnancies. The variety of choices made by women with ambivalent feelings toward their pregnancies strongly suggests differences not only in the anticipated consequences of the pregnancy, but also in the potential health and social outcomes should the pregnancy be continued. Because our sample was too small for meaningful assessment of the maternal and neonatal health outcomes of these pregnancies, and because we lacked information on economic or psychosocial outcomes, these areas should be future research priorities.

Women for whom information on pregnancy status was missing may have obtained abortions at outside facilities. However, any abortions that were missing in our sample make little difference to the comparisons of pregnancy status between measures. Since the two measures were compared using the same sample of women, and since they were compared separately for pregnancies that ended in abortion and those that were continued, abortions would not be systematically more or less underrepresented for any one measure.

Limitations

Our study has several limitations, most notably that the sample was confined to Latinas, predominantly of Dominican origin, in New York City, and thus our results are not generalizable to other populations or settings. However, our goal was not to produce accurate estimates of the prevalence of unintended pregnancy in the United States or unplanned pregnancy in Britain, but rather to discover how the U.S. and British measures relate to one another. On the basis of our findings, future work should examine the estimates produced by the two measures in nationally representative samples in these two countries.

The LMUP has been validated for use among Spanish-speaking women,³¹ and Latinas are well represented in the NSFG, but retrospective reports of pregnancy intentions and feelings have been found to be more positive among Latinas than among whites.²⁶ Compared with U.S.-born Latinas and whites, foreign-born Latinas may also be more likely to avoid expressing unhappiness about a pregnancy because of social and cultural constraints.²⁰ Thus, estimates using the LMUP, the TMUP and the measure combining intentions and feelings may yield different results in other populations.

Our comparison between the U.S. and British measures might have been sharper had we followed the exact

wording of the NSFG questions used to construct measures of unintended pregnancy; however, in the NSFG, women are asked these questions with respect to all of their pregnancies, whereas we questioned women who were having a pregnancy test. We note that the estimate of unintended pregnancy yielded by the TMUP in our sample was higher than might be expected on the basis of estimates for Latina women in the NSFG.¹ This difference may result from asking about intention status at the time of pregnancy testing rather than after the pregnancy is confirmed or after birth. Had we asked women our survey questions after the resolution of their pregnancies, we might have observed smaller proportions of pregnancies classified as unintended and unplanned. However, the relative difference between the two measures should be less affected by the timing of the survey. To the best of our knowledge, there is no evidence to suggest that the measures are differentially susceptible to retrospective reporting bias.

Conclusions

Despite its limitations, our study provides an important comparison between two commonly employed measures of unintended and unplanned pregnancy. Future work should include both measures in larger and more widely representative surveys to allow generalizable comparisons and to test the strengths and weaknesses of each. Meanwhile, researchers and policymakers should exercise caution when making comparisons of estimates of unintended and unplanned pregnancy between surveys both within and between countries. With a view to improving reproductive health and advancing reproductive rights, future research should also focus on developing a measure that can accurately predict pregnancies that will have negative consequences for women and their families.

REFERENCES

1. Finer LB and Zolna MR, Declines in unintended pregnancy in the United States, 2008–2011, *New England Journal of Medicine*, 2016, 374(9):843–852.
2. Wellings K et al., The prevalence of unplanned pregnancy and associated factors in Britain: findings from the third National Survey of Sexual Attitudes and Lifestyles (Natsal-3), *Lancet*, 2013, 382(9907):1807–1816.
3. U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion, Healthy People 2020, 2016, <https://www.healthypeople.gov/2020/topics-objectives/topic/family-planning/objectives>.
4. Klerman LV, The intendedness of pregnancy: a concept in transition, *Maternal and Child Health Journal*, 2000, 4(3):155–162.
5. Sable MR and Libbus MK, Pregnancy intention and pregnancy happiness: Are they different? *Maternal and Child Health Journal*, 2000, 4(3):191–196.
6. Miller WB, Barber JS and Gatny HH, The effects of ambivalent fertility desires on pregnancy risk in young women in the USA, *Population Studies*, 2013, 67(1):25–38.
7. Aiken ARA and Potter JE, Are Latina women ambivalent about pregnancies they are trying to prevent? Evidence from the Border Contraceptive Access Study, *Perspectives on Sexual and Reproductive Health*, 2013, 45(4):196–203.

8. Santelli J et al., The measurement and meaning of unintended pregnancy, *Perspectives on Sexual and Reproductive Health*, 2003, 35(2):94–101.
9. Yoo SH, Guzzo KB and Hayford SR, Understanding the complexity of ambivalence toward pregnancy: Does it predict inconsistent use of contraception? *Biodemography and Social Biology*, 2014, 60(1):49–66.
10. Chandra A et al., Fertility, family planning, and reproductive health of U.S. women: data from the 2002 National Survey of Family Growth, *Vital and Health Statistics*, 2005, Series 23, No. 25.
11. Barrett G, Smith SC and Wellings K, Conceptualization, development, and evaluation of a measure of unplanned pregnancy, *Journal of Epidemiology and Community Health*, 2004, 58(5):426–433.
12. Bachrach CA and Newcomer S, Intended pregnancies and unintended pregnancies: distinct categories or opposite ends of a continuum? *Family Planning Perspectives*, 1999, 31(5):251–252.
13. Kendall C et al., Understanding pregnancy in a population of inner-city women in New Orleans—results of qualitative research, *Social Science & Medicine*, 2005, 60(2):297–311.
14. Santelli JS et al., Toward a multidimensional measure of pregnancy intentions: evidence from the United States, *Studies in Family Planning*, 2009, 40(2):87–100.
15. England P and Edin K, eds., *Unmarried Couples with Children*, New York: Russell Sage Foundation, 2007.
16. Schwarz EB et al., Prevalence and correlates of ambivalence towards pregnancy among nonpregnant women, *Contraception*, 2007, 75(4):305–310.
17. Blake SM et al., Pregnancy intentions and happiness among pregnant black women at high risk for adverse infant health outcomes, *Perspectives on Sexual and Reproductive Health*, 2007, 39(4):194–205.
18. Edin K and Kefalas M, *Promises I Can Keep: Why Poor Women Put Motherhood Before Marriage*, Berkeley: University of California Press, 2005.
19. Geronimus AT, Damned if you do: culture, identity, privilege, and teenage childbearing in the United States, *Social Science & Medicine*, 2003, 57(5):881–893.
20. Aiken ARA, Dillaway C and Mevs-Korff N, A blessing I can't afford: factors underlying the paradox of happiness about unintended pregnancy, *Social Science & Medicine*, 2015, 132:149–155.
21. Kavanaugh ML and Schwarz EB, Prospective assessment of pregnancy intentions using a single- versus a multi-item measure, *Perspectives on Sexual and Reproductive Health*, 2009, 41(4):238–243.
22. Moreau C et al., Unplanned or unwanted? A randomized study of national estimates of pregnancy intentions, *Fertility and Sterility*, 2014, 102(6):1663–1670.
23. Kaufmann RB, Morris L and Spitz AM, Comparison of two question sequences for assessing pregnancy intentions, *American Journal of Epidemiology*, 1997, 145(9):810–816.
24. Barrett G and Wellings K, What is a “planned” pregnancy? Empirical data from a British study, *Social Science & Medicine*, 2002, 55(4):545–557.
25. Fischer RC et al., Exploring the concepts of intended, planned, and wanted pregnancy, *Journal of Family Practice*, 1999, 48(2):117–122.
26. Hartnett CS, Are Hispanic women happier about unintended births? *Population Research and Policy Review*, 2012, 31(5):683–701.
27. Barber JS, Yarger JE and Gatny HH, Black-white differences in attitudes related to pregnancy among young women, *Demography*, 2015, 52(3):751–786.
28. Park SH, Goo JM and Jo CH, Receiver operating characteristic (ROC) curve: practical review for radiologists, *Korean Journal of Radiology*, 2004, 5(1):11–18.

29. Jones RK and Kooistra K, Abortion incidence and access to services in the United States, 2008, *Perspectives on Sexual and Reproductive Health*, 2011, 43(1):41–50.
30. Gipson JD, Koenig MA and Hindin MJ, The effects of unintended pregnancy on infant, child, and parental health: a review of the literature, *Studies in Family Planning*, 2008, 39(1):18–38.
31. Morof D et al., Evaluation of the London Measure of Unplanned Pregnancy in a United States population of women, *PLoS One*, 2012, 7(4):e35381, doi:10.1371/journal.pone.0035381.

Acknowledgments

Support for this research was provided by an anonymous foundation and by grants P2CHD047879 and R24HD042849 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development of the National Institutes of Health. The authors thank Geraldine Barrett for suggesting that the London Measure of Unplanned Pregnancy be included in the study and for helpful discussions regarding its application.

Author contact: araa2@utexas.edu