The Fertility Desires-Intentions Gap in the United States

Thesis

Presented in Partial Fulfillment of the Requirements for the Degree Master of Arts in the Graduate School of The Ohio State University

By

Luca Badolato

Graduate Program in Sociology

The Ohio State University

2023

Thesis Committee

Sarah Hayford, Advisor

John B. Casterline

Corinne Reczek

Copyrighted by

Luca Badolato

2023

Abstract

Following the striking decline in fertility rates across high-income countries, a growing body of research has focused on the correspondence between childbearing preferences and observed fertility, operationalizing the broader construct of fertility preferences using both fertility desires and intentions. A complementary body of research focused on whether and how individuals revise their fertility preferences. Although fertility desires and intentions are conceptualized as different constructs in leading theories of fertility preferences, they are often used interchangeably in empirical research and rarely analyzed simultaneously, in part because of limited data availability. This paper builds on these theoretical and empirical advancements to analyze a largely overlooked gap, the correspondence between fertility desires and intentions. Drawing on four waves from 2011 to 2018 of the National Survey of Family Growth, I show that a significant proportion of individuals who desire a(nother) child do not intend to have one. In particular, I compute age- and parity-specific estimates and show that the correspondence between fertility desires and intentions depends on key status attributes, including age, parity, gender, sexual orientation, family-related factors, and socioeconomic constraints. I conclude by discussing relevant implications for the theoretical understanding of the childbearing decision process, demographic estimations based on fertility preferences, and fertility trends and social policies.

Vita

M.Sc. Economic and Social Sciences, Bocconi university, Summa cum Laude, 2021

B.Sc. Economics and Management, Università degli Studi di Milano, Summa cum Laude, 2018

Fields of Study

Major Field: Sociology

Table of Contents

Abstractiii
Vitaiv
List of Tables vi
List of Figures vii
Introduction1
Theoretical perspectives on fertility preferences
Theory of planned behavior 4
Traits-Desires-Intentions-Behaviors framework5
Conceptualizing the gap between fertility desires and intentions
Hypotheses
Data and methods14
Data14
Methods17
Results
Descriptive estimates: age- and parity-specific fertility desires-intentions gap 19
Regression estimates: understanding the fertility desires-intentions gap at the individual level
Discussion and Conclusion
Bibliography

List of Tables

Table 1 The correspondence between fertility desires and intentions, ideal-type configurations. 6
Table 2 Weighted summary statistics: proportion/mean and 95% Confidence Interval (N = 11,592)
Table 3 Weighted logistic regression estimates predicting fertility intentions (conditioned on positive fertility desires). Odds Ratios and Standard Errors in odds scale. 23
Table 4 A summary of hypotheses and empirical results

List of Figures

Figure 1 The correspondence between fertility desires and intentions: conceptual and analytical framework. 8	3
Figure 2 Weighted age-specific estimates of fertility intentions among respondents who want a(nother) child ($N = 23,769$)	9
Figure 3 Weighted parity-specific estimates of fertility intentions among respondents who want a(nother) child ($N = 23,769$)	9

Introduction

During the last few decades, demographers have witnessed a rapid and striking global decline in fertility rates and the emergence of sustained "lowest-low" fertility levels, defined as period total fertility rates (TFRs) at or below 1.3, in several high-income countries (Guzzo and Hayford 2023; Kohler, Billari, and Ortega 2002). Following these trends, the measurement and study of fertility preferences have become central in the demographic literature, with the primary question of whether and how much below-replacement fertility rates reflect actual changes in individual fertility preferences or unrealized fertility (Goldstein, Sobotka, and Jasilioniene 2009; Hartnett and Gemmill 2020). The divergence between fertility preferences and observed fertility has been analyzed at both the population and individual level and has become a rich area of investigation since the emergence of low fertility rates (Morgan and Rackin 2010; Sobotka and Beaujouan 2014). For instance, since the first studies, the positive gap between fertility preferences and realizations has been interpreted as an "unmet demand for children" (Bongaarts 2001; Chesnais 2000; Morgan 2003).

At the individual level, the broader concept of fertility preferences has been operationalized using both fertility desires and intentions, which have become standard theoretical and empirical tools in demographic analyses since the first fertility surveys (Morgan 2001; Westoff and Ryder 1977). Population scientists have used these constructs to measure the gap between fertility preferences and behaviors, underlining high levels of unrealized fertility (Morgan and Rackin 2010; Nitsche and Hayford 2020; Régnier-Loilier and Vignoli 2011; Spéder and Kapitány 2009). Similarly, a complementary body of research analyzed whether and how individuals revise their fertility desires and intentions across the life course, emphasizing that fertility preferences are moving targets that are adapted to changing circumstances (Hayford 2009; Iacovou and Tavares 2011; Liefbroer 2009). Two of the leading theories of fertility preferences, the theory of

planned behavior (TPB) and the traits-desires-intentions-behavior (TDIB) conceptualize fertility desires and intentions as clearly different constructs (Ajzen 1991; Ajzen and Klobas 2013; Miller 2011; Miller and Pasta 1995). Despite this clear distinction, fertility desires and intentions are often used interchangeably in empirical research and rarely analyzed simultaneously, in part because of limited data availability.

In this paper, I build on these theoretical frameworks alongside the growing empirical studies on fertility preferences to operationalize and analyze the gap between fertility desires and intentions. In particular, I show that a significant proportion of individuals who desire to have a(nother) child do not actually intend to have one despite their desires, and that the correspondence between fertility desires and intentions depends upon key status attributes, including age, parity, gender, sexual orientation, family-related factors, and socioeconomic constraints. I draw on four waves from 2011 to 2018 of the National Survey of Family Growth (NSFG), the most comprehensive nationally representative repeated cross-sectional survey in the U.S. on fertility preferences and behaviors. In the NSFG, respondents who express positive fertility desires are asked whether they also intend to have a(nother) child as a follow-up question. I compute age- and parity-specific estimates of the gap between fertility desires and intentions and analyze the determinants of this gap at the individual level. I conclude by elaborating on the implications of the findings for the theoretical understanding of the childbearing decision process, demographic estimations based on fertility preferences, and fertility trends and social policies.

Theoretical perspectives on fertility preferences

Fertility preferences are a crucial tool in demographic analyses and a key measure of interest since the development of the first fertility surveys in the 1940s. Fertility desires and intentions have been used as a proxy to predict future fertility trends both in high and low fertility countries (Hartnett and Gemmill 2020; Yeatman, Trinitapoli, and Garver 2020), to understand the precursors of the demographic transition (Bongaarts and Casterline 2013; Coale 1989), and to classify recent births into a wanted and an unwanted component (Casterline and El-Zeini 2007). With the emergence of below-replacement fertility rates across high-income societies, the correspondence between fertility preferences and realized fertility has become the focus of much research (Guzzo and Hayford 2023).

The gap between fertility preferences and realizations has been measured by using the more specific fertility ideals (Goldstein, Lutz, and Testa 2003; Sobotka and Beaujouan 2014), desires (Adsera 2006; Bongaarts 2001), intentions (Régnier-Loilier and Vignoli 2011; Spéder and Kapitány 2009), and expectations (Hayford 2009; Morgan and Rackin 2010). Although distinguishing among fertility ideals, desires, intentions, and expectations adds complexity, there is a general consensus on some primary distinctions. Fertility ideals reflect societal norms and represent the number of children people would like to have under "ideal conditions", marginally influenced by individual and contextual constraints (Blake 1966; Sobotka and Beaujouan 2014; Trent 1980). As underlined by Sobotka and Beaujouan (2014, p. 393), "their interchangeable use with intentions or desires, found in some of the past research, is misleading." Fertility ideals are, therefore, particularly relevant for macro-level analyses (Billari et al. 2021). At the micro-level, fertility desires and intentions have become central, and generally operationalized as different constructs. Fertility desires are seen as less constrained by life course and societal circumstances, and reflections of an intrinsic wish to have a(nother) child (Iacovou and Tavares 2011; Miller 2011; Shreffler et al. 2016). On the contrary, fertility intentions incorporate external factors and entails a specific plan to achieve childbearing preferences (Iacovou and Tavares 2011; Liefbroer 2009). Finally, although fertility intentions and expectations might be theorized as slightly different concepts, they are generally operationalized as synonymous in empirical research and large survey data collection (Gemmill 2019; Hayford 2009; Morgan and Rackin 2010) - "for practical purposes, [fertility intentions and expectations] may be thought of as measuring the same thing" (Iacovou and Tavares 2011, p. 90).

Despite the generally acknowledged differences between fertility desires and intentions, they are often operationalized interchangeably in empirical research and large surveys (Miller 2011). This confusion is also reflected in the retrospective classification of recent births, where questions about fertility wantedness and intendedness sometimes refer ambiguously to both measures. Fertility desires and intentions are the focus of two leading theories of fertility preferences, the theory of planned behavior and the traits-desires-intentions-behaviors framework.

Theory of planned behavior

According to the theory of planned behavior, fertility intentions result from a reasoned decision-based process and are influenced by attitudes, subjective norms, and control beliefs (Ajzen 1991; Ajzen and Klobas 2013). Attitudes refer to the perceived positive or negative consequences of having a child or not. For instance, the perception of how childbearing would limit individuals' freedom to do the things they enjoy is an example of a negative belief. Subjective norms derive from normative beliefs, that is, perceived expectations and behaviors of important referent individuals of groups. Finally, control beliefs concern the perceived presence of factors that can facilitate or complicate an individual's ability to have and raise a child. These three factors combine to form intentions, which involve a specific action, target, and, often, a specific context and time frame. One of the characteristics of the theory of planned behaviors is that its core structure can be easily extended to include personal characteristics and contextual factors, relevant in fertility research. For example, contextual factors can be modeled as actual controls that directly influence intentions through their effect on perceived control and/or moderate the effect of intentions on behaviors. In addition, personal characteristics can influence intentions by affecting the beliefs that give rise to attitudes, subjective norms, and perceived behavioral controls, and can be easily included in regression

models. The TPB solely focuses on fertility intentions; Ajzen and Klobas (2013, p. 216) specify that "desired fertility is not the same as intended fertility" but do not elaborate on the difference. It is possible to suppose that fertility desires might be embedded in the TBP as individuals' attitudes (Iacovou and Tavares 2011).

Traits-Desires-Intentions-Behaviors framework

In Miller's Traits-Desires-Intentions-Behaviors (TDIB) theoretical framework, the motivational forces driving fertility behaviors unfold in a sequential process: (i) traits, non-conscious motivational dispositions to have or not have children, lead to conscious (ii) desires to have children or not, which lead to conscious (iii) intentions, which finally lead to (iv) proceptive and contraceptive behaviors. In this framework, desires follow biological motivational traits and reflect a wish to achieve childbearing preferences, whereas intentions imply a specific decision to pursue an actionable childbearing goal through commitment and, commonly, a clear plan. In other words, desires are influenced by biological and motivational factors, while intentions, like in the theory of planned behavior, are also influenced by the social structure - social norms, institutions, personal, and economic circumstances (for a more extensive review, see Miller 2012; Miller and Pasta 1995). Importantly, Miller does not criticize the validity of the theory of planned behavior but instead emphasizes the importance of fertility desires as distinct and precursors of intentions. Nevertheless, (Miller 2011) begins his review article by pointing out two main shortcomings of the recent literature on fertility preferences. First, the terms fertility desires and intentions are often used interchangeably, resulting from inadequate or poor construct definitions and limited data availability (fertility desires and intentions are rarely collected simultaneously in large surveys). Second, although desires have unique properties, most empirical research emphasize fertility intentions, according to Miller in part because of the development of the theory of planned behavior.

Conceptualizing the gap between fertility desires and intentions

		Fertility intentions					
		Yes	No				
Fertility desires —	Yes	(i) Desire and intend (congruity)	(ii) Desire but not intend (incongruity)				
	No	(iii) Not desire but intend (incongruity)	(iv) Not desire and not intend (congruity)				

Table 1 The correspondence between fertility desires and intentions, ideal-type configurations.

Starting from the TDIB framework, it is possible to conceptualize four *ideal-type configurations*, reported in Table 1: individuals might (i) *desire and intend*, (ii) *desire but not intend*, (iii) *not desire but intend*, or (iv) *not desire and not intend* to have a(nother) child. In the first and the fourth case, there is a *congruity* between desires and intentions, while in the second and the third case, there is an *incongruity* between desires and intentions¹. The third case, individuals who do not desire but intend to have a(nother) child, is expected to be marginal, while the other three cases to represent relevant and distinct configurations of fertility preferences.

In this paper, I focus on individuals who desire to have a(nother) child, and analyze the distribution and characteristics of those who *desire and intend* and those who *desire but not intend* a(nother) child in the United States. At the aggregate level, the *incongruity* between positive fertility desires and intentions results in the desires-intentions gap. Miller (2012) concludes by underlying that, although most research about low fertility has focused on the gap between fertility preferences and behaviors, "it is the [desires-intentions] gap that may best indicate the problem areas at which social policy should be directed to help individuals

¹To simplify, I operationalize fertility desires and intentions as dichotomous constructs, which can alternatively be measured along a continuous or categorical scale (Weitzman et al. 2017). In this case, there could be an *incongruity* between desires and intentions when, for example, individuals probably desire but probably do not intend a(nother) child.

strive for the family size they intrinsically desire" (Miller 2012, 9. 94). While both fertility desires and intentions are developmental and expected to change across the life course (Lee 1980; Liefbroer 2009), according to the TDIB framework desires are influenced by enduring motivational traits, while intentions are more responsive to structural socio-economic constraints. Fertility intentions are already adjusted to changing micro- and macro-level conditions, and the gap between intentions and behaviors underestimates the influence of changing circumstances. Therefore, Miller proposes to estimate and analyze two gaps, the desires-intentions and the intentions-behaviors gaps.

Despite its relevance, the gap between positive desires and intentions have been relatively overlooked in empirical research. However, Guzzo and Hayford (2023) have recently shown that the difference between fertility desires and intentions is a useful measure of the fertility gap at the individual level. Prior to this study, demographers focused almost exclusively on the gap between fertility preferences and behaviors (Heiland, Prskawetz, and Sanderson 2008; Régnier-Loilier and Vignoli 2011; Spéder and Kapitány 2009) and on how individuals revise their fertility preferences (Hayford 2009; Iacovou and Tavares 2011; Liefbroer 2009). These studies show a relevant gap between positive fertility preferences and realizations across European countries, and identified age, parity, marital status, and socioeconomic factors as important predictors of this gap. Heiland et al. (2008) suggest that fertility desires are relatively more stable than fertility intentions over the life course and less influenced by structural constraints, as implied by the TDIB framework. Hayford (2009), Iacovou and Tavares (2011), and Liefbroer (2009) show that fertility intentions are developmental goals and are generally adjusted downwards, and to a lesser extent upwards, with increasing age in response to experiences in the family, educational, and occupational life domains. The relatively extended research on the fertility intentions-behaviors gap and stability of fertility preferences at the individual level provides a relevant theoretical and empirical basis to conceptualize the gap between fertility desires and intentions.

Hypotheses



Figure 1 The correspondence between fertility desires and intentions: conceptual and analytical framework.

The correspondence between fertility desires and intentions is expected to depend on several key status attributes related to life course stages and individual agency. These attributes include age, parity, gender, sexual orientation, family-related factors, and socioeconomic constraints.

One fundamental dimension in fertility research and primary determinant of the gap between preferences and behaviors and changes of fertility intentions is age (Iacovou and Tavares 2011). Across the life course, individuals face new and often unexpected constraints and experience major transitions in the work and family domains, which lead to a reassessment of their fertility preferences (Liefbroer 2009). In particular, age is related to both biological and normative factors. First, as individuals age, infecundity levels increase, and individuals are expected to revise their fertility intentions as a response to involuntary infertility. Second, age-related norms about the proper timing and sequencing of events provide individuals with a normative script of life and influence fertility-related preferences (Settersten and Hagestad 1996). Elaborating on Heckhausen's life-span theory of control, Liefbroer (2009) shows that individuals adjust downward their family size intentions as a specific compensatory secondary control strategy when they realize that the attainment of a goal has become unlikely. Therefore, some individuals might adjust their fertility intentions as a specific compensatory secondary control strategy while maintaining their underlying fertility desires (see Miller 2012, p. 94)². This leads to the first hypothesis.

Hypothesis I. The gap between fertility desires and intentions increases across age groups in the

later reproductive years.

Along with age, parity is a central factor in demographic estimations and a primary determinant of the correspondence between fertility preferences and behaviors. I expect significant differences between childless individuals and parents. For childless individuals, having a child not only represents realizing their fertility intentions but also achieving maternity and paternity status. Spéder and Kapitány (2009) found that childless people who did not realize their short-term fertility intentions are significantly less likely to abandon their fertility plans than individuals with one or more children. Régnier-Loilier and Vignoli (2011) reached comparable conclusions in Italy and France, where couples with already a child are more likely to forego their unrealized fertility intentions. Similarly, Iacovou and Tavares (2011) show that childless individuals are less likely to revise their intentions. Childless women are found to report the strongest fertility desires and maintain higher fertility intentions even when experiencing infertility problems (Shreffler et al. 2016).

Hypothesis IIa. The gap between fertility desires and intentions is smaller among childless individuals.

Parity is expected to influence the correspondence between fertility desires and intentions also among parents, with differences between individuals with one child compared to individuals with two or more

² It is surely possible that some individuals revise downward both their fertility desires and intentions. Across the life course, individuals who want to have a(nother) child might (i) fulfill their desires, (ii) change their desires, or (iii) have stable unfulfilled desires. This study focuses on the fertility intentions of the third group of individuals. For instance, I am mainly interested in estimating the correspondence between fertility desires and intentions using cross-sectional data, which affects relevant period demographic estimations. In the Discussion and Conclusion section, I elaborate on the importance of both cross-sectional and longitudinal data to analyze the fertility gap between desires and intentions.

children. Given the strong and permanent two-children family ideals, individuals with one child are normatively pressured to desire and intend to have another child (Sobotka and Beaujouan 2014). Similarly, couples with one child might plan to have another one to provide their current kid companionship or for sex-specific preferences (Bulatao 1981; Iacovou and Tavares 2011). For example, Régnier-Loilier and Vignoli (2011) found that individuals with one child are half as likely to forgo their unrealized short-term fertility intentions compared to parents of two or more children.

Hypothesis IIb. Among parents, the gap between fertility desires and intentions is smaller for

individuals with one child compared to individuals with two or more children.

The correspondence between fertility desires and intentions is expected to differ by gender, as a reflection of age-related and normative factors. For women, fecundability and observed fertility rates drop steadily after 35, while for men it is a slower and later process (Billari et al. 2007; Wagner, Huinink, and Liefbroer 2019). Similarly, Billari et al. (2011) show that social age deadlines, the age at which individuals are seen as too old to have a(nother) child, are perceived more frequently for women than men and lower than actual biological limits. Across European countries, the mean maternal social age deadline is 41.7 years, while the mean paternal social age deadline is 47.3 years. For instance, Wagner et al. (2019) found that childless women aged 35-37 are more likely than men to revise their fertility intentions from long-term to short-term family-formation intentions or forgo their fertility plans. Gendered normative factors related to work-family balance and childrearing are also likely to influence men's and women's fertility desires and intentions differently. Unbalanced childcare and housework divisions and the labor market structure make combining employment and parenthood more challenging for women (McQuillan et al. 2008). In the job market, women pay a motherhood wage penalty, especially in low-income sectors, while men gain a fatherhood premium (Glauber 2018). Musick, Meier, and Flood (2016) show that although both fathers and mothers report positive psychological benefits when spending time with children, women also report higher levels of stress and fatigue. This association is explained by fathers spending more time with children in leisure while mothers in childcare, including cooking, cleaning, and organizing family activities.

Hypothesis III. The gap between fertility desires and intentions is higher among women than among men.

A small but growing body of research focuses on fertility preferences and behaviors of sexual and gender minorities (Reczek 2020). Recent evidence suggests that sexual and gender minority individuals face both higher levels of unwanted and unintended fertility and significant barriers to achieving positive fertility preferences (Carpenter and Niesen 2021; Everett, McCabe, and Hughes 2017; Gregg 2018). In particular, both structural and individual factors affect sexual minority men and women's fertility desires and intentions, including economic and legal constraints - access to adoption, foster care, and assisted reproductive technologies - and decision-making processes that are emotionally, socially, and logistically difficult (Carpenter et al. 2020; Carpenter and Niesen 2021). These barriers add layers of complexity and uncertainty, leading some sexual minority men and women to forgo their fertility desires (Carpenter and Niesen 2021; Gregg 2018). For instance, among childless individuals who desire to have a child, gay and lesbian respondents are less likely to report positive fertility intentions (Baiocco and Laghi 2013; Riskind and Patterson 2010). In contrast, childless bisexual men and women report similar fertility desires and intentions to their heterosexual counterparts (Riskind and Tornello 2017). Furthermore, sexual minority populations report significantly worse measures of well-being, including physical and mental health and financial well-being, which is likely to affect their ability to realize positive fertility preferences (Stacey, Reczek, and Spiker 2022).

Hypothesis IV. The gap between fertility desires and intentions is higher among sexual minority

populations.

Characteristics related to the family domain are central in the studies on fertility preferences and are found to influence the correspondence between intentions and realizations. First, individuals who have a partner are more likely to realize their fertility preferences (Spéder and Kapitány 2009) and less likely to revise their fertility intentions compared to those who do not have a partner or are separated (Iacovou and Tavares 2011; Liefbroer 2009). In particular, married individuals are more likely to realize their short-term fertility

intentions than those cohabiting, who are instead more likely to postpone or forego their fertility plans (Régnier-Loilier and Vignoli 2011; Spéder and Kapitány 2009). Although marriage and fertility are increasingly disconnected, marriage remains a central factor in the childbearing decision process (Hayford, Guzzo, and Smock 2014). Married individuals are more likely to have more traditional attitudes to family, have longer relationships, and perceive their partnerships as more stable, which in turn influences fertility realization (Régnier-Loilier and Vignoli 2011). Among individuals with a partner, partners' characteristics are also relevant (Iacovou and Tavares 2011). In particular, partners' age is expected to be as important as individuals' age, as it follows the same social and biological limits described in the previous paragraphs. Finally, among parents, the age of the youngest child is expected to be associated with unrealized fertility (Philipov, Spéder, and Billari 2006). This follows preferences for relatively short birth intervals and reflects other constraints for which individuals are not able to realize their fertility preferences in a timely period (Iacovou and Tavares 2011).

Hypothesis V. The gap between fertility desires and intentions is higher among individuals without a partner and, compared to married couples, among cohabiting couples. Furthermore, partner's age and the age of the last child are negatively associated with fertility intentions.

Finally, socioeconomic factors, particularly employment and household income, are expected to influence the correspondence between fertility desires and intentions. However, the overall effect of employment and income on fertility preferences is less clear compared to family-related factors, and it is likely to differ between men and women (Liefbroer 2009). On the one hand, higher household income and full-time employment can help individuals realize their fertility preferences and provide financial resources to raise future children. For instance, stable job conditions are often seen as preconditions to have children (Régnier-Loilier and Vignoli 2011). On the other hand, couples in which both partners are employed can face higher opportunity costs and less work-life balance, or might decide to prioritize career-related preferences (Iacovou and Tavares 2011). Supporting these multifaceted expectations, Régnier-Loilier and Vignoli (2011) found that both inactive women and women with higher earnings are more likely to have an intended child than employed women with lower earnings. In addition, the gendered housework and participation in the labor force described above influence the effect of socioeconomic factors on fertility preferences. Following gendered expectations and traditional family norms, employment status has been found particularly relevant for men (Spéder and Kapitány 2009).

Hypothesis VI. The gap between fertility desires and intentions is moderated by measures of socioeconomic status, and the effect of employment status differ between men and women.Figure 1 reports a schematic representation of the conceptual and analytical framework, drawn starting from the TDIB framework.

Data and methods

Data

This study is based on the National Survey of Family Growth (NSFG) data, the most comprehensive nationally representative survey in the U.S. on fertility preferences and behaviors. Since 1973, the NSFG has collected repeated cross-sectional data to produce reliable national estimates of a broad range of fertility-related indicators. Originally designed to be nationally representative of non-institutionalized, ever-married women aged 15 to 44, it has been gradually expanded by interviewing women regardless of marital experience (from 1982) and including an independent sample of men aged 15 to 44 (from 2002). Starting from 2015, the NSFG expanded the age range for women and men to respondents aged 15 to 49, which allows computing standard demographic estimations across 5-years age groups among reproductive-age women and men. I draw from the last four waves of the NSFG from 2011 to 2018, the most recent release. During these four waves, the survey design and questions relevant for my analyses did not change, and the NSFG adopted a continuous interview design. Importantly, the NSFG provides sample weights to correct for survey design, non-response bias, and declining response rates across rounds, which allows for pulling together different waves (see Guzzo and Hayford 2023). I include men and women aged 15 to 49, resulting in a total raw sample of 42,062 observations.

The NSFG is uniquely suitable for analyzing the correspondence between fertility desires and intentions as operationalized in the theoretical section, as it follows a specific questionnaire design that reflects Miller's trait-desires-intentions-behaviors framework. First, all respondents are asked about their fertility desires through the question "(Looking to the future, do / If it were possible, would) you, yourself, want to have (a/nother) baby at some time (after this pregnancy is over / in the future)?"³. Valid answers include "yes", "no", and "don't know". Then, respondents are asked about their fertility intentions according to certain

³ The specific framing reflects whether respondents or their partners are pregnant and whether respondents or their partners are not physically able to have children.

Variable	Proportions/Mean	95% C.I.		
Fertility intentions $(0 = No, 1 = Yes)$	0.87	0.86 - 0.88		
Age group				
25-29	42.8%	41.3% - 44.4%		
30-34	30.0%	28.8% - 31.3%		
35-39	16.1%	15.0% - 17.2%		
40-44	8.6%	7.8% - 9.5%		
45-49	2.5%	2.1% - 3.0%		
Parity				
0	52.1%	50.2% - 53.9%		
1	24.8%	23.7% - 25.9%		
2	15.2%	14.1% - 16.3%		
3	5.5%	4.9% - 6.2%		
4 or more	2.5%	2.1% - 3.0%		
Gender ($0 =$ Women, $1 =$ Men)	0.56	0.55 - 0.57		
Sexual orientation				
Heterosexual	93.1%	92.4% - 93.8%		
Bisexual	3.3%	3.0% - 3.8%		
Gay and lesbian	2.0%	1.5% - 2.5%		
Other/Not ascertained	1.6%	1.3% - 1.9%		
Marital Status				
Never married	33.67	32.2% - 35.1%		
Cohabiting	18.4%	17.0% - 19.8%		
Married	41.9%	40.2% - 43.5%		
Separated or widowed	6.0%	5.6% - 6.7%		
Partner's age	32.65	32.4% - 32.9%		
Age of last child $(0 = 0-3, 1 = 4 \text{ or})$	0.48	0.46 - 0.50		
more)				
Employment status				
Not employed	9.2%	8.5% -10.1%		
Full-time	67.1%	65.9% - 68.5%		
Part-time	10.0%	9.3% - 10.8%		
Some of each	13.6%	12.6% - 14.7%		
Partner's employment status ($0 = Not$	0.82	0.81 - 0.83		
employed, 1 = Employed)				
Household income				
\$0-49,999	48.8%	46.9% - 50.7%		
\$50,000-99,999	31.5%	30.2% - 32.8%		
\$100,000 or more	19.7%	18.1% - 21.5%		

Table 2 Weighted summary statistics: proportion/mean and 95% Confidence Interval (N = 11,592).

criteria. First, respondents who are married or are cohabiting are asked whether they and their partner intend to have a(nother) child. This reflects both the TDIB framework and the theory of planned behavior, according to which fertility intentions entail a specific plan and have, therefore, to be aligned across partners, contrary to fertility desires which are individual (Miller 2011). Second, respondents who are not physically able to have children, or whose partner is not, are not asked about their fertility intentions. Again, this reflects the specificity of fertility intentions as entailing childbearing plans (see Shreffler et al. (2016) for a detailed discussion of infertility and fertility intentions). Following these criteria, respondents are asked about their fertility intentions through the question "Do you (and [name of current married or cohabiting partner]) intend to have (a/nother) baby at some time (in the future/after this pregnancy is over)?" Valid answers include "yes", "no", and "don't know"⁴. Relevant to these analyses, fertility desires and intentions are asked with the exact same wording and refer to the same timing ("at some time"), with the only difference that desires are framed as "want to have" and intentions as "intend to have".

Following the conceptual framework, I restrict the analysis to respondents who want a(nother) child (62.62 % of the raw sample) and provide a valid answer to the fertility intentions question (90.27%, with the remaining 9.73% proportion not applicable for physical infertility). This results in a total analytical sample of 23,769 observations.

I divide the respondents into five-year age groups: 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, and 45-49. Concerning parity, I added one child to the current number of children if respondents or their partners are pregnant, as fertility desires and intentions questions refer to another child *after the pregnancy is over*. The NSFG reports female and male respondents in two different data files, without other measures or specifications of gender identity; I follow that convention.

⁴ Unpartnered men are provided with a different set of valid answers: "definitely yes", "probably yes", "probably no", "definitely no", and "don't know". I combined "definitely yes" and "probably yes" into a "yes" category and "probably no" and "definitely no" into a "no" category to make the analyses comparable. Results are robust to an alternative specification that includes only "definitely yes" into the "yes" category.

The NSFG asked respondents about their sexual orientation in the computer-assisted self-interviewing section of the questionnaire. In particular, sexual orientation is coded into four categories: heterosexual, gay and lesbian, bisexual, and other/not ascertained.

Following the theoretical framework, I include in the family domain respondents' marital status, the age of their partner, and the age of the last child (for parents). As provided by the NSFG, marital status includes four categories: never married, cohabiting, married, and separated or widowed. Since the age of the last child is expected to influence the gap between fertility desires and intentions non-linearly, I created two categories: 0 to 3 years and 4 or more years⁵ (following a similar approach as Iacovou and Tavares 2011). As measures of the socio-economic domain, I include respondents' employment status, their partner's employment status, and household income. The NSFG asks respondents about their employed full-time, employed part-time, and some of each. Partners' employment status is measured as a binary variable, employed and not employed. Finally, household income is grouped into three categories: \$0-\$49,999, \$50,000-\$99,999, and \$100,000 or more.

Concerning the control variables, I include the NSFG round, race and ethnicity, years of completed education, and the importance of religion. In particular, race and ethnicity includes non-Hispanic white, non-Hispanic Black, Hispanic, and other as an additional category. Finally, NSFG respondents are asked how much religion is important in their life according to a scale from 1 (not important) to 3 (very important).

Methods

My analyses are twofold. First, I estimate age- and parity-specific estimates of the gap between fertility desires and intentions for men and women. In particular, I compute the proportion of respondents who intend, do not intend, and do not know, conditional on wanting a(nother) child. Second, I estimate a series

⁵ Results are robust to alternative specifications, including the age of the last child as a continuous variable or as a three-category variable with 0-3 years, 4-5 years, and 6 or more years.

of logistic regressions to analyze the determinants of the gap between desires and intentions at the individual level. The dependent variable is equal to 1 if the respondent intends to have another child and 0 if does not intend, conditioned on wanting another child. I decided to exclude the 0.9% of respondents who report "don't know" intentions for clarity and lack of statistical power to include them in multinomial regressions. In the baseline model, I include age, parity, gender, and the control variables. In the second model, I add respondents' sexual orientation and family-related factors. In the third model, I add socioeconomic factors. Finally, in the fourth model, I interact socioeconomic factors and gender. Because the gap between fertility desires and intentions among individuals in the 15-19 and 20-24 age groups is minimal, (as shown in the descriptive analysis), I restrict the regression models to individuals aged 25 or more. The regression analyses thus focus on the age groups with more variations in the outcome variables, and for which childbearing decisions are more salient. Results including young respondents aged less than 25 are consistent and robust, and available upon request. I excluded from the regression models the 0.48% of respondents with at least one missing value in any independent variable. Therefore, the final analytical sample includes 11,648 observations.

I report in Table 2 weighted summary statistics, mean or proportions and 95% confidence intervals, for each variable included in the logistic regression models. As underlined above, the analytical sample is restricted to individuals who want a(nother child), and is therefore skewed toward younger individuals who, on average, are more likely to intend to have a(nother child) and have lower parity levels. Importantly, age and parity are included in all regression models.

Results

Descriptive estimates: age- and parity-specific fertility desires-intentions gap

Figure 2 Weighted age-specific estimates of fertility intentions among respondents who want a(nother) child (N = 23,769).



Figure 3 Weighted parity-specific estimates of fertility intentions among respondents who want a(nother) child (N = 23,769).



I first compute age- and parity-specific estimates of the gap between positive fertility desires and intentions for men and women. Conditioned on desiring another child, I estimate the proportion of respondents by age group and parity level who intend to have a(nother) child, do not intend, and do not know.

Figure 2 reports the age-specific estimates. The gap between fertility desires and intentions follows a clear age pattern. Among individuals in the youngest age group, the gap is minimal, with nearly all respondents who desire to have a(nother) child also intending to have one. Starting from the 25-29 age group, the gap between desires and intentions increases almost linearly, reaching 40.78% among men in the 45-49 age group and 55.68% among women in the same age group. These estimates support Hypothesis I, according

to which the gap between fertility desires and intentions increases across age groups. Importantly, there are marked gendered dynamic: men are significantly more likely than women to intend to have a(nother) child across all the age groups. The absolute difference between men and women is 8.86 in the 30-34 age group, 8.47 in the 35-39 age group, 13.44 in the 40-44 age group, and 14.90 in the 45-49 age group. These estimates also support Hypothesis III, according to which the gap between fertility desires and intentions is higher among women than among men.

A marginal proportion of respondents who desire to have a(nother) child report not knowing whether they intend to have one. Although the proportion of "don't know" answers is low, and standard errors are consequently relatively large, there is a pattern. For both men and women, less than 1% of respondents in the youngest age groups are unsure about their fertility desires. The proportion of "don't know" answers gradually increases to a maximum of 2.62% for men in the 40-44 age group and 3.91% for women in the 35-39 age group, and again gradually declines in the following age groups. Reported uncertainty is thus maximal in the age groups approaching perceived social age deadlines and higher for women. This is consistent with Morgan (1981), which underlines that "don't know" answers to fertility intentions are meaningful.

Figure 3 reports the parity-specific estimates. There is a significant difference between childless individuals and parents. Almost all childless individuals who want a(nother) child also intend to have one, 96.15% among men and 95.12% among women. At parity 1, the gap between fertility desires and intentions increases to 10.82% for men and 11.42% for women. At higher parity levels, the gap is higher but stable, around 22% and 23% for both men and women. These estimates support both Hypothesis IIa, according to which the gap between fertility desires and intentions is smaller among childless individuals,

and Hypothesis IIb, according to which the gap between fertility desires and intentions is smaller for individuals with one child than individuals with two or more children. The percentage of respondents who report a "don't know" answer gradually increases across parity levels, reaching a maximum of 4.59% for men at parity 3 and 3.45% for women at parity 3.

Regression estimates: understanding the fertility desires-intentions gap at the individual level I continue by computing a series of logistic regression models to understand the determinants of the gap between desires and intentions at the individual level and test the main hypotheses. Table 3 reports the estimated odds ratios and standard errors.

The first model is a baseline regression that includes age, parity, gender, and the control variables. This specification complements the age- and parity-specific estimates of the gap between fertility desires and intentions, and confirms the previous results. The likelihood of intending a(nother) child given positive fertility desires decreases significantly with age. Older respondents are significantly less likely to intend to have a(nother) child than younger respondents, confirming hypothesis I. Parity is also a relevant predictor. Compared to childless respondents, individuals with one child are 42.9% less likely to report positive fertility intentions, those with two children 67.7% less likely, those with three children 67.6% less likely, and those with four or more children 60.4% less likely. These estimates confirm Hypothesis IIa and hypothesis IIb. Finally, men are 90.8% more likely to intend to have a(nother) child, confirming Hypothesis III, according to which the gap between fertility desires and intentions is higher among women than among men.

The second model adds respondents' sexual orientation and family-related factors. First, I hypothesized that the gap between fertility desires and intentions is higher among sexual minority populations (Hypothesis IV). I estimate that bisexual and gay and lesbian respondents are, respectively, 42.2% and 70.8% less likely to report positive fertility intentions than heterosexual respondents, a significant difference. Hypothesis IV is thus confirmed. Second, I hypothesized that the gap between fertility desires and intentions is higher among individuals without a partner and, compared to married couples, among cohabiting couples, and that it increases with the partner's age and the age of the last child (Hypothesis V). Partnered respondents are significantly more likely to report positive fertility intention and that married couples are relatively more likely to intend a(nother) child than cohabiting couples. Conversely, separated or widowed respondents are 7.15% less likely than unpartnered respondents, but the difference is not

statistically significant. The likelihood of positive fertility intentions decreases with the partner's age, with an odds ratio

	Model 1: Baseline		Model 2: Including sexual orientation and family domain		Model 3: Including socioeconomic domain		Model 4: Including interactions between socioeconomic domain and gender	
	OR	SE	OR	SE	OR	SE	OR	SE
Age group (ref. = 25-29)								
30-34	0.54***	0.06	0.63***	0.07	0.62***	0.07	0.62***	0.07
35-39	0.34***	0.04	0.48***	0.07	0.47***	0.07	0.48***	0.07
40-44	0.10***	0.01	0.18***	0.03	0.17***	0.03	0.18***	0.03
45-49	0.05***	0.01	0.10***	0.02	0.10***	0.02	0.10***	0.02
Parity (ref. $= 0$ children)								
1	0.57***	0.07	0.48***	0.07	0.48***	0.07	0.48***	0.07
2	0.32***	0.04	0.25***	0.04	0.26***	0.03	0.26***	0.04
3	0.32***	0.06	0.25***	0.05	0.25***	0.06	0.26***	0.05
4 or more	0.40***	0.11	0.31***	0.09	0.32***	0.09	0.31***	0.09
Gender (ref. = Women)								
Men	1.91***	0.19	1.50***	0.16	1.45**	0.17	1.05	0.29
Sexual orientation (ref. = Heterosex	ual)							
Bisexual			0.58*	0.13	0.59*	0.13	0.60*	0.13
Gay and lesbian			0.29***	0.08	0.29***	0.07	0.29***	0.07
Other/Not ascertained			1.21	0.48	1.25	0.51	1.25	0.55
Marital status (ref. = Never married))							
Cohabiting			5.19***	1.82	4.92***	1.86	4.98***	1.91
Married			6.88***	2.47	6.49***	2.52	6.50***	2.57
Separated or widowed			0.93	0.15	0.92	0.14	0.92	0.14
Partner's age			0.94***	0.01	0.94***	0.01	0.94***	0.01
Age of last child (ref. $= 0-3$)								
4 or more			0.67**	0.08	0.67***	0.08	0.68**	0.08
Employment status (ref. Not employ	yed)							
Full-time					1.29	0.19	0.99	0.16

Table 3 Weighted logistic regression estimates predicting fertility intentions (conditioned on positive fertility desires). Odds Ratios and Standard Errors in odds scale.

Part-time					1.19	0.22	0.95	0.20	
Some of each					1.03	0.20	0.93	0.24	
Partner's employment status (ref. No	ot employed)								
Employed	•••				1.03	0.16	0.80	0.14	
Household income (ref. \$0-49,999)	Household income (ref. \$0-49,999)								
\$50,000-99,999					0.95	0.12	0.93	0.12	
\$100,000 or more					1.02	0.16	1.01	0.16	
Employment status last 12 months #	Gender								
Full-time # Men							2.28**	0.69	
Part-time # Men							2.12	0.82	
Some of each # Men							1.62	0.70	
Partner's employment status # Gend	er								
Employed # Women							1.92***	0.37	
NSFG wave (Ref. 2011-2013)									
2013 - 2015	1.32*	0.17	1.36*	0.18	1.34*	0.18	1.37*	0.18	
2015 - 2017	1.43*	0.21	1.45*	0.22	1.42*	0.21	1.47*	0.22	
2017 - 2019	1.37*	0.20	1.41*	0.20	1.39*	0.20	1.41*	0.20	
Race and ethnicity (Ref. Non-Hispan	nic white)								
Hispanic	1.63***	0.21	1.73***	0.22	1.71***	0.22	1.70***	0.22	
Non-Hispanic Black	1.74***	0.21	1.83***	0.24	1.82***	0.24	1.89***	0.25	
Other	1.84***	0.31	2.01***	0.36	2.03***	0.36	1.99***	0.36	
Years of education	1.02	0.02	1.00	0.02	0.99	0.02	1.00	0.02	
Importance of religion	1.14*	0.07	1.12	0.06	1.12	0.06	1.11	0.06	
Intercept	7.02***	2.18	15.15***	5.16	14.29***	5.16	13.40***	4.86	
Ν	11,592		11,592		11,592		11,592		

Notes: *p<0.05, ** p<0.01, *** p<0.001

of 0.941. Finally, respondents whose last child is four years old or older are 32.7% less likely to indent a(nother) child than parents with a younger child. Hypothesis V is also confirmed.

The third model adds socioeconomic factors, including employment status, the partner's employment status, and household income. Compared to not employed respondents, those with full-time employment are 28.8% more likely to intend a(nother) child, and those with part-time employment 19.1%. These estimates suggest that the gap between fertility desires and intentions is higher for not employed individuals, but the difference is not statistically significant. Respondents whose partner is employed are marginally more likely to report positive intentions, but the difference is not statistically significantly associated with fertility intentions, there is a u-shaped relation: respondents with household income less than \$50,000 and higher than \$100,000 are marginally more likely to intend a(nother) child compared to those with household income between \$50,000 and \$99,999.

The fourth model adds an interaction between socioeconomic factors and gender. Consistent with gendered expectations and traditional family norms, I notice that employment status, particularly full-time employment, is significantly more relevant for men. Similarly, the partner's employment status is significantly more relevant for women. These estimates suggest that couples in which men are employed are more likely to report positive fertility intentions. The third and fourth models partially support Hypothesis VI, according to which the gap between fertility desires and intentions is moderated by measures of socioeconomic status, and the effect of employment status differ between men and women.

To conclude, I comment on the control variables. The regression estimates show that respondents in the 2011-2013 NSFG are more likely to report positive fertility intentions than those in the subsequent waves. Importantly, the gap between fertility desires and intentions did not increase across the NSFG rounds. White respondents are less likely to

intend to have a(nother) child than black and Hispanic respondents. Education is not significantly related to the gap between desires and intentions. Finally, there is marginal evidence that religiosity is positively associated with fertility intentions, but the relationship becomes not statistically significant when including family domain factors and sexual orientation.

To summarize, I report in Table 4 the list with the hypothesis elaborated in the conceptual framework and the empirical results.

	Hypothesis	Results
H.I	The gap between fertility desires and intentions increases across age groups in the later reproductive years.	Confirmed
H.IIa	The gap between fertility desires and intentions is smaller among childless individuals.	Confirmed
H.IIb	Among parents, the gap between fertility desires and intentions is smaller for individuals with one child than individuals with two or more children.	Confirmed
H.III	The gap between fertility desires and intentions is higher among women than among men.	Confirmed
H.IV	The gap between fertility desires and intentions is higher among sexual minority populations.	Confirmed
H.V	The gap between fertility desires and intentions is higher among individuals without a partner and, compared to married couples, among cohabiting couples. Furthermore, partner's age and the age of the last child are negatively associated with fertility intentions.	Confirmed
H.VI	The gap between fertility desires and intentions is moderated by measures of socioeconomic status, and the effect of employment status differ between men and women.	Partially confirmed

Table 4 A summary of hypotheses and empirical results.

Discussion and Conclusion

In this paper, I built from the theory of planned behavior and the traits-desires-intentions-behaviors framework to analyze the gap between positive fertility desires and intentions (Ajzen and Klobas 2013; Miller 2011). Fertility desires and intentions are standard tools in demographic analysis and have become central measures for analyzing and predicting fertility trends and classifying recent births into a wanted and an unwanted component (Casterline and El-Zeini 2007; Guzzo and Hayford 2023; Hartnett and Gemmill 2020). Since the emergence of below-replacement levels across high-income societies, demographers have emphasized the gap between positive fertility preferences and fertility realizations at both the population and individual levels (Morgan and Rackin 2010; Régnier-Loilier et al. 2011; Spéder and Kapitány 2009). The gap between fertility desires and intentions is critical to understand why some individuals do not strive for their childbearing desires (Miller 2011) and a relevant indicator that can be used to measure the fertility gap at the individual level (Guzzo and Hayford 2023). I computed age- and parity-specific estimates and analyzed the determinants of the gap between fertility desires and intentions, testing a series of hypotheses developed in the conceptual and analytical framework (see Figure 1).

These results show that the gap between fertility desires and intentions depends upon age, parity, gender, sexual orientation, and factors related to the family and socioeconomic domain. The gap between fertility desires and intentions follows a clear age pattern: it is minimal among individuals in the youngest age groups and increases almost linearly from the 25-29 age group. In particular, 40.78% of men and 55.68% of women in the 45-49 age group who desire a(nother) child do not intend to have one. Concerning parity, I found that the gap between fertility desires and intentions is minimal among childless individuals, it increases by 42.9% among individuals with one child, and by another 24.8% among those with two children. The gap between fertility desires and intentions is significantly higher among women and sexual minorities, particularly gay and lesbian

respondents. Factors related to the family domain are also relevant, and I found that the gap is higher among individuals without a partner and increases significantly with the partner's age and the age of the last child. Finally, socioeconomic factors are not systematically associated with fertility desires and intentions but differ between men and women. Respondent's employment status is significantly more relevant for men, while partner's employment status for women. In Table 4, I reported a detailed summary of my hypotheses and empirical results.

This study is based on the National Survey of Family Growth (NSFG), a nationally representative repeated cross-sectional survey in the U.S. The NSFG data have the unique advantages of following a specific questionnaire design that reflects Miller's trait-desires-intentions-behaviors framework and allowing age- and parity-specific computation of the correspondence between fertility desires and intentions in the U.S. Longitudinal surveys, such as the GGS and the National Longitudinal Survey of Youth (NLSY), have been extensively used to analyze fertility preferences, but they usually do not allow for age- and parity-specific estimations and asks different questions for desires and intentions (e.g., lifetime desires but short-term intentions). Nevertheless, the conceptual framework and findings suggest that the gap between fertility desires and intentions is almost null among young respondents and gradually increases across age groups. It would be relevant to complement these analysis with longitudinal data to understand the mechanisms underlining this process. When and why do individuals revise their fertility intentions but not their fertility desires?

I decided to focus these analyses on the U.S., motivated by a significant decline in the total fertility rate from 2.12 in 2007 to 1.64 in 2020 (World Bank 2023) and a robust literature on the correspondence between fertility preferences and behaviors and changing fertility preferences in this context (Guzzo and Hayford 2023; Hayford 2009; Morgan and Rackin 2010). Recent evidence suggests that the negative fertility trend is not driven by declining intended total family size but

likely by increasing unrealized fertility (Guzzo and Hayford 2023; Hartnett and Gemmill 2020). These analyses show a significant but stable gap between fertility desires and intentions. Whether and how much the gap between fertility desires and intentions differ across contexts is an open research question. Many European countries report lowest-low total fertility rates, and the gap between fertility preferences and realizations at the macro level is higher than in the U.S., which could reflect a higher gap between fertility desires and intentions. Across European countries, undesired and unintended is also lower compared to the U.S. Furthermore, the social, economic, and institutional context varies significantly across European countries (Kohler et al. 2002; Sobotka and Beaujouan 2014) and comparative analyses might illuminate how the socioeconomic structure influences the correspondence between desires and intentions.

Recent studies show significant levels of unrealized fertility and changing fertility preferences also across low-income countries (Casterline and Han 2017; Cleland, Machiyama, and Casterline 2020; Yeatman, Sennott, and Culpepper 2013). These studies confirm the validity of fertility preferences measures in high fertility contexts, showing a clear link between fertility desires and outcomes, especially as overall contraceptive use increases (Cleland et al. 2020; Yeatman et al. 2013). Longitudinal surveys show a relevant proportion, on average around 20%, of women changing their fertility desires downwardly or upwardly between survey waves, in part as a response of child mortality and union formation or dissolution (Cleland et al. 2020; Yeatman et al. 2013). A significant proportion of women at the end of their reproductive careers report wanting another child, suggesting relatively high levels of unrealized fertility (Casterline and Han 2017). In these contexts, fertility preferences measures are mainly based on fertility desires, and analyses of the correspondence between desires and intentions would be important to interpret demographic estimates and analyze fertility trends.

These findings have relevant implications for (i) the theoretical understanding of the childbearing decision process, (ii) demographic estimations based on fertility desires and intentions, and (iii)

fertility trends and social policies. These findings can be interpreted from different theoretical perspectives. On the one hand, the determinants of the gap between fertility desires and intentions at the individual levels align with hypotheses and reflect individual and societal constraints, supporting the idea that desires and intentions are meaningful constructs. On the other hand, a gap between desires and intentions reflects per se a sort of ambiguity and uncertainty, as individuals' desires and intentions are not aligned. It would be relevant to investigate and design in-depth interviews to understand better how individuals think about their fertility desires and intentions as separate constructs and which are the psycho-social consequences of a gap between the two measures.

One of the current challenges for demographers is to estimate unrealized fertility. Population scientists have proposed different approaches, including comparing overall fertility preferences and period total fertility rates (Bongaarts 2001), using longitudinal data to compare fertility preferences measured at one point in time and subsequent realizations (Harknett and Hartnett 2014; Morgan and Rackin 2010; Régnier-Loilier et al. 2011; Spéder and Kapitány 2009), and examining the fertility preferences of individuals at the end of their reproductive careers (Casterline and Han 2017). Depending on data availability, these indicators can be computed using fertility desires and intentions. The results show a relevant gap between fertility desires and intentions, which consequently affects these estimates. For example, if we estimate unrealized fertility by measuring fertility preferences at the end of the reproductive career among individuals between 40 and 44, estimates based on fertility desires and intentions would differ substantially, up to a 50% difference for women. Similarly, if we use longitudinal data to estimate unrealized fertility by comparing fertility intentions and subsequent realizations, the resulting estimates would be downwardly biased. For instance, individuals who intend to have a(nother) child are a subset of those who desire a(nother) child, representing only a portion of the overall fertility gap. As suggested by Miller (2011), it could be relevant to consider two gaps, the gap between fertility desires and intentions

and the gap between fertility intentions and behaviors, which sum to an overall fertility gap. In addition, although not the focus of my study, these analyses suggest a careful distinction between unwanted and unintended fertility, and wanted and intended fertility, when classifying recent births. Following Miller (2011), the results underline an "unmet demand for fertility intentions," as some individuals desire but do not intend to have another child. From a human rights perspective, it is arguable that policymakers should foster a social environment where individuals can achieve their desires. The gap between fertility desires and intentions is higher among individuals close to the end of their reproductive careers, sexual minorities, and women As underlined by Lazzari et al. (2023), large-scale availability of assisted reproductive technologies is an important factor in helping individuals achieve their fertility preferences and, in turn, crucial for determining completed fertility. The results show a significantly higher gap among sexual minorities, which reflects structural factors, legal constraints, and a social environment that lead some sexual minority individuals to forgo their fertility desires (Carpenter et al. 2020). Finally, consistent with the gendered expectations and division of labor within the family, employment status is significantly more relevant for men, while the partner's employment status for women. As the gender revolution unfolds, family demographers have shown increased fertility levels among gender-egalitarian couples and countries with higher gender equity (Esping-Andersen and Billari 2015; Goldscheider, Bernhardt, and Lappegård 2015). In the United States, as in many European countries, there is a sizeable motherhood wage penalty and fatherhood wage premium (Glauber 2018). These inequalities and expectations influence men's and women's decisions to pursue fertility desires and, consequently, future fertility trends. The gap between fertility desires and intentions can therefore illuminate structural inequalities and guide social policies.

Bibliography

- Adsera, Alicia. 2006. "An Economic Analysis of the Gap Between Desired and Actual Fertility: The Case of Spain." *Review of Economics of the Household* 4(1):75–95. doi: 10.1007/s11150-005-6698-y.
- Ajzen, Icek. 1991. "The Theory of Planned Behavior." Organizational Behavior and Human Decision Processes 50(2):179–211. doi: 10.1016/0749-5978(91)90020-T.
- Ajzen, Icek, and Jane Klobas. 2013. "Fertility Intentions: An Approach Based on the Theory of Planned Behavior." *Demographic Research* 29:203–32. doi: 10.4054/DemRes.2013.29.8.
- Baiocco, Roberto, and Fiorenzo Laghi. 2013. "Sexual Orientation and the Desires and Intentions to Become Parents." *Journal of Family Studies* 19(1):90–98. doi: 10.5172/jfs.2013.19.1.90.
- Billari, F. C., A. Goisis, A. C. Liefbroer, R. A. Settersten, A. Aassve, G. Hagestad, and Z. Spéder. 2011. "Social Age Deadlines for the Childbearing of Women and Men." *Human Reproduction* 26(3):616– 22. doi: 10.1093/humrep/deq360.
- Billari, Francesco C., Luca Badolato, Gunhild O. Hagestad, Aart C. Liefbroer, Richard A. Settersten, Zsolt Spéder, and Jan Van Bavel. 2021. "The Timing of Life: Topline Results from Round 9 of the European Social Survey." *ESS Topline Results Series* 11.
- Billari, Francesco C., Hans-Peter Kohler, Gunnar Andersson, and Hans Lundström. 2007. "Approaching the Limit: Long-Term Trends in Late and Very Late Fertility." *Population and Development Review* 33(1):149–70. doi: 10.1111/j.1728-4457.2007.00162.x.
- Blake, Judith. 1966. "Ideal Family Size among White Americans: A Quarter of a Century's Evidence." *Demography* 3(1):154–73. doi: 10.2307/2060069.
- Bongaarts, John. 2001. "Fertility and Reproductive Preferences in Post-Transitional Societies." *Population and Development Review* 27:260–81.
- Bongaarts, John, and John Casterline. 2013. "Fertility Transition: Is Sub-Saharan Africa Different?" *Population and Development Review* 38:153–68. doi: 10.1111/j.1728-4457.2013.00557.x.
- Bulatao, Rodolfo A. 1981. "Values and Disvalues of Children in Successive Childbearing Decisions." *Demography* 18(1):1–25. doi: 10.2307/2061046.
- Carpenter, Emma, Bethany G. Everett, Madelyne Z. Greene, Sadia Haider, C. Emily Hendrick, and Jenny A. Higgins. 2020. "Pregnancy (Im)Possibilities: Identifying Factors That Influence Sexual Minority Women's Pregnancy Desires." *Social Work in Health Care* 59(3):180–98. doi: 10.1080/00981389.2020.1737304.

- Carpenter, Emma, and Rachel Niesen. 2021. "'It's Just Constantly Having to Make a Ton of Decisions That Other People Take for Granted': Pregnancy and Parenting Desires for Queer Cisgender Women and Non-Binary Individuals Assigned Female at Birth." *Journal of GLBT Family Studies* 17(2):87– 101. doi: 10.1080/1550428X.2020.1773367.
- Casterline, John B., and Laila O. El-Zeini. 2007. "The Estimation of Unwanted Fertility." *Demography* 44(4):729–45. doi: 10.1353/dem.2007.0043.
- Casterline, John B., and Siqi Han. 2017. "Unrealized Fertility: Fertility Desires at the End of the Reproductive Career." *Demographic Research* 36:427–54. doi: 10.4054/DemRes.2017.36.14.
- Chesnais, Jean-Claude. 2000. "Determinants of below Replacement Fertility." *Population Bulletin of the United Nations 1999* 40–41:126–36.
- Cleland, John, Kazuyo Machiyama, and John B. Casterline. 2020. "Fertility Preferences and Subsequent Childbearing in Africa and Asia: A Synthesis of Evidence from Longitudinal Studies in 28 Populations." *Population Studies* 74(1):1–21. doi: 10.1080/00324728.2019.1672880.
- Coale, Ansley J. 1989. "Demographic Transition." Pp. 16–23 in *Social Economics*, edited by J. Eatwell, M. Milgate, and P. Newman. London: Palgrave Macmillan UK.
- Esping-Andersen, Gøsta, and Francesco C. Billari. 2015. "Re-Theorizing Family Demographics." *Population and Development Review* 41(1):1–31. doi: 10.1111/j.1728-4457.2015.00024.x.
- Everett, Bethany G., Katharine F. McCabe, and Tonda L. Hughes. 2017. "Sexual Orientation Disparities in Mistimed and Unwanted Pregnancy Among Adult Women: Sexual Orientation and Unintended Pregnancy." *Perspectives on Sexual and Reproductive Health* 49(3):157–65. doi: 10.1363/psrh.12032.
- Gemmill, Alison. 2019. "From Some to None? Fertility Expectation Dynamics of Permanently Childless Women." *Demography* 56(1):129–49. doi: 10.1007/s13524-018-0739-7.
- Glauber, Rebecca. 2018. "Trends in the Motherhood Wage Penalty and Fatherhood Wage Premium for Low, Middle, and High Earners." *Demography* 55(5):1663–80. doi: 10.1007/s13524-018-0712-5.
- Goldscheider, Frances, Eva Bernhardt, and Trude Lappegård. 2015. "The Gender Revolution: A Framework for Understanding Changing Family and Demographic Behavior." *Population and Development Review* 41(2):207–39. doi: 10.1111/j.1728-4457.2015.00045.x.
- Goldstein, Joshua, Wolfgang Lutz, and Maria Rita Testa. 2003. "The Emergence of Sub-Replacement Family Size Ideals in Europe." *Population Research and Policy Review* 22(5/6):479–96. doi: 10.1023/B:POPU.0000020962.80895.4a.
- Goldstein, Joshua R., Tomáš Sobotka, and Aiva Jasilioniene. 2009. "The End of 'Lowest-Low' Fertility?" *Population and Development Review* 35(4):663–99.
- Gregg, Isabel. 2018. "The Health Care Experiences of Lesbian Women Becoming Mothers." *Nursing for Women's Health* 22(1):40–50. doi: 10.1016/j.nwh.2017.12.003.

- Guzzo, Karen Benjamin, and Sarah R. Hayford. 2023. "Evolving Fertility Goals and Behaviors in Current U.S. Childbearing Cohorts." *Population and Development Review* padr.12535. doi: 10.1111/padr.12535.
- Harknett, Kristen, and Caroline Sten Hartnett. 2014. "The Gap between Births Intended and Births Achieved in 22 European Countries, 2004–07." *Population Studies* 68(3):265–82. doi: 10.1080/00324728.2014.899612.
- Hartnett, Caroline Sten, and Alison Gemmill. 2020. "Recent Trends in U.S. Childbearing Intentions." Demography 57(6):2035–45. doi: 10.1007/s13524-020-00929-w.
- Hayford, Sarah R. 2009. "The Evolution of Fertility Expectations over the Life Course." *Demography* 46(4):765–83. doi: 10.1353/dem.0.0073.
- Hayford, Sarah R., Karen Benjamin Guzzo, and Pamela J. Smock. 2014. "The Decoupling of Marriage and Parenthood? Trends in the Timing of Marital First Births, 1945-2002: Trends in the Timing of Marital First Births." *Journal of Marriage and Family* 76(3):520–38. doi: 10.1111/jomf.12114.
- Heiland, Frank, Alexia Prskawetz, and Warren C. Sanderson. 2008. "Are Individuals' Desired Family Sizes Stable? Evidence from West German Panel Data." *European Journal of Population* 24(2):129–56. doi: 10.1007/s10680-008-9162-x.
- Iacovou, Maria, and Lara Patrício Tavares. 2011. "Yearning, Learning, and Conceding: Reasons Men and Women Change Their Childbearing Intentions." *Population and Development Review* 37(1):89– 123. doi: 10.1111/j.1728-4457.2011.00391.x.
- Kohler, Hans-Peter, Francesco C. Billari, and Jose Antonio Ortega. 2002. "The Emergence of Lowest-Low Fertility in Europe During the 1990s." *Population and Development Review* 28(4):641–80. doi: 10.1111/j.1728-4457.2002.00641.x.
- Lazzari, Ester, Michaela Potančoková, Tomáš Sobotka, Edith Gray, and Georgina M. Chambers. 2023. "Projecting the Contribution of Assisted Reproductive Technology to Completed Cohort Fertility." *Population Research and Policy Review* 42(1):6. doi: 10.1007/s11113-023-09765-3.
- Lee, R. D. 1980. "Aiming at a Moving Target: Period Fertility and Changing Reproductive Goals." *Population Studies* 34(2):205–26. doi: 10.1080/00324728.1980.10410385.
- Liefbroer, Aart C. 2009. "Changes in Family Size Intentions Across Young Adulthood: A Life-Course Perspective." *European Journal of Population* 25(4):363–86. doi: 10.1007/s10680-008-9173-7.
- McQuillan, Julia, Arthur L. Greil, Karina M. Shreffler, and Veronica Tichenor. 2008. "The Importance of Motherhood Among Women in the Contemporary United States." *Gender & Society* 22(4):477– 96. doi: 10.1177/0891243208319359.
- Miller, Warren B. 2011. "Differences between fertility desires and intentions: implications for theory, research and policy." *Vienna Yearbook of Population Research* 9:75–98. doi: 10.1553/populationyearbook2011s75.

- Miller, Warren B., and David J. Pasta. 1995. "Behavioral Intentions: Which Ones Predict Fertility Behavior in Married Couples?1." *Journal of Applied Social Psychology* 25(6):530–55. doi: 10.1111/j.1559-1816.1995.tb01766.x.
- Morgan, S. Philip. 1981. "Intention and Uncertainty at Later Stages of Childbearing: The United States 1965 and 1970." *Demography* 18(3):267–85. doi: 10.2307/2060997.
- Morgan, S. Philip. 2001. "Should Fertility Intentions Inform Fertility Forecast? The Direction of Fertility in the United States." *Washington, DC: U.S. Census Bureau*.
- Morgan, S. Philip. 2003. "Is Low Fertility a Twenty-First-Century Demographic Crisis?" *Demography* 40(4).
- Morgan, S. Philip, and Heather Rackin. 2010. "The Correspondence Between Fertility Intentions and Behavior in the United States." *Population and Development Review* 36(1):91–118. doi: 10.1111/j.1728-4457.2010.00319.x.
- Musick, Kelly, Ann Meier, and Sarah Flood. 2016. "How Parents Fare: Mothers' and Fathers' Subjective Well-Being in Time with Children." *American Sociological Review* 81(5):1069–95. doi: 10.1177/0003122416663917.
- Nitsche, Natalie, and Sarah R. Hayford. 2020. "Preferences, Partners, and Parenthood: Linking Early Fertility Desires, Marriage Timing, and Achieved Fertility." *Demography* 57(6):1975–2001. doi: 10.1007/s13524-020-00927-y.
- Philipov, Dimiter, Zsolt Spéder, and Francesco C. Billari. 2006. "Soon, Later, or Ever? The Impact of Anomie and Social Capital on Fertility Intentions in Bulgaria (2002) and Hungary (2001)." *Population Studies* 60(3):289–308. doi: 10.1080/00324720600896080.
- Reczek, Corinne. 2020. "Sexual- and Gender-Minority Families: A 2010 to 2020 Decade in Review." Journal of Marriage and Family 82(1):300–325. doi: 10.1111/jomf.12607.
- Régnier-Loilier, Arnaud, and Daniele Vignoli. 2011. "Fertility Intentions and Obstacles to Their Realization in France and Italy." *Population (English Edition)* 66(2):361. doi: 10.3917/pope.1102.0361.
- Riskind, Rachel G., and Charlotte J. Patterson. 2010. "Parenting Intentions and Desires among Childless Lesbian, Gay, and Heterosexual Individuals." *Journal of Family Psychology* 24(1):78–81. doi: 10.1037/a0017941.
- Riskind, Rachel G., and Samantha L. Tornello. 2017. "Sexual Orientation and Future Parenthood in a 2011– 2013 Nationally Representative United States Sample." *Journal of Family Psychology* 31(6):792– 98. doi: 10.1037/fam0000316.
- Settersten, R. A., and G. O. Hagestad. 1996. "What's the Latest? Cultural Age Deadlines for Family Transitions." *The Gerontologist* 36(2):178–88. doi: 10.1093/geront/36.2.178.
- Shreffler, Karina M., Stacy Tiemeyer, Cassandra Dorius, Tiffany Spierling, Arthur Greil, and Julia McQuillan. 2016. "Infertility and Fertility Intentions, Desires, and Births among US Women." *Demographic Research* 35:1149–68. doi: 10.4054/DemRes.2016.35.39

- Sobotka, Tomáš, and Éva Beaujouan. 2014. "Two Is Best? The Persistence of a Two-Child Family Ideal in Europe." *Population and Development Review* 40(3):391–419. doi: 10.1111/j.1728-4457.2014.00691.x.
- Spéder, Zsolt, and Balázs Kapitány. 2009. "How Are Time-Dependent Childbearing Intentions Realized? Realization, Postponement, Abandonment, Bringing Forward." *European Journal of Population* 25(4):503–23. doi: 10.1007/s10680-009-9189-7.
- Stacey, Lawrence, Rin Reczek, and R. Spiker. 2022. "Toward a Holistic Demographic Profile of Sexual and Gender Minority Well-Being." *Demography* 59(4):1403–30. doi: 10.1215/00703370-10081664.
- Trent, Roger B. 1980. "Evidence Bearing on the Construct Validity of 'Ideal Family Size." *Population and Environment* 3(3–4):309–27. doi: 10.1007/BF01255345.
- Wagner, Michael, Johannes Huinink, and Aart C. Liefbroer. 2019. "Running out of Time? Understanding the Consequences of the Biological Clock for the Dynamics of Fertility Intentions and Union Formation." *Demographic Research* 40:1–26. doi: 10.4054/DemRes.2019.40.1.
- Weitzman, Abigail, Jennifer S. Barber, Yasamin Kusunoki, and Paula England. 2017. "Desire for and to Avoid Pregnancy During the Transition to Adulthood: Desire for and to Avoid Pregnancy." *Journal* of Marriage and Family 79(4):1060–75. doi: 10.1111/jomf.12396.
- Westoff, Charles F., and Norman B. Ryder. 1977. "The Predictive Validity of Reproductive Intentions." *Demography* 14(4):431–53. doi: 10.2307/2060589.
- World Bank. 2023. "Total Fertility Rate. World Development Indicators." https://data.worldbank.org/indicator/SP.DYN.TFRT.IN. Accessed 5 March 2023.
- Yeatman, Sara, Christie Sennott, and Steven Culpepper. 2013. "Young Women's Dynamic Family Size Preferences in the Context of Transitioning Fertility." *Demography* 50(5):1715–37. doi: 10.1007/s13524-013-0214-4.
- Yeatman, Sara, Jenny Trinitapoli, and Sarah Garver. 2020. "The Enduring Case for Fertility Desires." Demography 57(6):2047-56. doi: 10.1007/s13524-020-00921-