Forgotten Marriages? Measuring the Reliability of Marriage Histories

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Abstract

BACKGROUND
Marriage histories provide a valuable source of information for investigating nuptiality. While researchers typically acknowledge the problems associated with their use, it is unknown to what extent these problems occur and how they affect marriage analyses.

OBJECTIVE
This paper seeks to investigate the quality of marriage histories by measuring levels of misreporting and testing whether misreporting affects marriage indicators.

METHODS
Using data from the Malawi Longitudinal Study of Families and Health (MLSFH), I compare marriage histories reported by the same respondents at two different points in time. I investigate whether respondents consistently report their spouses (by name), status of marriage, and dates of marriage across the 2006 and 2010 waves. I test whether misreporting affects marriage indicators and I use multivariate regression models to investigate the characteristics associated with misreporting.

RESULTS
Results indicate that 26.1% of men and 16.3% of women omitted at least one marriage in one of the survey waves. This study finds that misreporting affects marriage indicators and that misreporting is not random. Individual, marriage, and survey characteristics are associated with omitting marriages and misreporting marriage dates.

CONCLUSIONS
This is the first study of its kind to examine the reliability of marriage histories collected in the context of Sub-Saharan Africa. Although marriage histories are frequently used to study marriage dynamics, no knowledge has existed, until now, on the degree of misreporting in marriage histories. Misreporting in marriage histories is shown to be non-negligent and, more importantly, can affect both marriage indicators and regression analyses.

1. Introduction

Marriage histories are a valuable source of information on nuptiality. At a minimum, they contain information on respondents' reported marriages, including marriage dates. More detailed marriage histories may collect information on how unions ended, number of children produced, and age at marriage. Researchers have previously used marriage histories (Amoateng and Heaton 1989; Anglewicz and Reniers 2010; Boileau et al. 2009; Brandon 1990; Fedor, Kohler and Behrman 2012; Gage-Brandon 1992; Grant and Yeatman Forthcoming; Hampshire and Randall 2000; Locoh and Thiriat 1995; Reniers 2003, 2008; Reniers and Tfaily 2008; Takyi and Gyimah 2007; Tilson and Larsen 2000), but have found that they are not without problems. As with any kind of information collected retrospectively, the possibility of recall error exists. In the case of marriage histories, respondents may intentionally or unintentionally omit certain marriages. Even if respondents successfully recall past marriages, they may fail to remember details about these marriages. While researchers typically acknowledge the problems associated with their use, such as omitting unsuccessful or short unions and misreporting dates (Boileau et al. 2009; Reniers 2008), it is unknown to what extent these problems occur, and more importantly, how they affect marriage analyses. Ideally, the validity of marriage histories would be measured by comparing them against public records; however, this is not feasible in many parts of Africa because civil marriages are not the norm (Enel, Pison and Lefebvre 1994; van de Walle and Meekers 1994).

An alternative method is to measure their reliability by comparing marriage histories reported by the same respondent at two or more points in time. To my knowledge, no other study has used this method to evaluate the quality of marriage histories in Sub-Saharan Africa. Using data from the Malawi Longitudinal Study of Families and Health (MLSFH), I investigate

whether respondents consistently report their spouses (by name), status of marriage, and dates of marriage across two survey waves. I examine how misreporting affects marriage indicators and investigate the characteristics associated with omitting marriages and misreporting marriage dates. This study finds a considerable amount of misreporting and demonstrates that marriage indicators are affected. Misreporting in marriage histories is not random. Several individual, marriage, and survey characteristics are associated with misreporting.

This study is organized in the following manner. In the next section, I provide a brief overview of marriage in Sub-Saharan Africa, as well as in Malawi, the setting of this paper. Then, I present the hypotheses that are tested in regression analyses: in particular, I summarize how individual, event, and survey characteristics could be associated with misreporting in marriage histories. Next, I describe the data and methods used in this study. Lastly, I present the findings and discuss their implications for studies using marriage history data.

1.1 Marriage in Sub-Saharan Africa

Sub-Saharan Africa has a great deal of regional diversity with respect to marriage patterns. In West and East Africa, marriage can, for the most part, be characterized as universal and early, particularly among women (Lesthaeghe, Kaufmann and Meekers 1989), where marrying before age 18 is not uncommon (Mensch, Grant and Blanc 2006). In Southern Africa, in contrast, marriage is not universal and women marry at much older ages (Baker 2003; Hosegood, McGrath and Moultrie 2009; Lesthaeghe et al. 1989). Additionally, a significant proportion of African marriages end in divorce (Amoateng and Heaton 1989; Isiugo-Abanihe 1998; Locoh and Thiriat 1995; Ratcliffe et al. 2002; Reniers 2003; Tilson and Larsen 2000) and remarriage after divorce is common, occurring relatively quickly, with most individuals

remarrying within a few years (Lesthaeghe et al. 1989; Locoh and Thiriat 1995; Tilson and

Larsen 2000; van de Walle 1993). In many parts of Sub-Saharan Africa, the payment of

bridewealth, is an integral part of the marriage process (Dekker and Hoogeveen 2002;

Lesthaeghe et al. 1989; Ngubane 1987; Radcliffe-Brown 1950), requiring the husband's family

to provide cash or gifts, often livestock, to the bride's family. Although practiced in many

patrilineal societies, it is rare in matrilineal societies.

In many parts of Sub-Saharan Africa, marriage is perceived as a process composed of

multiple stages, including the exchange of gifts, initiation of sexual relations, provision of

bridewealth, and birth of first child (Meekers 1992; van de Walle 1993). These stages differ

greatly across and within countries (Dekker and Hoogeveen 2002). The processual nature of

marriage can make it difficult to determine when a marriage begins, since several events such as

the exchange of gifts, first payment of bridewealth, or full payment of bridewealth can mark the

start of marriage. This characteristic of marriage complicates the reporting of marriages in

surveys by affecting whether marriages are reported and the accuracy of reported marriage dates.

Adding to this complexity is that many African societies recognize a variety of marriage

forms, including free unions, consensual unions, customary marriages, and religious and civil

marriages (Arnaldo 2004; Budlender, Chobokoane and Simelane 2004). Surveys and censuses

typically categorize all of these unions as marriages (van de Walle 1968). The least formal of

these unions, free unions, allows a couple to cohabit without undergoing formal ceremonies.

Couples may, for example, form free unions so that men have time to save enough money to

provide bridewealth. Customary unions are more formal, since they involve the payment of

bridewealth (among ethnic groups that practice this tradition), and/or involve the performance of

traditional rites, such as the exchange of drinks or kola nuts from the man's family to the woman's family, which is common in West Africa (van de Walle and Meekers 1994). There are also religious and civil marriages that are influenced by western practices (Bledsoe and Pison 1994).

Whether certain unions are perceived as marriages may change over time, especially for unions that have ended (van de Walle 1993), and may occur more frequently in cases where bridewealth has not been fully paid. Rather than a single payment, bridewealth can be paid over the course of several installments and can take years before it is paid completely (Dekker and Hoogeveen 2002; Nagashima 1987). Consequently, this can create ambiguity in determining when a marriage begins, at the time of first or last payment (Budlender et al. 2004). If a marriage ends in divorce before bridewealth is fully paid, some individuals may retrospectively decide not to report this union. In addition, producing children is considered to be an integral part of marriage (Karanja 1987; Radcliffe-Brown 1950) and formally links a woman to her husband's family. Because childless marriages have a high probability of ending in divorce (Reniers 2003; Tilson and Larsen 2000; van de Walle 1968), affected individuals may later omit reporting these marriages.

1.2 Marriage in Malawi

In Malawi, marriage is nearly universal, women marry young, polygamy is not uncommon, and payment of bridewealth is typically practiced among patrilineal ethnic groups. Marriage also frequently ends in divorce: approximately half of all rural women will have experienced a divorce at some point in their lives (Reniers 2003). There is, however, considerable variation in marriage and divorce patterns by region (Table 1). The Northern

region, where the Tumbuka are the dominant ethnic group, is largely patrilineal with mostly virilocal residence after marriage. Marriage in this region tends to be more formal and bridewealth payments, though not substantial, are part of the marriage process. Despite being predominantly Christian, the North has the highest rates of polygyny, approximately 41 percent of women enter into polygynous first marriages. Also, women residing in the North have the lowest probabilities of divorce for first marriages: approximately 14 and 40 percent of first marriages end in divorce after 5 and 25 years, respectively. Though these are the lowest divorce rates in Malawi, they are high, relative to other African countries (Amoateng and Heaton 1989; Isiugo-Abanihe 1998; Locoh and Thiriat 1995; Ratcliffe et al. 2002). The Southern region, where the Yao are the dominant ethnic group, is primarily matrilineal with mostly uxorilocal residence after marriage. Because the South is primarily matrilineal, marriages are not formalized in the same way, through the payment of bridewealth, as they are in the North. As a result, marriages tend to be more casual and informal, ending frequently in divorce (Kaler 2001). The South, historically known for its lack of marital stability (Kaler 2001; Mitchell 1956; Tew 1950), has the highest probabilities of divorce for women with 33 and 65 percent of first marriages ending in divorce after 5 and 25 years, respectively. Despite being predominantly Muslim, the South has the lowest rates of polygyny, approximately 23 percent of women enter into polygynous first marriages. The Central region, where the Chewa are the dominant ethnic group, observes a mixture of patrilineal and matrilineal kinship structures, and residence can be either virilocal or uxorilocal after marriage. Statistics for the Central region lie between those of the North and South.

1.3 Hypotheses

Using the literature as a guide, I test hypotheses, some of which are conflicting, about the individual, event, and survey characteristics that could be associated with misreporting.

Individual characteristics that have been found to be important are age, gender, and education. Older respondents may have a greater tendency to misreport events than younger respondents (Castro 2012). By virtue of having lived longer, they may have experienced several events of a similar nature, making it difficult to recall the specifics of a particular event. Region of residence, which dictates marriage patterns in Malawi, could also affect misreporting. Respondents in the South, where marital instability is greatest and marriages are the least formal, are likely to have higher rates of misreporting. Studies of data quality typically investigate whether gender differences exist. Most studies have shown that women are generally better at remembering marriage and family-related events (Auriat 1993; Mitchell 2010; Poulain, Riandey and Firdion 1992); they also more consistently reported partnerships in early waves of the MLSFH (Bignami-Van Assche 2003). In contrast, Hertrich (1998) found that men were better at reporting pregnancies and marriage procedures in a study of married couples in rural Mali. Numerous studies have also shown that more educated respondents are better at recalling events as well as details surrounding these events (Auriat 1991; Castro 2012; Mitchell 2010; Peters 1988; Smith and Thomas 2003). Schooling may increase a set of skills related to the ability to recall information. Respondents with little or no education may have difficulty grasping the concepts of dates and ages, increasing the likelihood that they will misreport marriage dates. Lastly, I test a hypothesis that has been less frequently investigated: respondents with a history of inconsistent reporting are more likely to misreport marriage histories.

Not just the marriage itself but also its characteristics are likely to influence recall. Salient events and recent events are more likely to be remembered (Sudman, Bradburn and Schwarz 1996). First marriages, viewed in many cultures as an important milestone in life, may be better remembered than those of a higher order. Longer duration events tend to be more memorable than shorter duration events (Smith and Thomas 2003). Short duration marriages may largely consist of unsuccessful marriages, which individuals may prefer to forget. Additionally, short duration marriages may not have produced children and bridewealth may not have been fully paid. At the time of the survey, these marriages may be perceived as relationships rather than marriages. Finally, I test whether entering into a polygamous marriage affects men's marriage reporting. Polygamous men might be more likely to misreport because they have experienced more marriages, of which some may have occurred closely in time.

Survey characteristics include survey conditions and interviewer effects. I examine three hypotheses related to survey conditions. The first tests whether the interviewer knowing the respondent's family produces less misreporting: this has been shown to produce higher response rates and greater response reliability (Weinreb 2006). The second hypothesis examines whether a higher degree of cooperation is associated with better reporting. More cooperative respondents may be more willing to answer questions and to respond with greater accuracy. The third hypothesis tests whether longer interview times are associated with greater levels of misreporting. Due to the amount of time required to complete the survey, some respondents may become fatigued and deliberately underreport events as a way to shorten the interview (Murphy 2009). Alternatively, longer interviews could be associated with less misreporting: the

respondent may have taken more time to reflect on the questions, resulting in more accurate answers.

Interviewer characteristics could also affect survey responses. The age of the interviewer could play a role: some respondents may be more comfortable with interviewers of their own age, and older interviewers could become more fatigued during interviews, leading to more errors in interviewing and recording survey responses. Alternatively, older interviewers could have more experience conducting interviews, which could increase their abilities to probe for responses. The evidence is mixed regarding the relationship between the gender of the interviewer and survey responses. While Axinn (1991) reported that female respondents in Nepal were more likely to underreport current pregnancies to male interviewers than female interviewers, Becker et al. (1995) showed that gender does not matter for responses to sensitive questions about family planning in Nigeria. In a study using MLSFH data, Anglewicz et al. (2009) demonstrated that the gender of the interviewer had a greater effect on female responses than male responses. Additional evidence from Malawi suggests that the need to fulfill gender quotas results in the selection of lower quality female interviewers than male interviewers (Beaman, Keleher and Magruder 2013; Dionne 2014). Ever-married interviewers may establish a better rapport with respondents, thus facilitating the reporting of previous and current marriages. Additionally, interviewers with prior interviewing experience probably have better interviewing skills such as probing for responses, which could increase the likelihood of obtaining complete and accurate responses. Lastly, respondents may be more comfortable with interviewers who live in the same district.

2. Data

This study uses data from the Malawi Longitudinal Study of Families and Health (MLSFH), formerly known as the Malawi Diffusion and Ideational Change Project (MDICP). The MLSFH is a panel survey that interviewed men and women in three rural districts of Malawi: Rumphi (Northern), Mchinji (Central), and Balaka (Southern). In 1998, the first survey wave interviewed 1,541 ever-married women, ages 15-49, and 1,065 of their husbands. In 2001, the MLSFH re-interviewed these respondents as well as all new spouses of men and women who remarried between 1998 and 2001. In 2004, the original sample and their new spouses were re-interviewed, along with a newly added sample of approximately 1,000 adolescents, ages 15-24. In 2006, 2008, and 2010, the sample included all respondents from previous waves, along with any new spouses of respondents. The 2008 wave added a sample of approximately 800 parents of MLSFH respondents. The data quality of the MLSFH has been assessed by Bignami-Van Assche (2003) and Anglewicz et al. (2009).

I use data from the 2006 and 2010 waves of the MLSFH. These waves were chosen because of the nature of marriage histories collected and the availability of data on interviewers. For the first time, the 2006 MLSFH collected detailed, identifiable information on all reported marriages. Respondents were asked to report the names of their current and past spouses, up to a maximum of ten spouses, beginning with the first spouse and ending with the current/most recent spouse. The MLSFH did not define marriage in this survey; rather, respondents themselves determined whether a past union constituted a marriage. This likely resulted in the inclusion of both formal and informal marriages. For each reported spouse, respondents were to answer a series of questions including the year the marriage began, the number of children born with that

spouse (not collected in 2010), and whether they were still married to the spouse. If the marriage had ended, they were to report the year it ended and the main reason why it ended. In 2010, the same procedures were used to collect marriage history data. Furthermore, the survey waves were organized to be independent: interviewers did not have information from previous waves when collecting data in the current wave.

Data collection procedures in the 2006 and 2010 MLSFH differed in two ways. In 2006, three survey teams, "family listing", "main survey", and "biomarker collection", interviewed respondents. Three separate visits were required to complete all sections of the survey. In 2010, biomarker collection did not occur and the family listing and main survey questionnaires were combined into a single questionnaire, resulting in only one visit. Consequently, respondents answered questions about marriage after a substantial amount of time had passed, increasing the likelihood of survey fatigue. In addition, the 2010 MLSFH introduced, for the first time, a system of incentives to the survey teams. If a survey team completed a minimum number of interviews per day, then all members of the team (supervisors, interviewers, and driver) received a financial bonus. This system could have motivated some interviewers to rush through interviews to increase their team's chances of receiving a bonus.

My potential sample consists of 2,016 respondents who participated in the section on marriage histories in both survey waves. I further restrict the sample to respondents whose reports of the number of times married equals reports of the number of spouses listed in the marriage histories. Reporting inconsistencies could be due to respondent, interviewer, and/or data entry error. I dropped 92 respondents who had inconsistent reports, resulting in 1,924

respondents in my potential sample. By excluding the most problematic observations, I am likely underestimating the amount of misreporting that exists in these marriage histories.

3. Methods

3.1 Reconstructed Marriage Histories (RMH)

The process used to measure the reliability of marriage histories consists of two steps. First, I matched marriages across surveys for each respondent in the potential sample. Because names tend to be spelled differently across survey waves, mostly due to the interpretation of the interviewer, I visually matched marriages on a case-by-case basis. Spouse name is the primary criteria used to verify that a marriage listed in 2006 corresponds to a marriage listed in 2010. With few exceptions, spouse names are similar enough to match without difficulty. I also used marriage dates to verify matches. If a marriage occurred before the 2006 wave and was not reported in both 2006 and 2010, then it is labeled as an "unmatched" marriage. Of 1,924 respondents in my potential sample, I could not match marriages for 53 respondents. Many of these respondents did not report any of the same spouses in marriage histories, creating suspicions as to whether the MLSFH interviewed the same respondent in both waves. These respondents were dropped, resulting in a total of 1,871 respondents (732 men, 1,139 women) in the analytic sample.

In the second step, I reconstructed marriage histories for respondents in the analytic sample. The items listed in the reconstructed marriage histories include marriage order (first, second, third, etc.), year marriage began, status of marriage (still married, separated/divorced[1],

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[1] Because most separations are soon followed by divorce, I combined divorced and separated into the same category. Reniers (2003) also combined divorced and separated into the same category. From this point on, I refer to this category as "divorced".

widowed), and year marriage ended. I used the following algorithm to reconstruct marriage histories. If reports in marriage histories are consistent across surveys, then I used these reports to create the reconstructed marriage history (RMH). If a marriage was reported in only one survey, then information from that survey is used for the RMH. If a marriage was reported in both surveys (i.e., the same spouse was listed by name in both surveys), but dates or other characteristics were reported inconsistently, then information provided in the earlier survey is used, if reported by the respondent. I use data from the earlier survey because reports become less reliable as events take place further back in time (Sudman et al. 1996) and the marriage in question would have happened closer in time to this survey. If a respondent reports "don't know", then data from the later survey are used (if this information was reported).

3.2 Independent Variables

This study focuses on four sets of independent variables: individual, marriage, survey, and interviewer characteristics. Individual characteristics include age, age squared, region of residence, education, and inconsistent reporting of survey responses. All individual characteristics with the exception of inconsistent reporting of survey responses are taken from the 2006 survey. Education is a dichotomous variable indicating whether the respondent has completed five or more grades of schooling. This is chosen as the cutoff point because it represents the median grades of schooling completed by the analytic sample. I include three variables under inconsistent reporting of survey responses: level of education, number of children ever born, and number of lifetime sexual partners. Respondents are coded as having inconsistent reporting of level of education if reports of educational attainment (no schooling,

primary, secondary) differ between the 2006 and 2010 waves.[2] A respondent, for instance, is coded as having inconsistent reporting if he or she reports primary education in 2006 and no education in 2010. Inconsistent reporting of the latter two variables is coded differently. Inconsistent reporting occurs if respondents report declines on these measures between 2006 and 2010. This coding scheme cannot detect other types of reporting inconsistencies. For example, a respondent may report having four lifetime sexual partners in 2006 and six in 2010 despite having had more sexual partners.

Marriage characteristics include marriage order, years since marriage began, short duration marriage, status of marriage, and entered into a polygamous marriage (for men only). Marriage order is divided into three categories: first, second, and third or higher. Third and higher order marriages are combined because they make up fewer than 5% of all marriages. I calculated years since marriage began by subtracting marriage start dates from 2006. I defined a short duration marriage as a marriage that lasted five years or less. Among current marriages, short duration marriages began after 2000. Status of marriage (married, divorced, widowed) refers to the reconstructed status of marriage in 2010. Men who married a woman while still married to another woman are considered to have entered into a polygamous marriage.

Survey characteristics include interviewer knows respondent's family (2006), degree of cooperation (2006 and 2010), and length of survey time (2010). At the end of each questionnaire, interviewers answered a series of questions about the preceding interview. In 2006, the MLSFH asked interviewers, "How well do you know the respondent's family?" If the interviewer reported knowing the respondent's family "by name only", "quite well", or "very well", then the interviewer is coded as knowing the respondent's family. If the interviewer reported "not at all",

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[2] In 2006, three respondents reported current school attendance. I took this into account when coding this variable.

then the interviewer is coded as not knowing the respondent's family. This question was not asked in 2010. In both survey waves, interviewers reported on the respondent's degree of cooperation. Because very few interviewers reported "bad" degree of cooperation, I combined "bad" and "average" responses into the same category. The other categories are coded as "good" and "very good". The data needed to calculate length of survey time are only available in 2010. I coded this variable into three categories: short, middle, and long. Short refers to the 25% shortest survey times; middle refers to the middle 50% of survey times; and long refers to the 25% longest survey times.

At the end of data collection in both 2006 and 2010, interviewers answered questions about their background, work history, thoughts on the MLSFH survey, and HIV/AIDS. I merged the interviewer data with the survey responses. While the 2010 interviewer data are, for the most part, complete, a significant proportion of the 2006 interviewer data are missing: 25.6% of respondents in the analytic sample lack 2006 interviewer data. This problem is not random and disproportionately affects respondents in the Central region, where 47.2% do not have interviewer data. In the North and South, 20.7% and 17.5%, respectively, lack this data. As a result, I do not include 2006 interviewer data in regression analyses. 2010 interviewer characteristics include age, age squared, ever married, has prior interviewing experience, and lives in same district as respondent.

3.3 Analyses

First, I test whether misreporting information collected in marriage histories affects marriage indicators. I compare means of marriage indicators calculated using data from the 2006 and 2010 MLSFH to those using reconstructed marriage histories (RMH). When calculating

2006 marriage indicators using RMH, I exclude marriages that began after the 2006 survey. All marriages are included when calculating 2010 marriage indicators using RMH. I use paired and unpaired statistical tests to examine whether these means differ. Whereas paired tests measure whether the mean difference between paired *observations* is zero, unpaired tests measure whether the mean difference between *groups* is zero. The implications of these results differ depending on the type of test performed. Paired tests reveal whether marriage indicators are biased at the individual level, which could affect regression analyses. Unpaired tests, on the other hand, uncover whether marriage statistics are biased at the group level, which could affect the interpretation of trends. For paired tests, I use either a t-test or Wilcoxon signed-rank test, depending on the distribution of the variable. For unpaired tests, I use either a t-test or Wilcoxon Mann-Whitney test.

The unit of analysis for all regression models is the marriage as listed in the RMH. I use multinomial logistic regression to model whether a marriage is reported in both waves ("matched") or only one wave ("unmatched"). This method permits the inclusion of both current and terminated marriages in models. Restricting this analysis to terminated marriages could introduce bias into the analyses. The three categorical outcomes are: 1) matched-terminated 2) unmatched-terminated and 3) current. Because this analysis is concerned with characteristics associated with unmatched marriages, matched-terminated is chosen as the base outcome. All independent variables with the exception of status of marriage are included in regression models. Status of marriage is not included because current marriages predict current marriages perfectly. Lastly, I adjust for clustering at the individual level because some individuals contribute multiple marriages.

Logistic regression is used to examine the characteristics associated with inconsistent reporting of marriage start and end dates. Because analyses are restricted to marriages reported in both survey waves, respondents whose marriages are included may already be better at reporting marriages consistently. Separate logistic regressions are run for each outcome: reported inconsistent marriage start date and reported inconsistent marriage end date. All independent variables are included in regression models. For the outcome, reported inconsistent marriage end date, only terminated-matched marriages are included. Due to a substantial decline in sample size, regressions are conducted on a pooled sample of men and women. Because the variable "entered into a polygynous marriage" does not apply to women, I do not include it in this set of analyses. In all models, I adjust for clustering at the individual level because some individuals contribute multiple marriages.

4. Results

4.1 Descriptive Statistics

Table 2 contains descriptive statistics of the matching process. More marriages are reported in 2006 than in 2010, even though additional marriages took place during the inter-survey period. Match rates indicate that most unmatched marriages are due to respondents not reporting them in 2010. While only 84.8% of men's marriages and 89.5% of women's marriages reported in 2006 are also reported in 2010, a much higher proportion of marriages reported in 2010 are reported in 2006. The reconstructed marriage history (RMH) contains 1,371 men's marriages and 1,729 women's marriages. Approximately 500 of these marriages are reported in only one of the two survey waves. Since it is unknown whether respondents reported all of their marriages in 2006 and 2010, these numbers mark the lower bound of the true number of

marriages. In terms of individual-level statistics, close to one-quarter of men and one-sixth of women omitted at least one marriage from one of the survey waves. Among those married more than once, around 50% omitted one or more marriages. Of respondents omitting at least one marriage, approximately 20% did not report multiple marriages.

In Table 3, I present reports of the number of times married in 2006 and 2010. For reports to appear consistent, the number of times married should be constant or increase over time. The left side of the table corresponds to the reported number of times married in 2006 and the top row corresponds to the same figure in 2010. The shaded areas refer to reported declines in the number of times married. Approximately 16% and 10% of men and women, respectively, reported fewer marriages in 2010. Although Table 3 provides evidence that a significant amount of misreporting exists, it fails to show two other types of misreporting: 1) an increase in the number of marriages even though a new marriage did not occur in the inter-survey period and 2) the same number of marriages reported even though a new marriage (i.e. a different spouse) occurred between survey waves.

Whereas consistent reporting of marriages across survey waves measures one dimension of data quality, consistent reporting of marriage-related information represents another dimension. I examined whether respondents consistently report status of marriage, marriage start dates, and marriage end dates across survey waves. Of these three items, there is little discrepancy on the status of marriage: less than 2% of men's marriages and 4% of women's marriages had discrepancies on this characteristic. Thus, I focus on discrepancies in marriage

dates. In Figures 1 and 2, I present differences in marriage start and end dates by gender.[3] These figures indicate that approximately half of all marriages have discrepancies in marriage start and end dates.

4.2 Marriage Indicators: 2006/2010 MLSFH vs. RMH

Although Table 4 shows that differences in marriage indicators are small, paired statistical tests indicate that most of these differences are statistically significant. With the exception of women in 2010, mean age at first marriage is lower using RMH than 2006/2010 MLSFH data. The number of times married and divorced is significantly higher using RMH data. I also find considerable discrepancies in the percentage ever divorced. While differences are small in 2006, they become strikingly large in 2010. For example, the percentage ever divorced among men is 12 percentage points lower using 2010 MLSFH data than RMH. Differences in the percentage ever widowed are, for the most part, statistically significant. According to unpaired statistical tests, differences in marriage indicators are not always statistically significant: marriage indicators calculated using 2006 MLSFH data are not significantly different from those calculated using RMH.

A close look at differences in marriage indicators between the 2006 and 2010 MLSFH suggests that underreporting is a greater concern in the later wave. For all variables, with the exception of age at first marriage among men and proportion ever widowed, means are lower in 2010 than in 2006, providing strong evidence of misreporting. Two possible explanations exist:

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[3] I removed outliers because they affect the overall presentation of data. For marriage start dates, I defined outliers as observations where the absolute difference is greater than 10 years. Outliers make up 3.5% of men's matched marriages and 5.3% of women's matched marriages. For marriage end dates, I removed observations where the absolute difference is greater than 15 years. Outliers make up 2.4% and 3.6% of men's and women's terminated matched marriages, respectively.

1) marriages are overreported in 2006 or 2) marriages are underreported in 2010. Due to the low likelihood that respondents would report marriages that never took place, the latter explanation is more likely.

4.3 Characteristics Associated with Unmatched Marriages

Table 5 presents multinomial logistic regression results predicting terminated-unmatched marriages.[4] Results show that marriages where women are older (at the time of the survey) are more likely to be unmatched. The direction of the age-squared term indicates that the relationship is non-linear and increases with age. Although age predicts unmatched marriages among women, it does not do so among men. Inconsistent reporting of number of lifetime sexual partners strongly predicts unmatched marriages for women but not for men.

With respect to marriage characteristics, short duration marriages are strongly associated with unmatched marriages for both genders. As expected, marriages where men entered into a polygamous marriage are more likely to be unmatched. None of the survey characteristics has a strong relationship with unmatched marriages. Only length of survey time is weakly associated with the outcome among women. Of 2010 interviewer characteristics, having had prior interviewing experience strongly predicts unmatched marriages. Among men, the direction is as expected: prior interviewing experience lowers the odds of an unmatched marriage. Among women, the relationship is reversed and is marginally significant. One potential explanation could be that women are less receptive to probing by interviewers. They may find it intrusive, decreasing their likelihood of providing complete information.

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[4] I do not present regression results for current marriages (available upon request).

4.4 Characteristics Associated with Inconsistent Reporting of Marriage Start and End Dates

Table 6 contains logistic regression results predicting inconsistent reporting of marriage start and end dates. While age is not associated with inconsistent reporting of marriage start dates, it is significantly associated with marriage end dates. Marriages where respondents are older (at the time of the survey) are more likely to be reported inconsistently. Region of residence strongly predicts inconsistent reporting of marriage start dates. Marriages in the South are significantly more likely to be inconsistently reported than marriages in the Central region. Compared to the other regions, the South has the highest levels of marital disruption and the least formal marriage processes. The combination of these two factors could make remembering marriage start dates more difficult. Even though the mechanism should be similar, region of residence does not predict inconsistent reporting of marriage end dates. Not surprisingly, education is negatively associated with inconsistently reporting both marriage start and end dates. This finding is consistent with previous studies that have found more educated respondents to be better at recalling details surrounding events (Auriat 1991; Castro 2012; Mitchell 2010; Peters 1988; Smith and Thomas 2003). Two measures of inconsistent reporting, number of children ever born and number of lifetime sexual partners, are significantly associated with inconsistent reporting of marriage start dates for women but not for men. This finding suggests that misreporting by women spills over into several domains, especially those of a sensitive nature.

Two marriage characteristics have significant associations with inconsistent reporting of marriage dates. While marriage order matters for marriage start dates, it is not associated with

end dates. Second marriages are more likely to be inconsistently reported, probably because first marriages are more memorable than later marriages. Although the coefficient is large and positive for third or higher order marriages among men, it is not statistically significant, possibly due to low statistical power resulting from a small number of third or higher order marriages. Additionally, short duration marriages strongly predict inconsistent reporting of marriage start dates among women and inconsistent reporting of marriage end dates among the pooled sample. The status of marriage in question is strongly associated with inconsistent reporting of marriage start dates for both genders. Interestingly, only marriages that ended in widowhood predict this outcome. It is unclear why this is not also observed for divorced marriages. Given that I control for respondent's age and years since marriage began, I can rule out the possibility that older respondents who experienced a spousal death years ago are more likely to inconsistently report marriage start dates. It is surprising that two variables, short duration marriages and entered into a polygamous marriage, do not predict inconsistent marriage start dates among men. Because polygamous men have multiple wives, one would expect that they would have greater difficulty remembering marriage dates.

Of survey characteristics, only degree of cooperation (2010) and length of survey time (2010) strongly predict inconsistent reporting of marriage start dates; these associations, however, are gender-specific. Women's marriages where interviewers reported average/bad cooperation on the part of respondents were more likely to be inconsistently reported than marriages where interviewers reported good cooperation. Among men, shorter interview times are significantly associated with misreporting. None of the survey characteristics are strongly associated with inconsistent reporting of marriage end dates.

Prior interviewing experience is the only 2010 interviewer characteristic that strongly predicts inconsistent reporting of marriage start dates. This relationship, however, is only significant among men. Marriages where the interviewer has prior interviewing experience are less likely to be reported inconsistently.

Lastly, I tested for interactions between gender and independent variables and found only one statistically significant interaction (not shown). Men's marriages where the man was left a widower are significantly more likely to have marriage end dates reported inconsistently than women's marriages where the woman was left a widow.

5. Discussion

The present study examines the reliability of marriage histories collected as part of the Malawi Longitudinal Study of Families and Health. Results indicate that a significant proportion of marriages are underreported and marriage dates are often reported inconsistently. Marriage indicators such as number of times married and age at first marriage are also affected by misreporting. This study finds that misreporting is not random. Several individual, marriage, and survey characteristics are significantly associated with underreporting marriages and misreporting marriage dates.

Previous studies are correct in surmising that the most likely candidates for omission from marriage histories are short or unsuccessful marriages (Boileau et al. 2009; Reniers 2008). These marriages are likely omitted because of problems in defining marriage and altered perceptions of marriage. Given that fewer marriages were reported in 2010, some respondents may have altered their perceptions of previous unions, viewing them as relationships rather than marriages. Alternatively, some respondents may have learned to condition their responses to the

survey. In order to reduce the amount of time spent answering survey questions, they may have intentionally omitted certain marriages. Since the MLSFH began, the survey has become longer and more complex. The MLSFH has added modules asking respondents to list sexual partners, household members, individuals providing actual and potential transfers, and network questions about individuals with whom they have discussed HIV/AIDS. For each of these modules, respondents are to answer a series of questions about each individual. Furthermore, in the 2004, 2006, and 2008 waves, multiple survey teams visited respondents, resulting in more time spent being interviewed. Considering the amount of time spent participating in the MLSFH, respondents, especially those who have been interviewed in multiple waves, may conclude that there is little or no benefit to taking the trouble to provide accurate responses. Respondents are given a token of appreciation, such as bars of soap and sugar, for their participation but some made it clear that this was not sufficient (Dionne 2014). Although given the option to refuse, they may agree to participate for the sake of politeness or because they hope that the survey may provide them with a more acceptable reward.

A side-by-side comparison of marriage indicators calculated using data from the 2006/2010 MLSFH and RMH indicate that differences are small but statistically significant. Depending on how marriage history data are used, the implications of misreporting can differ. Paired test results suggest that misreporting can affect regression analyses because the unit of observation is at the individual level. For example, a study examining the relationship between ever being divorced and HIV status could lead to erroneous conclusions if marriages and, hence, divorces are underreported. Consequently, researchers using marriage history data in individual-level regression analyses should be aware that underreporting marriages and misreporting

marriage dates could bias results. Unpaired test results, on the other hand, indicate that misreporting does not always bias marriage indicators. This finding is consistent with previous studies that have shown that inconsistent reporting of age at first sex and marriage do not always bias population-level indicators (Cremin et al. 2009; Wringe et al. 2009; Żaba et al. 2009). Researchers, however, should display caution when calculating population-level marriage indicators from marriage history data because 2010 marriage indicators were shown to be biased.

Although men and women underreport a considerable number of marriages, the problem appears to be greater among men. This finding is consistent with previous studies that have shown that women are generally better at remembering marriage and family-related events (Auriat 1993; Mitchell 2010; Poulain et al. 1992). The practice of polygamy could provide one explanation for why men are worse at reporting marriages: there are simply more marriages to remember. Compared to monogamous men, polygamous men are at greater risk of marrying and divorcing. Multivariate regression results substantiate this explanation: marriages where men have entered into a polygamous marriage are more likely to be unmatched.

Differences in survey procedures could have also led to greater levels of misreporting in 2010. Survey design called for three household visits in 2006 compared to only one visit in 2010. Consequently, survey fatigue may have caused respondents being interviewed in 2010 to provide less accurate responses and to take shortcuts to shorten the survey time. Moreover, the MLSFH offered financial incentives to survey teams for the first time in 2010. These incentives were tied to the number of surveys completed each day, which may have caused some interviewers to take shortcuts or rush through interviews to ensure that their survey team achieved the minimum number of interviews per day. A system of incentives did not exist in the 2006 survey.

6. Conclusion

This is the first study of its kind to examine the reliability of marriage histories collected in the context of Sub-Saharan Africa. Although marriage histories are frequently used to study marriage dynamics, no knowledge has existed, until now, on the degree of misreporting in marriage histories. How relevant these findings are up-and-beyond working with the MLSFH is not known and, at best, this study can only conjecture at its relevance.

The findings in this study are most relevant to longitudinal surveys that have, in a similar fashion, collected marriage histories repeatedly. Both shifting perceptions of previous marriages and panel conditioning might have led some respondents to omit marriages. In terms of its relevance to cross-sectional and longitudinal surveys that have collected marriage histories only once, the problem of panel conditioning would not exist. Instead, such surveys may encounter respondents underreporting marriages because they retrospectively no longer view them as marriages. One strategy for minimizing under-reporting is to use context-appropriate definitions of marriage. In the case of Malawi, marriage could be defined as any union that was perceived, at any point during its duration, as a marriage by the couple and members of the community, even if traditional or formal ceremonies were not completed. Marriages would include unions that ended before full payment of bridewealth (if part of the local custom) and unions that did not produce any children. While this strategy might be successful in decreasing the number of underreported marriages due to changing perceptions of marriage, it would not eliminate underreporting due to panel conditioning.

The context of this study, rural Malawi, should also be taken into account when judging the relevance of findings to other contexts. Compared to many parts of Sub-Saharan Africa,

marriage in Malawi is less formal and highly unstable. Approximately 50% of women will experience a divorce at some point in their lives (Reniers 2003). Although the results of this study are probably most relevant for surveys conducted in similar contexts, they could still shed some light on misreporting in marriage histories collected in other parts of Sub-Saharan Africa. In areas where marriage is more formal and stable, changing perceptions of marriage would probably result in the omission of some marriages. The proportion of marriages omitted, however, would likely be lower, as marital instability would be less common. Additionally, the problem of determining the start of a marriage would probably still lead to misreported marriage dates. Levels of misreporting would likely be lower because respondents have experienced fewer marriages, and would, thus, have fewer dates to recall.

7. Acknowledgements

References

Amoateng, A.Y. and Heaton, T.B. (1989). The sociodemographic correlates of the timing of divorce in Ghana. *Journal of Comparative Family Studies* 20(1): 79-96.

Anglewicz, P., adams, j., Obare, F., Kohler, H.-P., and Watkins, S. (2009). The Malawi Diffusion and Ideational Change Project 2004-06: Data collection, data quality, and analysis of attrition. *Demographic Research* 20(21): 503-539.

Anglewicz, P. and Reniers, G. (2010). *Remarriage and migration in rural Malawi*. Paper Presented at the Annual Meeting of the Population Association of America, Dallas, Texas, April 15-17, 2010.

Arnaldo, C. (2004). Ethnicity and marriage patterns in Mozambique. *African Population Studies* 19(1): 143-164.

Auriat, N. (1991). Who forgets? An analysis of memory effects in a retrospective survey on migration history. *European Journal of Population* 7(4): 311-342.

—. (1993). "My wife knows best" A comparison of event dating accuracy between the wife, the husband, the couple, and the Belgium population register. *Public Opinion Quarterly* 57(2): 165.

Axinn, W.G. (1991). The influence of interviewer sex on responses to sensitive questions in Nepal. *Social Science Research* 20(3): 303-318.

Baker, K.R. (2003). For better, for worse: An examination of the decline in marital prevalence in Sub-Saharan Africa. [PhD Thesis]. Philadelphia: University of Pennsylvania, Graduate Group in Demography.

Beaman, L., Keleher, N., and Magruder, J. (2013). Do job networks disadvantage women? Evidence from a recruitment experiment in Malawi. [unpublished manuscript]. Evanston: Northwestern University.

Becker, S., Feyisetan, K., and Makinwa-Adebusoye, P. (1995). The effect of the sex of interviewers on the quality of data in a Nigerian family planning questionnaire. *Studies in Family Planning* 26(4): 233-240.

Bignami-Van Assche, S. (2003). Are we measuring what we want to measure? Individual consistency in survey response in rural Malawi. *Demographic Research* 2003(S1): 77-108.

Bledsoe, C. and Pison, G. (1994). *Nuptiality in Sub-Saharan Africa: Contemporary anthropological and demographic perspectives*. Oxford: Clarendon Press.

Boileau, C., Clark, S., Bignami-Van Assche, S., Poulin, M., Reniers, G., Watkins, S.C., Kohler, H.P., and Heymann, S.J. (2009). Sexual and marital trajectories and HIV infection among ever-married women in rural Malawi. *Sexually Transmitted Infections* 85: I27-I33.

Brandon, A. (1990). Marriage dissolution, remarriage and childbearing in West Africa: A comparative study of Cote d'Ivoire, Ghana and Nigeria. [PhD Thesis]. Philadelphia: University of Pennsylvania, Graduate Group in Demography.

Budlender, D., Chobokoane, N., and Simelane, S. (2004). Marriage patterns in South Africa: methodological and substantive issues. *Southern African Journal of Demography* 9(1): 1-26.

Castro, R. (2012). Inconsistent respondents and sensitive questions. *Field Methods* 25(3): 283-298.

Cremin, I., Mushati, P., Hallett, T., Mupambireyi, Z., Nyamukapa, C., Garnett, G., and Gregson, S. (2009). Measuring trends in age at first sex and age at marriage in Manicaland, Zimbabwe. *Sexually Transmitted Infections* 85(Suppl 1): i34-i40.

Dekker, M. and Hoogeveen, H. (2002). Bride wealth and household security in rural Zimbabwe. *Journal of African Economies* 11(1): 114-145.

Dionne, K. (2014). The politics of local research production: Surveying in a context of ethnic competition. [unpublished manuscript]. Northampton: Smith College.

Enel, C., Pison, G., and Lefebvre, M. (1994). Migration and marriage change: A case study of Mlomp, Joola village in southern Senegal. In: Bledsoe, C. and Pison, G. (ed.). *Nuptiality in Sub-Saharan Africa: Contemporary anthropological and demographic perspectives*. Oxford: Clarendon Press: 92-116.

Fedor, T.M., Kohler, H.P., and Behrman, J.R. (2012). *The impact of learning HIV status on marital stability in Malawi*. Paper Presented at the Annual Meeting of the Population Association of America, San Francisco, CA, May 3-5, 2012.

Gage-Brandon, A.J. (1992). The polygyny-divorce relationship: A case study of Nigeria. *Journal of Marriage and the Family*: 285-292.

Grant, M. and Yeatman, S. (Forthcoming). The impact of family transitions on child fostering in rural Malawi. *Demography*.

Hampshire, K. and Randall, S. (2000). Pastoralists, agropastoralists and migrants: Interactions between fertility and mobility in northern Burkina Faso. *Population Studies* 54(3): 247-261.

Hertrich, V. (1998). Are men's and women's answers to be equally trusted? A dual collection of birth and marriage histories in a population in Mali. *Population: An English Selection* 10(2): 303-318.

Hosegood, V., McGrath, N., and Moultrie, T. (2009). Dispensing with marriage: Marital and partnership trends in rural KwaZulu-Natal, South Africa 2000-2006. *Demographic Research* 20: 279-312.

Isiugo-Abanihe, U.C. (1998). Stability of marital unions and fertility in Nigeria. *Journal of Biosocial Science* 30(1): 33-41.

Kaler, A. (2001). "Many divorces and many spinsters": Marriage as an invented tradition in southern Malawi, 1946-1999. *Journal of Family History* 26(4): 529-556.

Karanja, W. (1987). 'Outside wives' and 'inside wives' in Nigeria: A study of changing perceptions in marriage. In: Parkin, D. and Nyamwaya, D. (ed.). *Transformations of African marriage*. Manchester, UK: Manchester University Press: 247-262.

Lesthaeghe, R., Kaufmann, G., and Meekers, D. (1989). The nuptiality regimes in Sub-Saharan Africa. In: Lesthaeghe, R. (ed.). *Reproduction and social organization in Sub-Saharan Africa*. London: Clarendon Press: 238-337.

Locoh, T. and Thiriat, M.-P. (1995). Divorce et remariage des femmes en Afrique de l'Ouest - Le cas du Togo *Population* 50(1): 61-93.

Meekers, D. (1992). The process of marriage in African societies: A multiple indicator approach. *Population and Development Review* 18(1): 61-78.

Mensch, B.S., Grant, M.J., and Blanc, A.K. (2006). The changing context of sexual initiation in sub-Saharan Africa. *Population and Development Review* 32(4): 699-727.

Mitchell, C. (2010). Are divorce studies trustworthy? The effects of survey nonresponse and response errors. *Journal of Marriage and Family* 72(4): 893-905.

Mitchell, J.C. (1956). *The Yao village: A study in the social structure of a Nyasaland tribe*. Manchester: Manchester University Press.

Murphy, M. (2009). Where have all the children gone? Women's reports of more childlessness at older ages than when they were younger in a large-scale continuous household survey in Britain. *Population Studies* 63(2): 115-133.

Nagashima, N. (1987). Aspects of change in bridewealth among the Iteso of Kenya. In: Parkin, D. and Nyamwaya, D. (ed.). *Transformations of African marriage*. Manchester, UK: Manchester University Press: 183-198.

Ngubane, H. (1987). The consequences for women of marriage payments in a society with patrilineal descent. In: Parkin, D. and Nyamwaya, D. (ed.). *Transformations of African marriage*. Manchester, UK: Manchester University press: 173-182.

Peters, H.E. (1988). Retrospective versus panel data in analyzing lifecycle events. *Journal of Human Resources* 23(4): 488-513.

Poulain, M., Riandey, B., and Firdion, J.-M. (1992). Data from a life history survey and from the Belgian population register: A comparison. *Population: An English Selection* 4: 77-96.

Radcliffe-Brown, A.R. (1950). Introduction. In: Radcliffe-Brown, A.R. and Forde, D. (ed.). *African systems of kinship and marriage*. London: Oxford University Press: 1-85.

Ratcliffe, A.A., Hill, A.G., Harrington, D.P., and Walraven, G. (2002). Reporting of fertility events by men and women in rural Gambia. *Demography* 39(3): 573-586.

Reniers, G. (2003). Divorce and remarriage in rural Malawi. *Demographic Research* S1(Article 6): 175-206.

—. (2008). Marital strategies for regulating exposure to HIV. *Demography* 45(2): 417-438.

Reniers, G. and Tfaily, R. (2008). Polygyny and HIV in Malawi. *Demographic Research* 19: 1811-1830.

Schatz, E. (2002). Numbers and narratives: Making sense of gender and context in rural Malawi. [PhD Thesis]. Philadelphia: University of Pennsylvania, Graduate Group in Demography and Sociology.

Smith, J.P. and Thomas, D. (2003). Remembrances of things past: test-retest reliability of retrospective migration histories. *Journal of the Royal Statistical Society Series a-Statistics in Society* 166: 23-49.

Sudman, S., Bradburn, N.M., and Schwarz, N. (1996). *Thinking about answers: The application of cognitive processes to survey methodology*. San Francisco: Jossey-Bass Publishers.

Takyi, B.K. and Gyimah, S.O. (2007). Matrilineal family ties and marital dissolution in Ghana. *Journal of Family Issues* 28(5): 682-705.

Tew, M. (1950). *Peoples of the Lake Nyasa region*. London: International African Institute.

Tilson, D. and Larsen, U. (2000). Divorce in Ethiopia: The impact of early marriage and childlessness. *Journal of Biosocial Science* 32(3): 355-372.

van de Walle, E. (1968). Marriage in African censuses and inquiries. In: Brass, W., Coale, A.J., Demeny, P., Heisel, D.F., Lorimer, F., Romaniul, A., and Walle, E.V.d. (ed.). *The Demography of tropical Africa*. Princeton, New Jersey: Princeton University Press: 183-238.

—. (1993). Recent trends in marriage ages. In: Foote, K.A., Hill, K.H., and Martin, L.G. (ed.). *Demographic change in sub-Saharan Africa*. Washington, D.C.: National Academy Press: 117-152.

van de Walle, E. and Meekers, D. (1994). Marriage drinks and kola nuts. In: Bledsoe, C. and Pison, G. (ed.). *Nuptiality in Sub-Saharan Africa: Contemporary anthropological and demographic perspectives*. Oxford: Clarendon Press: 57-73.

Weinreb, A.A. (2006). The limitations of stranger-interviewers in rural Kenya. *American Sociological Review* 71(6): 1014-1039.

Wringe, A., Cremin, I., Todd, J., McGrath, N., Kasamba, I., Herbst, K., Mushore, P., Żaba, B., and Slaymaker, E. (2009). Comparative assessment of the quality of age-at-event reporting in three HIV cohort studies in sub-Saharan Africa. *Sexually Transmitted Infections* 85(Suppl 1): i56-i63.

Żaba, B., Isingo, R., Wringe, A., Marston, M., Slaymaker, E., and Urassa, M. (2009). Influence of timing of sexual debut and first marriage on sexual behaviour in later life: findings from four survey rounds in the Kisesa cohort in northern Tanzania. *Sexually Transmitted Infections* 85(Suppl 1): i20-i26.

Table 1. Ethnic group, religion, and marriage patterns by region among women, 1998 and 2001 MLSFH

Characteristic	North	South	Central
Ethnic Group (dominant)[a]	Tumbuka (90%)	Yao (67%)	Chewa (79%)
Religion[a]			
Catholic	12%	13%	25%
Protestant	86%	18%	71%
Muslim	0%	69%	0%
Other	2%	0%	3%
Polygynous husband (1st marriage)[b]	41%	23%	28%
Type of Lineage[c]			
Matrilineal	0%	85%	-
Patrilineal	100%	6%	-
Bi-lateral/Chief	0%	9%	-
Virilocal residence after 1st marriage [b]	73%	24%	83%
Marriage Customs			
Level of formality	Formal	Informal	Formal or informal
Bridewealth paid	Yes	No	In some cases
Ended in divorce (1st marriage) [b]			
After 5 years	14%	33%	20%
After 25 years	40%	65%	43%

[a] Author's own calculations using data from the 2001 MLSFH.
[b] Reniers (2003) calculated statistics using data from the 2001 MLSFH.
[c] Schatz (2002) calculated statistics using data from the 1998 MLSFH. Schatz did not provide statistics for type of lineage in the Central region.

Table 2. Matching process, by gender, 2006 and 2010 MLSFH

	Men	Women
Number of marriages reported in 2006	1227	1593
Number of marriages reported in 2010	1111	1480
Difference (2006-2010)	116	113
Match rates[a]		
% marriages reported in 2006 also reported in 2010	84.8	89.5
% marriages reported in 2010 also reported in 2006	93.6	96.3
Marriage-level statistics		
Unmatched marriages (%)	18.8	12.9
Number of marriages	1371	1729
Individual-level statistics		
Did not report at least one marriage in 2006 or 2010[b] (%)		
All respondents	26.1	16.3
Married more than once[c]	51.8	46.1
Did not report multiple marriages[d]	22.5	15.6
Number of respondents	732	1139

[a] Does not include marriages that took place after the 2006 wave.

[b] Excludes marriages that began after the 2006 wave.

[c] Refers to respondents married more than once by the 2006 wave.

[d] Among respondents who did not report at least one marriage in both survey waves.

Table 3. Reported number of times married for men and women, 2006 and 2010 MLSFH

Men 2010

		1	2	3	4	5	6	7	Total
	1	340	51	6	0	0	0	0	397
	2	**58**	137	19	4	2	0	0	220
	3	**13**	**23**	36	9	1	1	1	84
	4	**8**	**4**	**3**	5	1	1	0	22
2006	5	**1**	0	**3**	**1**	2	0	0	7
	6	0	0	0	0	0	1	0	1
	7	0	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0	0
	9	0	**1**	0	0	0	0	0	1
	Total	420	216	67	19	6	3	1	732

Women 2010

		1	2	3	4	5	6	7	Total
	1	734	49	3	0	0	0	0	786
	2	**70**	165	32	2	1	0	0	270
2006	3	**12**	**21**	31	5	0	0	0	69
	4	**1**	**2**	**4**	3	0	0	0	10
	5	**2**	0	0	0	0	0	1	3
	6	0	0	0	**1**	0	0	0	1
	Total	819	237	70	11	1	0	1	1139

Table 4. Marriage Indicators (means) for men and women, 2006 and 2010 MLSFH

Men

Variables	Data Source			Type of Test		Data Source			Type of Test	
	2006	RMH	N	Paired	Unpaired	2010	RMH	N	Paired	Unpaired
Age at first marriage	22.16	21.96	708	***		22.63	21.98	704	***	*
	(4.19)	(4.20)				(5.58)	(4.21)			
Number of times married[a]	1.68	1.77	731	***		1.62	1.88	731	***	***
	(0.92)	(1.02)				(0.89)	(1.07)			
Number of times divorced[a]	0.47	0.53	731	***		0.43	0.64	731	***	***
	(0.80)	(0.87)				(0.76)	(0.94)			
Ever divorced	0.33	0.36	723	***		0.30	0.42	731	***	***
	(0.47)	(0.48)				(0.46)	(0.49)			
Ever widowed	0.07	0.08	724	**		0.08	0.10	731	**	
	(0.26)	(0.27)				(0.27)	(0.30)			

Women

Variables	Data Source			Type of Test		Data Source			Type of Test	
	2006	RMH	N	Paired	Unpaired	2010	RMH	N	Paired	Unpaired
Age at first marriage	17.79	17.71	1079			17.34	17.68	1079	†	
	(3.87)	(3.46)				(6.61)	(3.43)			
Number of times married[a]	1.40	1.45	1139	***		1.37	1.52	1138	***	***
	(0.68)	(0.74)				(0.67)	(0.81)			
Number of times divorced[a]	0.42	0.45	1139	***		0.39	0.54	1139	***	***
	(0.72)	(0.76)				(0.72)	(0.84)			
Ever divorced	0.32	0.33	1126	*		0.29	0.37	1138	***	***
	(0.47)	(0.47)				(0.45)	(0.48)			
Ever widowed	0.09	0.10	1139	*		0.13	0.12	1139		
	(0.29)	(0.30)				(0.33)	(0.33)			

Note: Standard deviations are in parentheses. T-tests are used unless otherwise stated.

[a] Wilcoxon rank-sum tests are used for paired tests and Wilcoxon Mann-Whitney tests are used for unpaired tests.

† $p<0.10$; * $p<0.05$; ** $p<0.01$; *** $p<0.001$

Table 5. Multinomial logistic regression results predicting terminated unmatched marriages among men and women (reference group = terminated matched marriages), 2006 and 2010 MLSFH

	Men	Women
Individual Characteristics		
Age	-0.02	0.18***
	(0.05)	(0.05)
Age squared	0.00	-0.00***
	(0.00)	(0.00)
Region of residence		
Central (ref.)	---	---
South	0.35	0.19
	(0.29)	(0.27)
North	0.14	0.30
	(0.33)	(0.34)
Completed 5+ grades of schooling	-0.04	0.29
	(0.27)	(0.28)
Inconsistent reporting of:		
Level of education	0.41	0.46†
	(0.32)	(0.28)
Number of children ever born	0.51†	0.11
	(0.28)	(0.26)
Number of lifetime sexual partners	0.21	1.29***
	(0.22)	(0.21)
Marriage Characteristics		
Marriage order		
First (ref.)	---	---
Second	-0.14	0.08
	(0.26)	(0.31)
Third or higher	0.38	-0.10
	(0.38)	(0.45)
Years since marriage began	0.02	0.00
	(0.01)	(0.02)
Short duration marriage	1.22***	1.53***
	(0.27)	(0.27)
Entered into polygamous marriage	0.66**	
	(0.23)	
Survey Characteristics		
Interviewer knows respondent's family, 2006	-0.33	-0.45
	(0.38)	(0.38)
Degree of cooperation, 2006		
Good (ref.)	---	---
Very Good	0.13	0.14
	(0.24)	(0.22)
Average/bad	0.27	-0.23
	(0.34)	(0.30)

Degree of cooperation, 2006		
Good (ref.)	---	---
Very Good	0.05	-0.05
	(0.28)	(0.28)
Average/bad	0.20	-0.15
	(0.25)	(0.24)
Length of survey time, 2010		
Middle (ref.)	---	----
Short	-0.13	0.42†
	(0.26)	(0.25)
Long	0.08	0.15
	(0.26)	(0.24)
Interviewer Characteristics, 2010		
Age	0.04	-0.20
	(0.24)	(0.21)
Age squared	-0.00	0.00
	(0.00)	(0.00)
Female	-0.50†	-0.26
	(0.28)	(0.22)
Ever married	0.21	0.01
	(0.32)	(0.32)
Has prior interviewing experience	-0.68*	0.48†
	(0.29)	(0.26)
Lives in same district as respondent	-0.21	-0.25
	(0.31)	(0.26)
Constant	-1.71	-4.04
	(3.49)	(3.04)
Pseudo-R^2	0.206	0.216
N	1,020	1,316

Note: Robust standard errors in parentheses. Omitted category = current marriages.

† p<0.10; * p<0.05; ** p<0.01; *** p<0.001

Table 6. Logistic regression results predicting inconsistent reporting of marriage start and end dates, men and women, 2006 and 2010 MLSFH

| | Marriage Start Date | | Marriage End Date |
	Men	Women	All
Individual Characteristics			
Age	-0.03	0.04	0.12*
	(0.04)	(0.06)	(0.06)
Age squared	0.00	-0.00	-0.00†
	(0.00)	(0.00)	(0.00)
Region of residence			
Central (ref.)	---	---	---
South	0.90***	0.91***	0.11
	(0.23)	(0.19)	(0.31)
North	0.19	0.14	-0.17
	(0.20)	(0.20)	(0.36)
Completed 5+ grades of schooling	-0.42*	-0.71***	-0.81**
	(0.19)	(0.18)	(0.30)
Inconsistent reporting of:			
Level of education	-0.21	-0.26	0.36
	(0.24)	(0.21)	(0.38)
Number of children ever born	-0.07	0.69**	0.25
	(0.23)	(0.26)	(0.34)
Number of lifetime sexual partners	-0.05	0.38*	0.28
	(0.17)	(0.17)	(0.27)
Male			-0.16
			(0.26)
Marriage Characteristics			
Marriage order			
First (ref.)	---	---	---
Second	0.59**	0.37+	-0.28
	(0.21)	(0.20)	(0.30)
Third or higher	0.40	0.03	-0.03
	(0.30)	(0.36)	(0.58)
Years since marriage began	-0.02	-0.02	0.01
	(0.01)	(0.02)	(0.02)
Short duration marriage	0.19	0.46*	0.81**
	(0.23)	(0.21)	(0.28)
Entered into polygamous marriage	0.16		
	(0.18)		
Status of marriage			
Still married (ref.[a])	---	---	
Divorced (ref.[b])	0.20	0.29	---
	(0.21)	(0.19)	
Widowed	1.06*	0.55*	-0.31
	(0.44)	(0.27)	(0.27)

Survey Characteristics

Interviewer knows respondent's family, 2006	0.02	-0.07	-0.13
	(0.24)	(0.24)	(0.36)
Degree of cooperation, 2006			
Good (ref.)	---	---	---
Very good	0.14	0.06	-0.08
	(0.17)	(0.15)	(0.24)
Average or Bad	0.05	0.04	0.63†
	(0.26)	(0.21)	(0.38)
Degree of cooperation, 2010			
Good (ref.)	---	---	---
Very good	-0.01	-0.10	0.47
	(0.19)	(0.18)	(0.33)
Average or Bad	0.00	0.39*	-0.37
	(0.19)	(0.17)	(0.28)
Length of survey time, 2010			
Middle (ref.)	---	---	---
Short	0.46*	-0.11	0.10
	(0.20)	(0.18)	(0.29)
Long	0.04	0.01	0.14
	(0.18)	(0.17)	(0.27)
Interviewer Characteristics, 2010			
Age	0.29†	0.21	-0.06
	(0.15)	(0.16)	(0.25)
Age squared	-0.00	-0.00	0.00
	(0.00)	(0.00)	(0.00)
Female	0.06	0.06	0.49†
	(0.20)	(0.16)	(0.26)
Ever married	-0.22	-0.36	-0.58†
	(0.23)	(0.22)	(0.35)
Has prior interviewing experience	-0.52*	-0.15	-0.34
	(0.22)	(0.18)	(0.29)
Lives in same district as respondent	0.00	-0.03	-0.28
	(0.19)	(0.17)	(0.30)
Constant	-3.86†	-4.27†	-1.73
	(2.31)	(2.40)	(3.68)
Pseudo-R^2	0.08	0.12	0.11
N	805	1,088	462

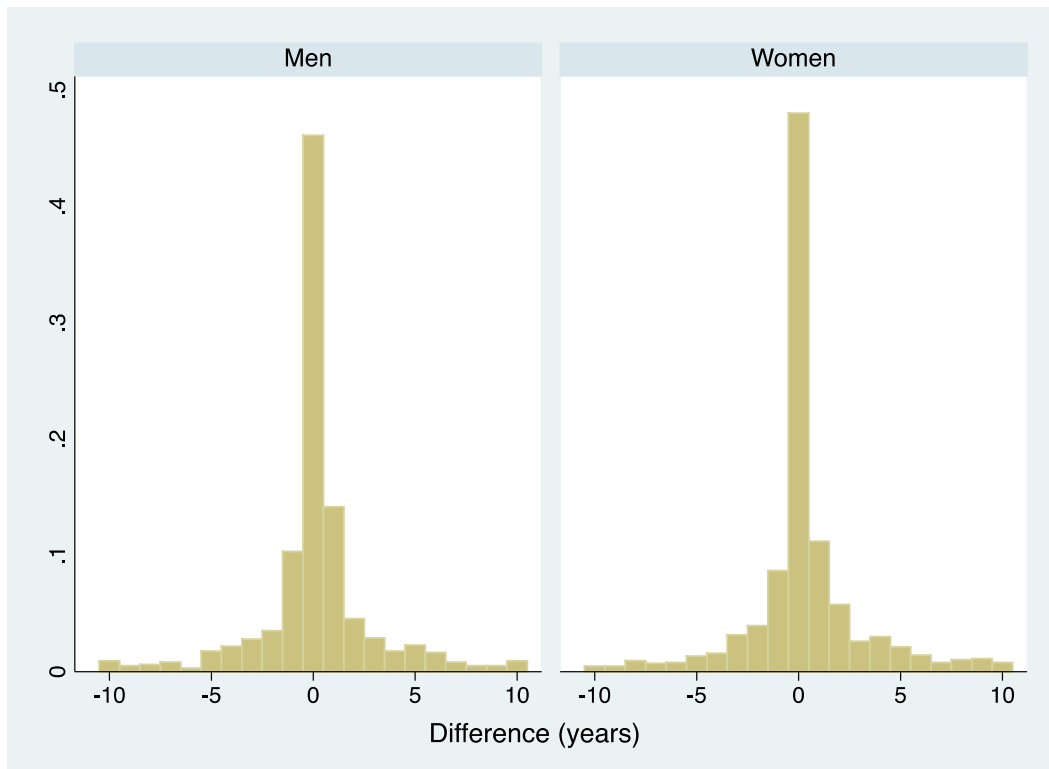Note: Robust standard errors in parentheses

[a] Reference group for the outcome predicting inconsistent reporting of marriage start dates.

[b] Reference group for the outcome predicting inconsistent reporting of marriage end dates.

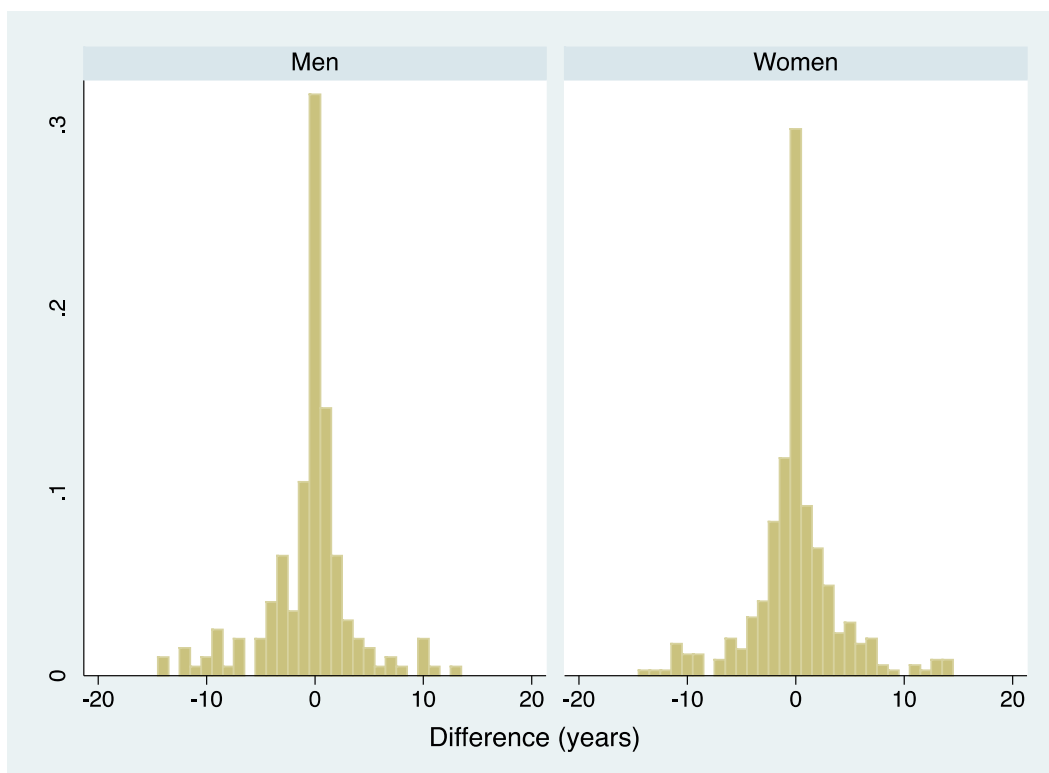† p<0.10; * p<0.05; ** p<0.01; *** p<0.001

Fig. 1 Difference in marriage start dates (2006-2010)

Note: Restricted to marriages where marriage start dates were reported in 2006 and 2010.

Fig. 2 Difference in marriage end dates (2006-2010)

Note: Restricted to terminated marriages where marriage end dates were reported in 2006 and 2010.