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Review Article

Unrealized fertility in demography

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Abstract

BACKGROUND
Over the past few decades, demographic research on unrealized fertility – the experience of having fewer children than desired – has expanded rapidly, particularly in low-fertility settings. More recently, scholars have shown that unrealized fertility is also widespread in higher-fertility contexts, affecting individuals across diverse sociodemographic conditions. Yet the literature remains fragmented, spanning definitions and measurement approaches, and with limited synthesis across settings.

OBJECTIVE
This article reflects on the current state of demographic research on unrealized fertility. Drawing on studies from both the Global North and Global South, we provide a narrative review of how unrealized fertility has been measured, its primary causes, and the persistent gaps in the field.

RESULTS
We identify five dominant approaches to measuring unrealized fertility and review their strengths and limitations, as well as the data constraints that hinder cross-contextual comparisons. We then consider the principal causes of unrealized fertility and introduce a preliminary conceptual model for understanding its multilevel drivers. Finally, we highlight key gaps in the literature and propose substantive and methodological directions for future research.

CONTRIBUTION
As unrealized fertility is increasingly the focus of public discourse and policy debates, this is a critical moment for demography to deepen and standardize research on the topic. Our review synthesizes the field to date and offers concrete recommendations for advancing demographic research on unrealized fertility.

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1. Introduction

Demographers have long been interested in people's fertility goals – both to forecast future fertility trends and to understand the extent of mismatch between what individuals say they want versus what fertility outcomes come to pass. In terms of the latter, for decades the dominant interest was understanding the causes and consequences of 'overshooting' one's desired fertility, with comparatively less consideration given to the opposite experience (Casterline 2019). More recently, however, demographers have turned their attention to 'unrealized fertility,' the phenomenon of having fewer children than desired.

Although growing, this literature has developed without coherent organization due in part to the geographically siloed nature of fertility research. That is, research from lower-fertility contexts, such as Europe and the United States, has developed separately from research from other, higher-fertility parts of the world, which has both slowed the development of a unifying conceptual framework and led to cross-contextual measurement differences that complicate comparative research. Additionally, this siloed development contributed to a delayed recognition that unrealized fertility is prevalent across diverse fertility and socioeconomic contexts.

Given the rapidly expanding yet fragmented state of research on unrealized fertility, we offer a reflection and narrative review of the field. We start with a brief historical overview that traces demographic research on the misalignment of fertility goals and outcomes, which eventually led to the study of unrealized fertility. Next, as part of our narrative review, we summarize existing measurement approaches, highlighting both aggregate and individual approaches to measuring unrealized fertility as well as their strengths and weaknesses. In contrast to systematic and scoping reviews, narrative reviews seek to make sense of broad and complex topics and to summarize, critique, and offer recommendations for the field. We used an iterative search process that included key word searches in the Web of Science database and forward and backward citation tracking to map and classify research on unrealized fertility within demography and related disciplines (Boell and Cecez-Kecmanovic 2014; Greenhalgh, Thorne, and Malterud 2018; Hirt et al. 2023). We then summarize the causes of unrealized fertility and introduce a conceptual framework that depicts the multilevel forces that give rise to it. Finally, we identify gaps in the literature and propose topics for future demographic research on unrealized fertility. We prioritized global representation in our review, seeking to integrate heretofore separated research from the Global North and Global South, but acknowledge that this was limited by our predominant reliance on English-language literature.

2. The emergence of demographic research on unrealized fertility

The recent rise in research on unrealized fertility has historical parallels. Demographic research on fertility proliferated in the middle of the 20th century – a time when there was considerable concern around 'over-population' (Merchant 2021). The publication of Paul Ehrlich's *Population Bomb* and emphasis on population growth and momentum across the Global South first set the field's gaze toward identifying the social conditions that would lower fertility. Although fertility desires were woefully absent from much of this work, over time demographers took interest in understanding how family size ideals shift in a population – predicated on the assumption that a downward trend in women's desired family size would prompt a corresponding decline in fertility (Bongaarts 1992; Bongaarts 1997).

The emerging attention paid to women's fertility desires at a time when demography was occupied by an interest in high fertility gave way to a focus on unwanted fertility, women having more children than desired. By the 1970s, demographic surveys regularly asked women their family size goals, which were then set against births to estimate unwanted childbearing. They also asked women whether previous births were wanted later than they occurred ('mistimed') or when no more births were desired ('unwanted') (Trent 1980; Lightbourne 1985a; Lightbourne 1985b). Related research on the causes and consequences of mistimed and unwanted fertility subsequently flourished (e.g., Gipson, Koenig, and Hindin 2008; Foster 2020).

Around the turn of the 21st century, however, the emergence of low fertility led to a shift in fertility research (Morgan 2003; Kohler, Billari, and Ortega 2002; Suzuki 2003). Initially, much of this research on low fertility treated women's fertility desires as implicit, assuming low-fertility outcomes reflected women's desires for fewer children. Only select research acknowledged that the new, ultra-low fertility levels might not reflect women's desires but instead could represent women having fewer children than they desired (Bongaarts 2002; Chesnais 2000). Over time, this area of inquiry grew in demography but stayed geographically confined to low-fertility contexts.

In Global South settings where fertility has historically been higher, little demographic research considered the possibility that people were having fewer children than they desired (Merchant 2021; Casterline and Agyei-Mensah 2017). Only very recently have demographers begun to tackle the topic of unrealized fertility in higher-fertility settings, documenting surprisingly high levels of unrealized fertility alongside high levels of unwanted fertility (Casterline and Han 2017; Assaf and Moonzwe Davis 2022).

3. Measuring unrealized fertility

Fundamental to understanding unrealized fertility is making sense of its measurement. What we know about unrealized fertility has been constrained by its measurement and the strengths and weaknesses of respective approaches. To summarize the approaches to measuring unrealized fertility, we identified a range of terms used to describe the broader phenomenon of having fewer children than desired. Terminology varied across the literature and included the terms "fertility gap" (e.g., Philipov 2009; Beaujouan and Berghammer 2019), "underachieved fertility" (e.g., Nitsche and Hayford 2020; UNFPA 2025), "unmet demand for children" (e.g., Chesnais 2000; Harknett and Hartnett 2014), fertility "misalignment" (e.g., Channon and Harper 2019), "unmet fertility goals" (e.g., Brinton et al. 2018), and finally "unrealized fertility" (e.g., Casterline and Han 2017; Assaf and Moonzwe Davis 2022).

We identified five principal approaches to measuring unrealized fertility in the existing literature, which we present in Table 1. Very few surveys, and no nationally representative ones of which we are aware, include questions designed to measure unrealized fertility directly. As such, researchers instead rely on comparisons between fertility goals and fertility outcomes. Note that we use the phrase 'fertility goals' as an umbrella term, but how these goals are measured is important for understanding and identifying unrealized fertility. Desires reflect what an individual wants, whereas intentions reflect a commitment to an action (Miller and Pasta 1995; Badolato 2025). Intentions incorporate constraints over time, some of which may themselves be the cause of fertility outcomes falling short of desires (Sobotka and Beaujouan 2014). Below, we describe how researchers have used both aggregate and individual-level approaches to study the broad phenomenon of unrealized fertility.

3.1 Aggregate approaches to measurement

Our review of the literature identified two main approaches to measuring unrealized fertility at the population level. Under the first, which we coin the *aggregate-period approach*, researchers compare the mean family size goal for a population to the period total fertility rate (TFR) (e.g., Philipov and Bernardi 2011). Studies use various measures of family size goals, including mean personal desired family size (e.g., "For you personally, what would be the ideal number of children you would like to have or would have liked to have had?")[3] and mean intended parity (e.g., "How many (more) children

[3] Precise wording of this and all measures of fertility goals range across surveys and over time. This phrasing comes from the Generations and Gender Survey round 2. In contrast, the Demographic and Health Survey program asks people with children, "If you could go back to the time when you did not have any children and

do you intend to have?"), sometimes restricted to respondents in their early or middle reproductive ages. Some studies (e.g., Bongaarts 2001) have instead used mean societal family size ideal (e.g., "What do you think is the ideal number of children for a family?") because it was all that was available, but this is more likely to measure norms than an individual's desire for their own family (Testa 2012). As one example, using Eurobarometer data from 13 European countries, Bongaarts (2008) finds an average country-level shortfall of 0.44 births per woman based on comparing the mean ideal family size to the tempo-adjusted TFR.

The key strength of this approach is the ease with which it can be estimated using survey measures of family size goals and estimates of the TFR from the same or alternate source. It also reflects both desires and fertility under current conditions, which can be particularly useful for policy purposes (Philipov and Bernardi 2011). However, it suffers from biases due to tempo fluctuations in the TFR (though tempo adjustments reduce this) and in fertility goals, which may change over time and across cohorts (Lee 1980; Golovina et al. 2024).

To attend to some of these biases, a more refined aggregate approach uses a cohort perspective, which we label the *aggregate-cohort approach*. Using repeated measures from birth cohorts over time, researchers compare mean desired or intended family size for a still young cohort to achieved parity toward the end of the cohort's reproductive career (e.g., Beaujouan and Berghammer 2019; Bongaarts 2002). This approach uses repeated cross-sections of the same data source over time (e.g., US National Longitudinal Survey of Youth as in Morgan and Rackin 2010) or combines data on fertility goals from one source with data on cohort fertility from another. For example, Beaujouan and Berghammer (2019) compare mean intended family size for women ages 20 to 24 from the Europe-based Fertility and Family Surveys to completed cohort fertility at ages 40 to 42 from the Human Fertility Database. They found gaps between early-cohort goals and almost completed fertility that were largest in southern European countries, where they surpassed 0.6 children per woman.

A main strength of the cohort approach is that it follows the same birth cohort, which is important when family size goals are rapidly changing across cohorts. A main weakness, however, is that family size goals might also change within cohorts, and this cannot be accounted for unless they are measured at multiple points in the life course.

Aggregate approaches to measuring unrealized fertility are generally used in contexts where fertility has fallen and stayed below replacement level. In such settings, policy interest tends to center around the fact that fertility goals in a population are higher than overall fertility, and aggregate estimates are easy for policymakers and lay audiences

could choose exactly the number of children to have in your whole life, how many would that be?" People without children are asked, "If you could choose exactly the number of children to have in your whole life, how many would that be?"

to understand. For example, these types of approaches contribute to statements such as "Europeans want more children than they actually have" (European Commission 2005 as cited in Philipov and Bernardi 2011). The main weakness of aggregate approaches, however, is that they fail to capture individuals' experiences that may differ from aggregate patterns. For example, recent research finds that individual-level unrealized fertility is particularly high across sub-Saharan Africa even in contexts where fertility exceeds desires in the aggregate (Casterline and Han 2017; Assaf and Moonzwe Davis 2022).

Although aggregate measures offer interesting ways to classify fertility dynamics in a population, they make substantively distinct theoretical contributions relative to work that focuses on individual-level experiences of unrealized fertility. Thus, in the following sections, we focus specifically on the individual-level experience of having fewer children than desired.

Table 1: Approaches to measuring unrealized fertility at the aggregate and individual levels

Approach	Measure of fertility goals	Measure of fertility outcomes
(1) Aggregate-period	Mean desired or intended family size across the reproductive age range or limited to a certain age group	Total fertility rate or tempo-adjusted total fertility rate
(2) Aggregate-cohort	Mean desired or intended family size in early reproductive ages	Completed or almost completed cohort fertility
(3) Individual-number	Desired family size in late reproductive ages	Completed or almost completed fertility
(4) Individual-more	Wants a(nother) child in late reproductive ages	None
(5) Individual-longitudinal	Intended or desired family size in early reproductive ages	Completed or almost completed fertility

3.2 Individual-level approaches to measurement

The literature has featured three main approaches to measuring unrealized fertility at the individual level, each of which estimates the prevalence of (usually) women in a population with unrealized fertility. The first, and most widely used, approach is what we call the *individual-number approach*. In this approach, researchers use cross-sectional data to classify women as having unrealized fertility if their desired family size exceeds their parity (either living children or children ever born) when they approach the end of the reproductive age range (e.g., Channon and Harper 2019). This method is a variant of the Lightbourne (1985b) method that has been used to estimate levels of unwanted fertility at the individual level (e.g., by the Demographics and Health Survey [DHS] program). For example, Casterline and Han (2017) use DHS data to estimate unrealized fertility among women aged 44 to 48 across 78 countries in Africa, Asia, and Latin

America.[4] Using the individual-number approach, they find levels of unrealized fertility that ranged regionally from 13% in South Asia to 45% in sub-Saharan Africa.

Key strengths of this approach are its simplicity and that its underlying data can estimate unrealized and unwanted fertility simultaneously (e.g., Assaf and Moonzwe Davis 2022; UNFPA 2025). Weaknesses of this approach include that it is vulnerable to ex post rationalization. As such, the approach may underestimate unrealized fertility if women suppress the true number of children that they desired and instead report the number of children that they actually had as their desired number. Alternatively, bias in the other direction could yield an overestimation of unrealized fertility if people report desires, which are sometimes framed as 'ideals,' that are wholly unconstrained by reality (Philipov and Bernardi 2011; Ryder and Westoff 1971).

Other research has employed what we refer to as the *individual-more approach*. This approach relies on a survey question asking whether individuals want a child if they do not have one or want another if they have already had children (hereafter 'want a(nother)'). This approach codes women aging out of the reproductive window (typically aged 45 or older) who want a(nother) child as having unrealized fertility (e.g., Beaujouan 2022). The logic underlying this approach is that these women are unlikely to have another biological child given their advanced reproductive age, and thus they are likely to age out of reproduction wanting more children than they have. Research shows that this approach produces lower estimates than the individual-number approach from the same samples. For example, Casterline and Han's (2017) estimates are 2% (vs. 13%) in South Asia and 18% (vs. 45%) in sub-Saharan Africa.

The key strength of this approach is that it is estimated using a single survey item – one generally considered to be the most reliable and valid measure of fertility desires (Casterline and El Zeini 2007). The main weakness is that it is unclear what role knowledge of physiological constraints plays in shaping how women in their late 40s respond to a question about desiring a child. Women who are aware of the low likelihood that they will successfully conceive a(nother) child may lower their desires even if they would prefer to have another child, which could lead to this approach underestimating unrealized fertility.

The fifth and final approach that we identify is the *individual-longitudinal approach*. This approach relies on following the same individuals over time and comparing desired or intended family size early in an individual's reproductive career to achieved parity toward the end of reproduction (e.g., Berrington and Pattaro 2014; Quesnel-Vallée and Morgan 2003). For example, using the individual-longitudinal approach, Morgan and

[4] Casterline and Han (2017) focus on women ages 44 to 48 because there was limited fertility among women 44 and older in the low- and middle-income country surveys they used. They exclude women aged 49 because of concerns about age displacement thought to be a problem in some DHS surveys. Other researchers have used different age criteria when applying this approach (e.g., 40 to 49; 45 to 49).

Rackin (2010) find that 35% of women and 43% of men in the US National Longitudinal Survey of Youth 1979 cohort had, in their 40s, underachieved the parity they intended in young adulthood.

The key strength of this approach is that it links individuals' early-life goals with their later-life outcomes. Though mostly estimated within a single longitudinal survey, it could be estimated by linking a survey that included fertility goals to population registers or other administrative measures of fertility outcomes. Its main weakness is that it relies on early-life fertility goals that are known to change over time and to be particularly volatile during young adulthood (Yeatman, Sennott, and Culpepper 2013; Müller et al. 2022; Heiland, Prskawetz, and Sanderson 2008). Such revisions in desires may lead to inaccurately classifying people as having unrealized fertility (or not) based on goals they expressed long ago and have since revised. Whether this is a limitation of the approach depends on whether fertility desires in young adulthood are the most appropriate benchmark against which to compare achieved fertility or whether measures of unrealized fertility should account for revisions in desires that occur over the life course. Key to this question is the interpretation of why desires change over time: Do they change due to new information and experiences (in which case revised desires are likely the better benchmark) or because of constraints that could be seen as endogenous to unrealized fertility (in which case early-life desires may be most appropriate)? Both are likely true.

3.3 Measuring unrealized fertility across contexts

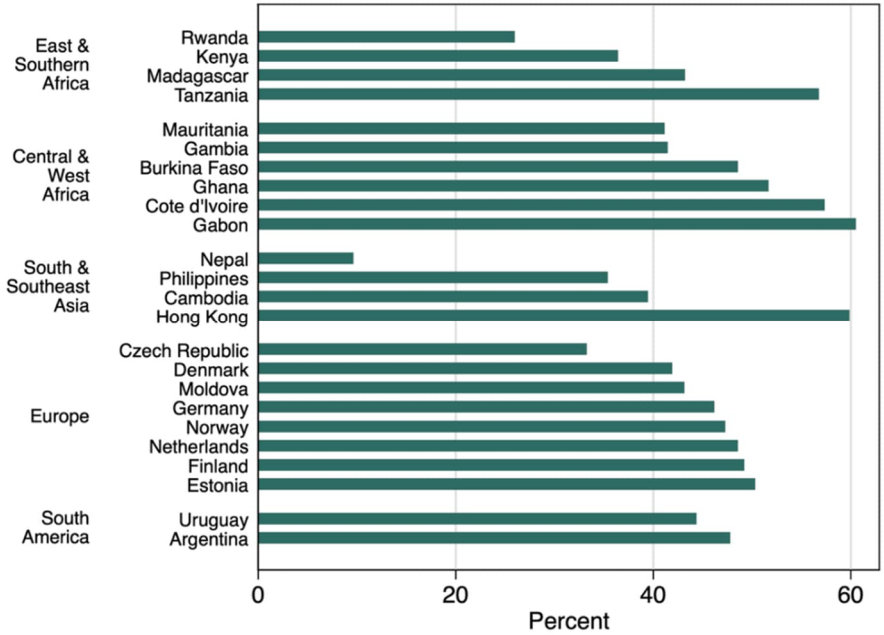
Differences in data availability have largely prevented researchers from using the same approach to estimate individual-level unrealized fertility across contexts spanning the Global North and Global South. Large-scale longitudinal data that include fertility goals, which are needed for the individual-longitudinal approach, are rare in the Global South. Thus, most estimates using this approach have been from North America and Europe. In contrast, estimates using the individual-number and individual-more approach are most common in the Global South because of the historic availability of rich DHS Program data on fertility desires. In the Global North, on the other hand, large cross-sectional surveys with modules on fertility frequently do not include measures of fertility desires late in reproduction. Decades ago, such questions were replaced by questions on fertility intentions and expectations, which were considered better at forecasting fertility outcomes (Trent 1980; Philipov and Bernardi 2011). Interestingly, it is precisely the predictive failure of fertility desires that highlights the existence of unrealized fertility. In contrast to desires, intentions eventually converge with parity as people age (Morgan and Rackin 2010), meaning they cannot be used to estimate unrealized fertility late in

reproduction. A few, mostly European-based, survey programs offer important exceptions by including a measure of personal desired family size (e.g., multiple rounds of the Eurobarometer, see Testa 2012). Notably, round 2 of the Generations and Gender Survey (GGS-II) included this measure in many countries with large enough samples to estimate unrealized fertility at the end of the reproductive age range (Gauthier et al. 2021).

Figure 1 presents estimates of unrealized fertility using a comparable individual-number approach from contexts spanning the Global North and Global South. To do so, we combine recent survey data from the GGS-II and the DHS Program to produce weighted estimates of unrealized fertility among women ages 45 to 49 across 24 countries in Africa, Asia, Europe, and South America. In three-quarters of the countries included in Figure 1, more than 40% of women at the end of their reproductive careers desired larger families than they had. These results make clear that unrealized fertility is pervasive across widely divergent fertility contexts. For example, in Hong Kong, where the TFR is below one child per woman, almost 60% of women age 45 to 49 years experience unrealized fertility. Nearly the identical prevalence of women age 45 to 49 years in the sub-Saharan country of Gabon, with a TFR of 3.6, experience unrealized fertility. Of the countries included, only Nepal, where both fertility and desired fertility are around two children per woman, has a prevalence of unrealized fertility below 10%.[5]

[5] A 2025 United Nations Population Fund (UNFPA) report drew from a pilot online survey conducted by YouGov. Using a version of the individual-number approach for people aged 50 to 88 in 14 countries, it found levels of unrealized fertility that ranged from 19% in Nigeria to 40% in Indonesia (results were not disaggregated by sex) (UNFPA 2025).

Figure 1: Prevalence of unrealized fertility among women ages 45 to 49 across countries in Africa, Asia, Europe, and South America, 2020–2023



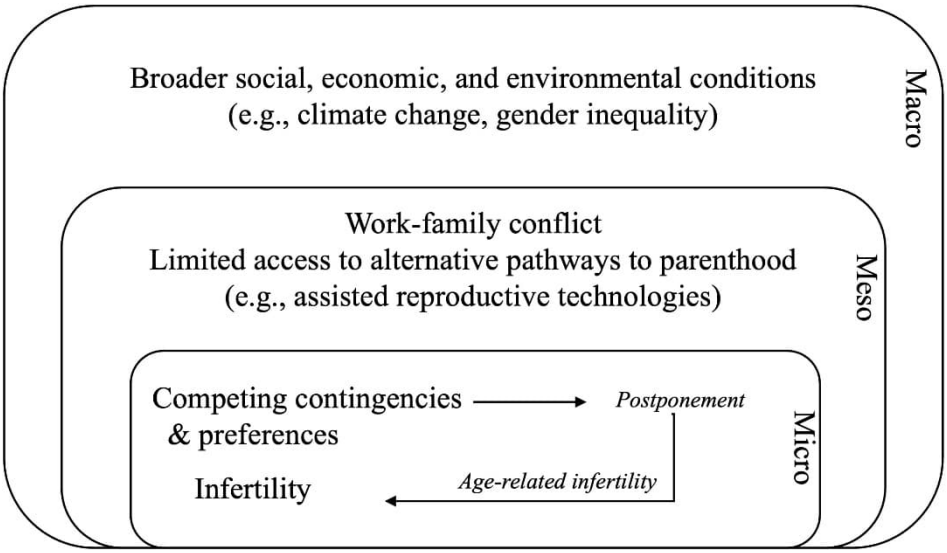
Notes: Analyses use data collected between 2020 and 2022 from the Demographic and Health Surveys Program (13 countries in Africa and Asia) and between 2020 and 2023 from the Generations and Gender Program (10 countries in Europe and South America plus Hong Kong). Estimates include survey weights and are made using the individual-number approach by comparing family size desires to children ever born among women aged 45 to 49. Data from Argentina were collected only in the city of Buenos Aires.

4. The causes of unrealized fertility

Having established that unrealized fertility is common across diverse contexts, we turn to identifying its principal causes. Although there are limited direct comparisons across geographic contexts, there is enough relevant literature from a range of settings to begin to identify common themes. Drawing from the existing literature, we developed a conceptual framework depicting the multilevel causes of unrealized fertility at the individual level. Our framework, presented in Figure 2, extends from the micro-level forces that are the focus of most literature to include meso- and macro-level considerations. Although the precise causes of unrealized fertility and their relative significance will vary across settings, we see them as embedded in a shared framework.

Beginning with micro-level factors, two broad categories of contributing causes emerged in the literature: infertility and competing contingencies and preferences. Infertility refers to the inability to either conceive or carry a pregnancy to term. Trends in infertility and its consequences have been studied across disciplines and contexts (e.g., Larsen 2000; Mascarenhas et al. 2012; Inhorn and van Balen 2002), though its links with unrealized fertility have not always been explicit. Primary infertility implies unrealized fertility for all but those who desired childlessness. Secondary infertility, on the other hand, will result in unrealized fertility for those who seek to continue childbearing but are physiologically unable to do so. Since most tools for the biomedical or survey identification of infertility are conditioned on the intent to have a child or at least sustained exposure to the risk of conception (World Health Organization 2023; Greil et al. 2010), the very identification of infertility signals unrealized fertility in most cases. In one of the few papers to explicitly link infertility with unrealized fertility, Lazzari and Beaujouan (in press) find that a self-reported history of infertility was associated with fertility falling below ideals among both men and women in the European countries they studied.

Figure 2: Conceptual framework of the causes of unrealized fertility



Aside from infertility, a second set of factors contributing to unrealized fertility is the large and inclusive category that we call 'competing contingencies and preferences.' This refers to broad-ranging circumstances wherein the desire to have a certain number

of children is incompatible, or perceived to be incompatible, with other life goals, such as those pertaining to education, employment, leisure, partnership, or one's economic situation (Nitsche and Hayford 2020; Blair-Loy 2005; Bongaarts 2001; Casterline and Han 2017). Other researchers have labeled these simply as 'competing preferences,' but we advocate for calling them competing contingencies and preferences since the distinction between preferences and constraints can be blurry. 'Preferences' connotes agency and choice, whereas 'contingencies' accommodates a more complex dynamic that recognizes the structural forces acting at the meso- and macro-levels (see Figure 2) that constrain choices. For example, a woman's desire for a particular career may encourage her to postpone or forgo having children. However, in many circumstances a given career is not itself inherently incompatible with childbearing; rather, it is societal structures and institutions (e.g., the expense of childcare; gender norms around housework) that lead to the perceived incompatibility. To describe this as a competing preference alone diminishes the role of structure.[6]

Although there are many types of competing contingencies and preferences, those related to economics and partnership emerge as among the most common in the literature. Starting with one's economic situation, individuals may weigh their desire to have a(nother) child against their perceived ability to support their children at a particular standard of living. This includes both those who forgo (additional) childbearing because of concerns about the ability to feed and house a child as well as those who forgo (additional) childbearing because of constraints on higher-order investments in the child or in their other children (Adsera 2006; Dey and Wassof 2010; Chen and Yip 2017).

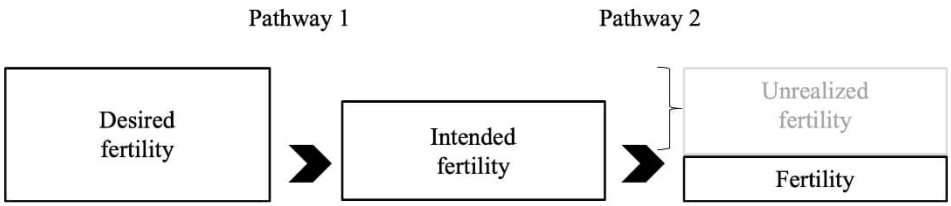
Partnership factors are another major source of competing contingencies and preferences that can lead to unrealized fertility. A lack of a suitable partner, either outright or through relationship dissolution, may contribute to involuntary childlessness or having fewer children than desired (Nishikido, Cui, and Esteve 2022). The importance of finding 'the right' partner will be particularly salient in contexts where fertilty normatively occurs within committed, long-term unions. Additionally, divergent fertility desires within a partnership can lead to unrealized fertility for one partner if the other partner's preference for fewer children is followed (Iacovous and Tavares 2011; Yeboah, Kwankye, and Frempong-Ainguah 2021).

The relationship between infertility and competing contingencies and preferences is itself dynamic over the reproductive life course. When competing contingencies and preferences lead to the repeated postponement of a desired first or higher-order birth, people may run out of time to realize their fertility goals due to age-related infertility (Gemmill 2019; Timæus and Moultrie 2008; Nitsche and Hayford 2020; Beaujouan 2023).

[6] Here, we also share Casterline and Han's (2017) view that "when preferences compete and one set loses, the losing preferences can nevertheless be regarded as valid and the loss as genuine" (p. 431).

Building from the traits-desires-intentions-behavior model of fertility (Miller 1994), we identified two main pathways through which micro-level forces could lead to unrealized fertility (Figure 3). First, fertility intentions could diverge downward from fertility desires, and second, fertility outcomes could fall short of fertility intentions. Competing contingencies and preferences are most likely to work by depressing fertility intentions downward if childbearing and other life goals are seen as incompatible. Infertility, on the other hand, will predominately cause intentions to go unfulfilled, although experiences with infertility could also prompt eventual reductions in fertility intentions (Lazzari 2025).

Figure 3: Pathways through which unrealized fertility materializes



Enveloping the micro-level causes are a set of meso- and macro-level forces in the background that contribute to unrealized fertility (Figure 2). Meso-level forces include societal influences such as work–family conflict and limited access to alternative pathways to parenthood, such as assisted reproductive technology or adoption. These work through micro-level forces to contribute to unrealized fertility. Work–family conflict, for example, may exacerbate competing contingencies and preferences and thus contribute to the postponement of fertility and ultimately to intentions diverging from desires (Brinton and Oh 2019). Poor access to assisted reproductive technologies, on the other hand, strengthens the link between experiences of infertility and unrealized fertility by causing outcomes to diverge from intentions (Inhorn 2003; Inhorn and Patrizio 2015).

At the macro-level, even broader social, economic, and environmental conditions will shape the likelihood of unrealized fertility. Consistent with gender equity theories of fertility, gender systems can heighten or weaken work–family conflict across settings, and this will influence the way in which competing contingencies and preferences lead fertility intentions to fall short of desires (Brinton et al. 2018; Chen and Yip 2017; Goldscheider, Bernhardt, and Lappegård 2015). Additionally, concerns about climate change as a whole or the specific effects of changing climactic patterns (e.g., flooding) may suppress intentions relative to desires (Bodin and Björklund 2022). Equally, such macro-level forces that prompt a fundamental rethinking of fertility desires are distinct from unrealized fertility (Bisi, Sturm, and Van Bavel 2024).

Considering the causes of unrealized fertility in a broader framework, such as that provided by Figure 2, makes clear that what is often depicted as residing at the individual level is fundamentally shaped by larger forces, only some of which we have described here. It also identifies two potential intervention points: factors that could support fertility intentions so they do not fall below fertility desires and factors that could increase fertility outcomes so they are in line with an individual's fertility intentions. The former is likely to respond to changes in the environmental, social, and work–family context. Such forces currently exert downward pressure on fertility intentions for people across the globe and contribute to a growing perception of the incompatibility of having (many) children and contemporary life (Brinton and Oh 2019; Caldwell and Schindlmayr 2003; Smith 2004). The latter, on the other hand, will require improved healthcare to reduce the disease-related drivers of infertility, better education about the physiological constraints of later-life fertility, and more widespread and equitable access to reproductive technologies and parenting rights, including for same-sex partners (Carvalho et al. 2019; Pedro et al. 2018; Van Gerwen, Muzny, and Marrazzo 2022).

5. Key areas for future research

Beyond the measurement and causes of unrealized fertility, there are other areas ripe for future research. We highlight three such areas below that researchers have begun to explore but with limited consensus.

5.1 The consequences of unrealized fertility

Although researchers and laypeople alike can agree that unrealized fertility is an undesirable outcome that is likely to have implications for people's lives, there has been scant research on the specific consequences of ending one's reproductive career having fewer children than desired. There is, however, a larger literature on the consequences of infertility that can inform our understanding (Dyer 2007). Across a range of global settings, research has identified negative impacts of infertility on mental and physical health, financial security, and marital stability. At the same time, infertility research also highlights heterogeneities in consequences – with some people suffering extreme harms while others experience few impacts (Thoma et al. 2021).

The consequences of unrealized fertility are also likely to vary widely. For some, it could be the defining characteristic of their lives, as suggested by extreme – but not rare – examples in the infertility literature. In these cases, unrealized fertility, and the recognition that one's fertility desires will not be achieved, could result in severe mental

health consequences (White and McQuillan 2006). For others, unrealized fertility may have few, if any, consequences. Having had fewer children than desired may simply reflect a life that took a different direction than what was originally desired. In these cases, it might not be perceived as a major loss, as suggested by qualitative research from Brazil (Carvalho, Wong, and Miranda-Ribeiro 2018).

Too little is known about the impacts of unrealized fertility to be able to distinguish between unrealized fertility that is detrimental and unrealized fertility that is not. This should be a key priority for future research. One potentially important differentiator could be along the lines of parenthood and nonparenthood. That is, involuntary childlessness may be more consequential than not having one or more additional desired children because the former also implies the failure to achieve a desired status as parent (Nitsche and Hayford 2020; Liamputtong 2007; McQuillan et al. 2003). Additionally, the consequences of unrealized fertility could be particularly extreme in social and cultural contexts where individuals' identity, status, and purpose are most closely interwoven with parenthood and their number of children (Hollos et al. 2009; Cui 2010). Given the dearth of research on the consequences of unrealized fertility more broadly, however, there is much to learn about its impacts across life domains and when – and for whom – they are most negative.

5.2 Men's unrealized fertility

Most research on unrealized fertility has focused squarely on women, as has our review. This is due, in part, to the women-centric nature of fertility data in demography. Data on men's fertility exist, however, which make it possible to estimate men's unrealized fertility using the range of measurement approaches we described earlier. Studies from the Global North include men in their estimates of unrealized fertility using the individual-longitudinal approach (e.g., Morgan and Rackin 2010; Berrington and Pattaro 2014) and the individual-number approach (e.g., Lazzari and Beaujouan in press). There is limited research on unrealized fertility among men in the Global South, although DHS data would permit such an endeavor. The small number of existing studies point to similarly high levels of unrealized fertility among men, with some studies even finding higher levels among men when compared to similar-aged women (Quesnel-Vallée and Morgan 2003; Morgan and Rackin 2010). Less still is known about the causes and consequences of unrealized fertility for men, although some qualitative research has included men as partners (e.g., Carvalho et al. 2018) and individuals (e.g., Brinton and Oh 2019). The literature on infertility points to the possibility that there might be important differences in the consequences of unrealized fertility by gender (Alosaimi et al. 2017; Thoma et al. 2021), but more research is needed. Men's unrealized fertility is

an important topic for future research, and we encourage researchers to give it due attention.

5.3 Unrealized fertility beyond numbers alone

This review has focused exclusively on unrealized fertility in terms of underachieving a specific number of children, but there are other ways fertility desires may be unrealized. A quantum approach says nothing about the timing or compositional goals people may have for their fertility that may, too, go unrealized. Taking these in turn, there can be tempo unrealized fertility – that is, fertility that came later than desired. Just as surveys often allow for women to state that a birth came too soon, select surveys (e.g., GGS; Performance Monitoring for Action; US National Survey of Family Growth) permit respondents to describe a birth or pregnancy as coming later than desired. This approach, however, will capture only births that eventually happen, even if they come later than desired, and will miss those births that never happen. A few researchers have studied the gap between intended (rather than desired) and achieved fertility over short-time periods (e.g., three years) (e.g., Harknett and Hartnett 2014; Spéder and Kapitány 2009; Régnier-Loilier and Vignoli 2011), which can be used to measure the realization of fertility timing goals. Although they represent different dimensions of unrealized fertility, timing and numeric goals are related since delays in timing may contribute to people having fewer children than desired by the end of their reproductive career. Relatedly, although unrealized fertility is typically conceptualized as a fixed state that occurs at the end of reproduction, there may be a variant of unrealized fertility that people experience earlier in their lives as they have fewer children than they desire at a certain point. Thus, experiences of unrealized fertility could be dynamic, changing across the reproductive life course, and is a possibility worth further exploration.

Another type of unrealized fertility relates to the sex composition of children – for example, not having as many boys or girls as desired. A desire for a particular sex composition could also lead to unrealized numeric fertility goals if it pushes numeric fertility desires upward and they cannot be achieved in time (Assaf and Moonzwe Davis 2022; Fayehun et al. 2020). Many DHS surveys ask specifically about desired number of boys and desired number of girls in addition to overall desired number of children. Recent evidence using DHS data from Africa and Asia concluded that number of children is a greater driver of unrealized fertility than sex composition (Assaf and Moonzwe Davis 2022). This finding may be context-specific but nonetheless highlights the value of extending beyond numbers alone to consider other aspects of unrealized fertility.

6. Advancing research on unrealized fertility

Central to notions of reproductive justice is the belief that people should not only be able to avoid the births they do not want but also have the children they desire.[7] To date, demographers have focused far more on unwanted births than desired births forgone. Fortunately, this has begun to change, and a growing body of demographic research has collectively shown that across vastly different economic, fertility, and social contexts, unrealized fertility is common. Our review identified the principal ways in which demographers have measured unrealized fertility heretofore and identified a framework of its principal causes at the micro-, meso-, and macro-levels. Nonetheless, both substantive and methodological questions remain.

We started this review by introducing the myriad terms that are used to describe fertility that falls below desires and introduced a range of approaches to its measurement. To create a more cohesive literature that is in conversation even when context or approach differ, we recommend standardizing terminology of constructs to differentiate between them. 'Fertility gap' seems most appropriate for discussing population-level discrepancies between desired numbers of children and actual fertility. There can be both positive (higher fertility levels than desired) and negative (lower fertility levels than desired) fertility gaps. 'Unrealized fertility' could then be reserved to characterize the individual-level experience of having fewer children than desired.

To advance research on unrealized fertility, we need more data and we need to improve and standardize the way in which demographers measure unrealized fertility. This can be achieved through small changes to existing survey programs and through the development of new, direct measures of unrealized fertility and its sequelae. First, changes to existing survey programs could make estimates of unrealized fertility more widely available. The individual-number approach, while not perfect, offers a simple, indirect measure of unrealized fertility that can be estimated across contexts with cross-sectional data, as we have here. Although there are differing perspectives on the best time to measure fertility desires in the reproductive life course, it seems likely that a person's report on their personal desired family size late in reproduction reflects what they truly wished they had even if it also represents an adjustment from their early-life desires.

Thus, we recommend that large nationally representative surveys include questions about personal family size desires where they do not currently. Fertility intentions are important but cannot tell us what people want – a critical oversight. Where sequential surveys already permit, researchers could use these data to study trends over time and changes in the sociodemographic correlates of unrealized fertility. Continued collection

[7] And they should be able to raise the children they have in a safe and healthy environment (see https://blackrj.org/our-issues/reproductive-justice).

of data sources like the DHS Program are essential to assess trends in unrealized fertility in many settings moving forward.

Although there is still much to learn from existing data and approaches, we see a need to develop a new measure that is designed specifically to capture unrealized fertility. Existing approaches largely infer unrealized fertility from a combination of questions designed for other purposes. A direct question about unrealized fertility would better measure perceived unrealized fertility, by which we mean unrealized fertility that people themselves view as such. From a person-centered perspective, this is arguably the most relevant indicator. Additionally, a direct measure of unrealized fertility would facilitate the inclusion of follow-up questions to elicit the perceived causes and consequences of unrealized fertility. While we offer recommendations for these questions, we caution that these items need to be tested across contexts and that alternatives should be considered.

We see value in a measure that asks respondents specifically whether they had fewer children than they desired. This might look like asking people toward the end of the reproductive period, "Do you wish you had had more children?" followed by "How many more children do you wish you had had?" Alternatively, the question could ask "Do you wish you had had more children by now?" – which could be asked across age ranges. Such a question would also acknowledge that alternative pathways to parenthood, including adoption and surrogacy, as well as physiological differences by sex, mean that the end of reproduction is fuzzy. Together, these questions could produce estimates of unrealized fertility at specific ages and the extent of unrealized fertility (i.e., number of children). They may also home in on unrealized fertility that is most meaningful to the individual and potentially also the most consequential, although this needs to be tested empirically.

Surveys could then include a follow-up question asking about the perceived causes of unrealized fertility. Recent pilot studies have shown promise in asking a direct question about people's reasons for having fewer children than they desired (UNFPA 2025; Yeatman and Anderson 2025). For example, a YouGov survey commissioned by the United Nations Population Fund asked, "In your personal situation, what factors led or are likely to lead you to have fewer children than you initially desired?" Results from these pilots suggest that people can identify and report on the perceived and anticipated causes of unrealized fertility and provide a starting list of reasons.

To begin to better understand the consequences of unrealized fertility, researchers might adapt a question that has been used in the Generations and Gender Survey to measure the anticipated consequences of unintended childbearing. A version adapted to measure the anticipated consequences of unrealized fertility could ask people who report wanting a(nother child), "Even though you want to have a(nother) child, suppose that you did *not* have a(nother) child. What effect do you think this would have on various aspects of your life?" A further adapted version could measure the perceived consequences of

unrealized fertility among people toward the end of the reproductive period who report wishing they had had more children (e.g., "What effect has having had fewer children than you desired had on various aspects of your life?"). The original GGS question asked about impacts on the possibility to realize other life goals, joy and satisfaction, care and security in old age, and partnership. Qualitative research could help identify whether these – or other domains – are the most salient for understanding the consequences of unrealized fertility.

Admittedly, many causes and consequences of unrealized fertility might not be clear to individuals, nor will they necessarily be things all respondents are willing to disclose. Thus, causal inference techniques that can be used to disentangle the causes and impacts of unrealized fertility for people's lives can complement the survey-based approaches we propose.

7. Conclusion

The increasing discussion of unrealized fertility in public discourse and policy debates makes now a critical time to expand and deepen demographic research on unrealized fertility. As addressed in this review, demographic research has already demonstrated that people across the globe are having fewer children than they desire and highlighted the key drivers of this phenomenon. Nonetheless, there remains much to learn about its causes, for whom the consequences are most severe, and what can be done to support people in meeting their goals. Demographers are well positioned to meet this moment through both the broader analysis of existing data and the design and collection of new data.

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9. Data availability

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