Archives of Sexual Behavior (2018) 47:1507–1516
https://doi.org/10.1007/s10508-018-1197-4

ORIGINAL PAPER

Public Perception of Female Fertility: Initial Fertility, Peak Fertility, and Age-Related Infertility Among U.S. Adults

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Received: 18 April 2017 / Revised: 28 February 2018 / Accepted: 14 March 2018 / Published online: 26 March 2018

Abstract

Perceptions of fertility are thought to impact reproductive behaviors, yet little is known about how lay people conceptualize the female fertility timeline. In this research, public perception of the female fertility timeline was assessed via a national survey of U.S. adults ($N = 990$) ranging in age from 18 to 89 years. Although there is no scientific consensus on the makeup of the female fertility timeline, results from this research indicate that the U.S. public posits fertility onset at (approximately) 13 years, peak fertility at 22, ideal first pregnancy age at 23, too late for pregnancy at 46, and infertility at 49. Regression analysis revealed that perceived peak fertility and ideal pregnancy age were positively correlated such that participants perceived the ideal pregnancy age as directly following peak fertility. Education was significantly related to fertility perceptions; those with more education perceived initial fertility to be lower and peak fertility and ideal pregnancy age to be higher. In other words, more highly educated individuals perceived fertility to manifest over a longer period of time as compared to individuals with less education. Black and Hispanic participants and participants with lower income perceived ideal first pregnancy age as significantly lower than did White participants and participants with higher income. These differences may suggest that the seeds of health disparities associated with phenomena such as adolescent pregnancy are lurking in fertility timeline perceptions.

Keywords Illness representation · Pregnancy · Reproductive health · Science perceptions · Self-regulation theory

Introduction

Public and lay perceptions of what female fertility is, when it transpires, and normative behaviors related to it have been shown to play a role in individuals' and couples' reproductive choices and behaviors (Butler, 2002; Fulford, Bunting, Tsibulsky, & Boivin, 2013; Jensen & Bute, 2010). According to self-regulation theory (Leventhal, Meyer, & Nerenz, 1980), such perceptions—theorized as "cognitive representations" or, in the case of infertility and other health challenges, "illness representations" (Benyamini, Gozlan, & Kokia, 2004; Conrad & Barker, 2010)—set the foundation for the development of coping mechanisms and, in turn, emotional and behavioral outcomes. Self-regulation theory posits that cognitive representations that align with scientifically verified understandings of health and illness are associated with increased medical compliance and better health outcomes (Leventhal et al., 1980). From this perspective, pinpointing what public perceptions are concerning specific scientifically framed phenomena such as female fertility provides insight into why individuals behave in ways that have been shown to promote or negate health.

To date, there has been a wealth of scholarship on the behavioral and communicative mechanisms that predict adolescent pregnancy and age-related infertility (e.g., Chipman & Morrison, 2015; Lavin & Cox, 2012; Martins & Jensen, 2014). Much of this research speaks to the ethics involved in intervening in the so-called natural or scientifically normal course of human female reproduction. Greil et al. (2016), for instance, analyzed data from the National Survey of Fertility Barriers to demonstrate that ethical concerns about assisted reproductive technologies (ARTs) are on the decline among U.S. women.

Electronic supplementary material The online version of this article (https://doi.org/10.1007/s10508-018-1197-4) contains supplementary material, which is available to authorized users.

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ARTs are often enlisted to counter age-related fertility concerns and have been criticized, historically, for thwarting the average or normal timeline upon which female fertility transpires (Farquhar, 2014).

Despite the prevalence of these debates that hinge upon assumptions concerning normal female fertility and reproduction, research has yet to delineate the lay public's perception of the so-called normal female fertility timeline or "reproductive career" (Frisch, 1980). That is, little is known about where, exactly, the public locates key moments in females' reproductive life such as when they perceive that females are first fertile, at peak fertility, at the ideal age for first pregnancy, no longer able to become pregnant, and no longer fertile. Several studies have addressed part of this issue, researching particular population subgroups and focusing almost exclusively on representations of the timeline's conclusion (Daniluk, Koert, & Cheung, 2012; Swift & Liu, 2014). For instance, Bretherick, Fairbrother, Avila, Harbord, and Robinson (2010) surveyed 360 Canadian female undergraduates and found that they estimated the age at which female fertility declines and ends as considerably older than what medical experts contended was the case. Similar results have been found for Swedish, U.S., and Finnish university students (Lampic, Svanberg, Karlström, & Tydén, 2006; Peterson, Pirritano, Tucker, & Lampic, 2012; Virtala, Vilska, Huttunen, & Kunttu, 2011), Canadian new mothers (Tough et al., 2006), and female U.S. infertility and gynecology patients (Ryan, Maassen, Dokras, Syrop, & van Voorhis, 2005), as well as for U.S. reproductive healthcare providers (Hammond, Rocconi, & Steinkampf, 2002).

Lay Illness Representations, Timelines, and Female Fertility

Illness representations—known colloquially as lay models of health threats—are the cognitive constructions of a health issue that aid individuals in coping with and thereby self-regulating in the face of a health-related danger (Leventhal, Diefenbach, & Leventhal, 1992; Rexhaj, Python, Morin, Bonsack, & Favrod, 2013). Constructed out of an individual's embodied experiences, exposure to information generated from the broader culture, and interpersonal interactions, illness representations are theorized in terms of four key representational dimensions related to identity, timeline, causes, and consequences (Heijmans & de Ridder, 1998). Leventhal et al. (1980) hypothesized that when illness representations are constituted by scientifically recognized, concrete portrayals of symptoms and coping mechanisms—otherwise known as "prescriptive (medical science) model[s]" (Hampson, Glasgow, & Toobert, 1990)—individuals are more likely to comply with medically prescribed "preventative and protective action" (Leventhal et al., 1980). Subsequent research upheld this contention and found relationships between scientifically recognized illness representations and a number of positive health outcomes (see, for example, Hampson et al., 1990; Leventhal et al., 1992; Orbell et al., 2008).

Although Leventhal et al. (1980) theorized illness representations in terms of illness specifically, such representations could be theorized more broadly, particularly for topics such as female fertility that—even in their so-called normal expression—are medicalized via the incorporation of potential threats related to, for instance, unplanned pregnancy and age-related infertility (Greil, McQuillan, & Slauson-Blevins, 2011). All four of the central dimensions of an illness representation are relevant to an individual's perception of female fertility, but the timeline dimension is especially pronounced as female fertility is consistently defined across medical literature and popular media in terms of time and timing (Bute & Russell, 2012; Harter, Kirby, Edwards, & McClanahan, 2005; Jensen, 2016). Thus, the beliefs and expectations that individuals have about female fertility will necessarily be grounded in ideas about its duration and strength over and in time. Scholarly attention to this specific dimension will therefore illuminate how individuals conceptualize fertility related opportunities and threats.

What complicates the theorization of female fertility in terms of existing accounts of lay illness representations is that there exists no concrete, scientifically recognized (and therefore "valid": Leventhal, Nerenz, & Steele, 1984) portrayal of the female fertility timeline. A review of scientific research on the female fertility timeline offers several points of contention and ambiguity. There is agreement about the average age of menarche and menopause in the U.S. (approximately 12.7 and 52 years, respectively; Frisch, 2002), which largely corresponds with initial fertility and the end of fertility. But there remains some disagreement about when fertility peaks and then begins to decline. Dunson, Colombo, and Baird's (2002) identification of the peak at between 19 and 26 years—a conclusion generated from their study of women's self-reported intercourse and menstrual timing while using natural family planning methods to conceive—has received the most sustained scholarly support over studies that situate the peak either earlier or later based on historical birth records and contemporary ethnography data generated from natural-fertility populations (e.g., Larsen & Vaupel, 1993; Menken, Trussell, & Larsen, 1986; Strassmann & Warner, 1998). The ideal time for a first pregnancy, of course, is as much a normative question as a biological one (Munshi & Myaux, 2006), so that query necessarily lacks a scientifically verifiable counterpart. In scenarios such as this that are without a single, scientifically agreed-upon representation, it stands to reason that lay representations of the health issue at hand take on an even more central role in shaping beliefs and behaviors than they might in other scenarios with more scientific coherence. In this respect, assessing what those lay perceptions are has the potential to go a long way toward understanding the processes that shape reproductive behaviors related to family planning and sexual health.

Research Questions

The current study examined the perceptions that U.S. adults have about the timing of key moments in the female fertility timeline. First, we examined how U.S. adults situated fertility events (e.g., peak fertility, ideal pregnancy age) in time, and whether those perceptions were related to one another.

RQ1: What do perceptions about the female fertility timeline look like among U.S. adults?
RQ2: Are perceptions of female fertility related?

In addition to examining timelines, we investigated which variables, if any, might explain lay perceptions of the female fertility timeline. Existing research provides reason to suspect that demographic variables such as sex, age, education, and race may be related to fertility perceptions. For example, Bunting, Tsibulsky, and Boivin (2012) found that women and those with more education had greater general fertility knowledge than did men and those with less education. And Lundsberg et al. (2014) reported that younger women (ages 18–24) had wider gaps in their knowledge about the potential causes of infertility (such as age) than did older women (ages 25–34 or 35–40). Correspondingly, Black and Hispanic women have long been stereotyped by cultural narratives as hyper-fertile (Ginsburg & Rapp, 1995; Sandelowski & de Lacey, 2002). It is possible that they have absorbed this narrative and, in the process, become more likely to perceive a longer window of female fertility. Given this research, we posed the following research question:

RQ3: What demographic factors are related to perceptions of the female fertility timeline?

Beyond demographics, exposure to public sex education, which—in the U.S.—tends to involve at least a basic overview of biology and human reproduction, may be related to individual's perceptions of the female fertility timeline (Irvine, 2004). Although most public secondary schools in the U.S. offer public sex education, individuals who are home-schooled, attend private school, or opt-out of sex education in the public schools do not necessarily receive such exposure. As such, this variable was included to explore its relationships to perceptions of the female fertility timeline:

RQ4: Is exposure to public sex education related to fertility perceptions?

Finally, we examined whether experience with fertility issues, and knowledge of fertility, would be related to perceptions about the female fertility timeline.

RQ5: Does the female fertility timeline differ according to experience with fertility issues (RQ5a) or knowledge of fertility (RQ5b)?

Method

Participants

In 2017, participants were enlisted by Qualtrics Panels–an independent research firm–to take an online survey. Qualtrics was asked to stratify the sample along three dimensions: sex (target: 50% female), education (target: 50% less than high school education), and age (target: 18 and older). After reading and providing consent, participants completed a battery of demographic and individual difference measures. All procedures were approved by a university Institutional Review Board.

U.S. adults ($N = 990$) were recruited for participation. Approximately half of participants were female (53.90%) and had less than a high school education (47.10%). Participants ranged in age from 18 to 89 ($M_{age} = 39.51$, SD = 15.06). They were asked whether they had children (0 = no, 1 = yes; 76.2% were parents), and what their own age was at the birth of their first child ($M = 26.38$, SD = 7.61, range 15–63). Complete demographic information is given in Table 1.

Measures

Demographics

Demographics in the analysis included age, sex (coded as: 0 = male, 1 = female), education (0 = less than high school degree, 1 = high school degree, 2 = postsecondary degree), income, political party (Republican, Democrat, or no political party affiliation), race/ethnicity, whether they had children, and sexual identity (recoded as 0 = not only heterosexual and 1 = only heterosexual).

Perceived Fertility Timeline

The study was introduced to participants as follows: "We would like to understand your perceptions of female fertility. Fertility means 'able to have children.'" Participants were assured that there were not necessarily correct answers for the questions posed and that the researchers were interested only in their perceptions of the ideas at hand. Following this introduction, participants were asked to respond to five questions about their perceptions of female fertility. Questions were developed from existing historical and qualitative research on public

Table 1 Demographics

	N (%)
Sex	
Male	456 (46.1%)
Female	534 (53.9%)
Education	
Less than high school degree	466 (47.1%)
High school degree	271 (27.4%)
Postsecondary degree	253 (25.6%)
Household income	
Less than $10,000	197 (19.9%)
$10,000–14,999	107 (10.8%)
$15,000–24,999	132 (13.3%)
$25,000–34,999	150 (15.2%)
$35,000–49,999	136 (13.7%)
$50,000–74,999	119 (12.0%)
$75,000–99,999	64 (6.5%)
$100,000–149,999	47 (4.7%)
$150,000–199,999	11 (1.1%)
$200,000 or more	27 (2.7%)
Political party	
Republican	275 (27.8%)
Democrat	315 (31.8%)
No political party affiliation	345 (34.8%)
Race/ethnicity	
White	771 (78.1%)
Black	98 (9.9%)
Asian/Pacific Islander	29 (2.9%)
Native American	12 (1.2%)
Other	77 (7.8%)
Hispanic/Latino	114 (11.6%)
Parents	
Yes	580 (58.6%)
No	410 (41.4%)
Sexual identity	
Only heterosexual	706 (71.3%)
Mostly heterosexual	56 (5.7%)
Bisexual	64 (6.5%)
Mostly lesbian/gay	9 (0.9%)
Only lesbian/gay	35 (3.5%)
Other	35 (3.5%)
Refuse to answer	85 (8.6%)

Demographic information. For race/ethnicity, participants could select more than one answer

understanding and discourse concerning the female reproductive career (Jensen, 2016; Jensen & Blumling, 2018). They included: (1) At what age does a female first become fertile? (2) At what age does a female reach peak fertility? That is, when is she most fertile? (3) At what age is a female no longer fertile? (4) In general, what is the ideal (or best) age for a female to get pregnant for the first time? (5) In general, when is it too late for a female to get pregnant? Participants responded to each question by typing the number that corresponded with their answer.

Public Sex Education

Participants were asked whether they had received formal education pertaining to sexual health. The following question was posed: "When you were in school, did you receive sexual education? That is, did you have a class that covered information related to human sexual health (e.g., how women get pregnant, what condoms are, what sexually transmitted diseases are?)." Participants could respond (1) yes, (2) no, (3) yes, but it was not a class, (4) yes, but it only covered abstinence (i.e., not having sex), or (5) I am not sure. The focus of the current analysis was on the distinction between those who received public sex education in school, which may have covered topics related to female sexual health, compared to those who did not receive this training. The variable was recoded into 1 = yes (n = 692) and 0 = options 2–5 (N = 298) (M = .70, SD = .46; 69.90% of participants received sexual education).

Experience with Fertility Issues

Participants' experience with fertility issues was assessed with three items based on the work of Dick et al. (2003). First, participants responded to the item, "Have you or your partner had difficulty in conceiving a child?" with *no* or *yes* (no = 0, yes = 1; M = .13, SD = .34; 13.10% reported difficulty conceiving a child). Second, participants were asked, "To your knowledge, has any member of your family had difficulty conceiving a child?" (no = 0, yes = 1; M = .18, SD = .38; 18% reported a family member having difficulty conceiving a child). Third, participants were asked, "To your knowledge, has a close friend had difficulty conceiving a child?" (no = 0, yes = 1; M = .25, SD = .44; 25.4% reported difficulty conceiving a child). Taken together, 38.80% of participants (n = 394) had some experience with fertility issues.

Knowledge of Fertility Issues

Participants' knowledge of fertility (i.e., those elements of fertility science wherein there is a consensus) was assessed with nine items (Lampic, Svanberg, Karlström, & Tydén, 2006).

Participants responded to these items using a closed-ended format with coded categories established by Peterson et al. (2012). Correct answers were coded as a "1" and incorrect answers as a "0". Answers to all nine questions were then aggregated into a single index representing knowledge ($M = 2.46$, SD = 1.37, range 1–7; 52.70% of participants answered two or less correctly).

Analysis Plan

For RQ1, means and SDs were calculated for each of the fertility perception variables. For RQ2–RQ5, bivariate correlations were calculated to examine the relationship between fertility perceptions, demographics, and individual difference variables. G*Power (Faul, Erdfelder, Buchner, & Lang, 2009; Faul, Erdfelder, Lang, & Buchner, 2007) was utilized to evaluate the power of the design. For exploratory research, G*Power utilizes benchmark effect sizes as a default for evaluating power for a design (expressed as an *f*, a small effect = .10, medium effect = .25, and a large effect = .40). For bivariate correlation analysis, the design had excellent power (.88) to detect small effects.

Education is a linear three-level variable (0 = less than high school degree, 1 = high school degree, 2 = postsecondary degree), so the bivariate analysis was followed by a one-way MANOVA to allow for comparison between different levels. The analysis had good power (.81) to detect small effects and excellent power (1.00) to detect medium effects. Finally, hierarchical linear regression was utilized to examine how the variables, as a group, were related to fertility perceptions. The regression analysis was blocked so that one can readily decipher the contribution of demographics, and how other variables were related above and beyond those demographic factors. In effect, the first block served as a control that allows one to evaluate the relationship between other variables and fertility perceptions, above and beyond demographics. The hierarchical regression had good power (.74) to detect a small effect and excellent power to detect a medium effect (1.00). For all analyses, alpha was set to .05 to guard against Type I error.

Results

Descriptive Statistics

RQ1 asked how U.S. adults perceived the fertility timeline. Figure 1 depicts the mean participant scores for all five perceived fertility timeline variables. Participants perceived initial fertility to occur around age 13 ($M = 13.23$, $SD = 3.64$), peaking around age 22 ($M = 22.06$, SD = 7.84), and fading to infertility at age 50 ($M = 49.04$, SD = 12.21). The ideal first pregnancy age was around 23 ($M = 23.41$, SD = 6.13), which places it just after peak fertility. Participants perceived women as too late for pregnancy at approximately 46 years of age ($M = 45.96$, SD = 11.76).

Demographic and Individual Difference Variables Related to Fertility Perceptions

Bivariate Analysis

RQ2 asked whether fertility perceptions were related (see "Appendix A", which is available in an online supplemental file). All of the fertility perceptions were positively correlated. Initial fertility and peak fertility were moderately correlated ($r = .37$, $df = 979$, $p < .001$); if a participant thought that women became fertile at a younger age, then the participant was also more likely to perceive peak fertility at a younger age. Peak fertility and ideal first pregnancy age were also moderately correlated ($r = .35$, $df = 976$, $p < .001$); higher peak fertility age led to higher first ideal pregnancy age, with the latter following shortly after the former. Infertility and perceptions of when it is too late to get pregnant exhibited the largest correlation among the fertility perceptions ($r = .58$, $df = 968$, $p < .001$), suggesting that some, but not all, of the

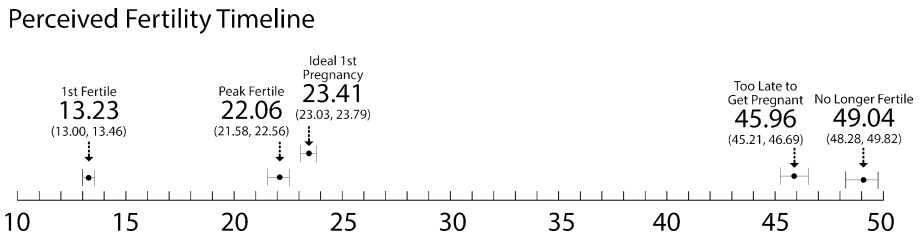

Fig. 1 Perceived fertility timeline for participants. Numbers represent mean ages for each fertility question with 95% confidence intervals in parentheses. For example, the mean for initial fertility was 13.23 years with a confidence interval of 13.00 and 13.46

variance in lateness stemmed from the perceived onset of infertility.

RQ3–RQ5 asked which demographic and individual difference variables were related to fertility perceptions. Once again, bivariate relationships were examined (see "Appendices A and B," which are available in an online supplemental file). Women ($r = -.06$, $df = 981$, $p = .047$), higher educated individuals ($r = -.09$, $df = 981$, $p = .008$), Republicans ($r = -.08$, $df = 981$, $p = .012$), those who took a sexual education course ($r = -.07$, $df = 981$, $p = .036$), and those with a friend who faced fertility issues ($r = -.07$, $df = 981$, $p = .023$) all perceived initial fertility to be lower. Those with no political party affiliation ($r = .07$, $df = 981$, $p = .039$) and higher scores on the knowledge of fertility issues scale ($r = .07$, $df = 981$, $p = .026$) perceived initial fertility to be higher. Peak fertility was perceived as higher by participants who were older ($r = .16$, $df = 979$, $p < .001$), more educated ($r = .10$, $df = 979$, $p = .001$), had higher income ($r = .08$, $df = 979$, $p = .012$), White ($r = .07$, $df = 976$, $p = .033$), heterosexual ($r = .10$, $df = 979$, $p = .001$), and more knowledgeable about fertility issues ($r = .06$, $df = 979$, $p = .048$). Peak fertility was perceived as lower by participants who were Black ($r = -.09$, $df = 976$, $p = .006$), Hispanic ($r = -.09$, $df = 972$, $p = .004$), had taken a sexual education course ($r = -.09$, $df = 979$, $p = .004$), and had family with fertility issues ($r = -.06$, $df = 979$, $p = .048$). Infertility scores were higher for participants who were older ($r = .16$, $df = 974$, $p < .001$), parents ($r = .07$, $df = 974$, $p = .021$), and heterosexual ($r = .12$, $df = 974$, $p < .001$).

Ideal first pregnancy was perceived as higher by participants who were older ($r = .07$, $df = 978$, $p = .033$), female ($r = .15$, $df = 978$, $p < .001$), more educated ($r = .15$, $df = 978$, $p < .001$), had higher income ($r = .13$, $df = 978$, $p < .001$), Democrats ($r = .13$, $df = 978$, $p < .001$), White ($r = .08$, $df = 975$, $p = .014$), and heterosexual ($r = .10$, $df = 978$, $p < .001$). Ideal first pregnancy was perceived as lower by participants who were Republican ($r = -.06$, $df = 978$, $p = .066$), unaffiliated with a political party ($r = -.07$, $df = 978$, $p = .031$), and Black ($r = -.07$, $df = 975$, $p = .020$). Only three variables were related to perceptions about when it is too late to get pregnant. Participants who were older ($r = .11$, $df = 972$, $p = .001$) or Black ($r = .07$, $df = 969$, $p = .021$) had higher scores on this fertility perception whereas those who identified as Asian ($r = -.07$, $df = 969$, $p = .035$) had lower scores.

Education was classified with three levels. Notably, questions arise concerning the difference between those with less than a high school degree and those with a high school degree. Does this difference in education equate to differences in fertility perceptions? As a follow-up analysis, a MANOVA was conducted with education as a three-level fixed factor and all of the fertility perceptions as outcomes. The multivariate test was significant, Pillai's Trace = .06, $F(10, 1922) = 6.45$, $p < .001$. An examination of the univariate tests revealed that education was significantly related to initial fertility, $F(2, 964) = 2.86$, $p = .05$, peak fertility, $F(2, 964) = 8.05$, $p < .001$, and ideal first pregnancy age, $F(2, 964) = 12.30$, $p < .001$. Table 2 reports the means and SDs by education level. Participants with less than a high school education perceived initial fertility to start later ($M = 13.44$, SD = 4.20) than participants with a postsecondary degree ($M = 12.79$, SD = 2.31, Cohen's $d = .19$). Participants with a postsecondary degree perceived peak fertility to occur later ($M = 23.66$, SD = 7.00) as compared to both high school graduates ($M = 21.58$, SD = 6.88, Cohen's $d = .30$) and those without a high school degree ($M = 21.32$, SD = 8.41, Cohen's $d = .30$). Participants with less than a high school degree perceived ideal first pregnancy age as lower ($M = 22.35$, SD = 6.63) than either those with a high school degree ($M = 24.17$, SD = 6.05, Cohen's $d = .29$) or postsecondary degree ($M = 24.39$, SD = 4.74, Cohen's $d = .29$). The statistical differences are best classified as small effects as they range from Cohen's $d = .19$–30 (Cohen, 1988).

Multivariate Analysis

Finally, all study variables were examined collectively in a series of hierarchical regressions with the fertility perceptions as the dependent variables and demographics, fertility experience and knowledge, and fertility perceptions entered in separate blocks (21 predictors per model; see Table 3).

Table 2 Fertility perceptions by level of education

	Initial fertility *M* (SD)	Peak fertility *M* (SD)	Infertility *M* (SD)	Ideal pregnancy *M* (SD)	Too late pregnancy *M* (SD)
Education					
Less than high school	13.44 (4.20)[a]	21.32 (8.41)[a]	48.94 (13.99)[a]	22.35 (6.63)[a]	46.08 (13.94)[a]
High school degree	13.14 (3.12)[ab]	21.58 (6.88)[a]	49.26 (11.53)[a]	24.17 (6.05)[b]	45.91 (10.18)[a]
Postsecondary degree	12.79 (2.31)[b]	23.66 (7.00)[b]	48.83 (8.63)[a]	24.39 (4.74)[b]	45.78 (8.22)[a]
N	967	967	967	967	967

Means with different superscripts are significantly different, $p < .05$

Table 3 Hierarchical regression analyses

	Initial fertility	Peak fertility	Infertility	Ideal pregnancy	Too late pregnancy
Block 1	.02	.07***	.04***	.06***	.03**
Age	.02	.17***	.13***	.02	.12**
Sex	− .01	.00	.01	.09*	− .04
Education	− .06	.06	− .06	.03	.02
Income	.02	.05	.06	.09*	.01
Republican	− .10*	− .07*	− .08*	− .07	− .08*
Democrat	− .05	− .02	− .00	.10**	− .07*
Black	− .04	− .06*	− .02	− .07*	.06
Asian	− .00	.07*	− .04	− .04	− .05
American Indian	.03	.01	.01	.01	− .00
Hispanic	.01	− .07*	− .01	− .04	− .01
Parent	− .00	− .08*	.03	.01	− .03
Sexual identity	− .03	.09**	.10**	.09**	.03
Block 2	.02**	.02**	.00	.00	.01
Sexual education	− .06	− .04	.06	.03	.01
Personal diff conceiving	− .01	− .03	.02	.00	.06
Family diff conceiving	.01	− .05	− .00	− .03	.03
Friend diff conceiving	− .07	− .06	.01	− .03	− .00
Aware fertility issues	.10*	.10**	− .01	.04	− .03
Block 3	.19***	.20***	.36***	.21***	.36***
Initial fertility	–	.27***	− .05	.19***	.11***
Peak fertility	.30*	–	.14***	.18***	.03
Infertility	− .06	.17***	–	.18***	.52***
Ideal pregnancy	.21*	.18***	.15***	–	.11***
Too late pregnancy	.14*	.03	.50***	.13***	–

R^2 change is listed in the block row, and betas are listed for each predictor within that block

*$p < .05$, **$p < .01$, ***$p < .001$

For initial fertility, the regression was significant for the second and third blocks (reported at Block 3): $R = .47$, $R^2 = .22$, $F(21, 935) = 12.43$, $p < .001$. Republicans had lower initial fertility scores, and those with higher knowledge of fertility issues had higher initial fertility scores. Peak fertility, ideal pregnancy, and too late to become pregnant were positively related to initial fertility perceptions, above and beyond other predicators.

All three blocks were related to peak fertility, $R = .54$, $R^2 = .29$, $F(21, 935) = 18.15$, $p < .001$. Seven demographic variables (age, Republican, Black, Asian, Hispanic, parent, and sexual identity) were significantly related to peak fertility perceptions. Knowledge of fertility was significantly related to peak fertility, above and beyond demographics. Initial fertility, infertility, and ideal pregnancy were all positively related to peak fertility perceptions.

For infertility, the regression was significant at the first and third block (reported at block 3): $R = .64$, $R^2 = .41$, $F(21, 935) = 30.47$, $p < .001$. Age, Republican, and sexual identity were significantly related to infertility perceptions; older, heterosexual, and non-Republicans perceived infertility to start at a later age. Peak fertility, ideal pregnancy, and too late to become pregnant were all positively related to infertility perceptions.

For ideal first pregnancy age, the regression was significant at the first and third block (reported at Block 3): $R = .53$, $R^2 = .28$, $F(21, 935) = 17.44$, $p < .001$. Five demographics (sex, income, Democrat, Black, and sexual identity) were related to ideal first pregnancy age; female, having higher income, Democrat, non-Black, and heterosexual participants all perceived ideal first pregnancy to occur at an older age. Initial fertility, peak fertility, too late to become pregnant, and infertility were all positively related to ideal first pregnancy perceptions.

For too late to become pregnant, the regression was significant at the first and third block (reported at Block 3): $R = .62$, $R^2 = .39$, $F(21, 935) = 28.26$, $p < .001$. Age, Republican, and Democrat were all significantly related to this perception. Older, unaffiliated individuals perceived this age to be older.

Discussion

The results of this study found that U.S. adults perceived the female fertility timeline as initiating at about 13 years of age, peaking at 22, being at an ideal point for first pregnancy at 23, being too late for a pregnancy at 46, and concluding with

infertility at age 49. Results also showed that different points on the timeline were correlated with each other. Of particular interest to scholars of sexual health and family planning may be the correlation between peak fertility age and the ideal age for first pregnancy, with the latter consistently shadowing the former by about a year. The order of these events seems somewhat counterintuitive, especially if an individual or group is aiming to maximize the likelihood of pregnancy and/or multiple pregnancies over multiple years. After all, the years leading up to peak fertility would seem to offer more opportunity for reproductive success in the long term than would the years in which fertility is in decline. These data invite questions not only about why this may be the case but also about whether perceptions of these two points on the timeline always move together, either universally or differentially across cultures. More specifically, they lead scholars to question whether perceptions of peak fertility have always been situated before ideal first pregnancy. If so, then this would mean that—when cultural norms dictated earlier ideal first pregnancy ages in, for instance, the mid-twentieth century—perceptions of peak fertility would have been understood to be earlier even than that. A scenario along these lines would mean that movement for one of these points would involve movement for both and that public health initiatives attempting to shape or respond to these perceptions must account for their linkage. One could foresee, for instance, healthcare providers suggesting long-acting contraceptive techniques when in conversation with younger women patients in light of the finding that many women anticipate having children after perceived peak fertility.

The strongest correlation between points on the perceived fertility timeline involved being too late for pregnancy and infertility. Participants' understanding of when it was too late for pregnancy seemed to rely heavily on when they perceived age-related infertility to occur. However, it should also be noted that not all of the variance can be explained in this way. It is likely that some of this perception also has to do with cultural beliefs and social norms rather than simply a biological sense of when pregnancy is no longer possible. Additional qualitative research on this aspect of the timeline would provide insight into the social and cultural considerations that tend to be at play in fertility perception formation. From a psychometric standpoint, interview, focus group, and ethnographic research would help to further validate the wording of the survey questions concerning the female fertility timeline for additional clarity of purpose.

When one turns to the demographic and individual difference variables related to fertility perceptions, one pattern stands out clearly: peak fertility and ideal age for first pregnancy were related to an especially large number of factors. By contrast, fewer factors were associated with the remaining points on the timeline: initial fertility, too late for pregnancy, and infertility. Future research could investigate why this is the case, but the present data suggest that peak fertility and ideal age for first pregnancy are more shaped by factors such as age, race, education, and income than are others. This may mean that there is more emphasis put on these specific elements of the timeline than on others in a variety of mediated and interpersonal contexts. It could also mean that factors that were not explored in this study related to, for instance, cultural identity or familial expectations play a role in this shaping effect. That the heaviest shaping involves what has turned out to be the central elements of the timeline, as opposed to the extreme endpoints, suggests that individuals might feel there is more room for the exertion of choice and control regarding these moments than there are with the other points.

It should also be noted that some factors in this dataset group together in more or less predictable and potentially telling ways. For example, peak fertility was deemed to be higher by those with higher income levels, as well as by participants who identified as White. The flipside of this is that lower income, Black, and Hispanic participants perceived peak fertility at a younger age. In these perceptions, the seeds of longitudinal health disparities seem to be evident. Research demonstrates that young motherhood and pregnancy is associated not only with a range of negative health implications for women and their children, but also with lower educational achievement and professional success (Jeha, Usta, Ghulmiyyah, & Nassar, 2015; Kane, Morgan, Harris, & Guilkey, 2013). Indeed, this narrative also plays out in the data in terms of education in that those with less than a high school degree situated peak fertility and ideal age at first pregnancy as significantly lower than those with a high school or postsecondary degree. That individuals representing populations at higher risk for health disparities are also those most likely to perceive ideal pregnancy age earlier chronologically demonstrates that perceptions—while not the same thing as beliefs or behaviors—are often tied to health outcomes in ways that reinforce and reproduce the status quo.

One of the strengths of this study is that it considered issues of identity that have been less explored in relationship to fertility perceptions. Notably, the data included a limited measure of sexual identity and revealed that those who identify as heterosexual reported higher ages for peak fertility, ideal first pregnancy, and infertility than did those who identified as bisexual, gay, or lesbian. Perhaps these earlier perceptions among nonheterosexual individuals have something to do with the hardships they anticipate in their journey toward becoming parents. They may feel that it is best to try to begin a family earlier because they may need the help of reproductive technologies, which have lower success rates, to so do. Or it may be that they simply have a sense that peak fertility and ideal pregnancy, as well as infertility, is situated earlier on the timeline. Whatever the case may be, future research to examine the relationship between fertility perceptions and sexual identity is in order.

From a theoretical perspective, existing research on lay illness representations has theorized about the ways in which such representations can function positively when they align with

validated scientific models and recommendations. The research reported here comes at this question from a slightly different vantage point by calling for an expanded conceptualization of lay illness representations and their functions. More specifically, the focus here has been on, first, not only looking to health phenomena that are exclusively illnesses in the traditional sense for theorizing but also to medicalized conditions more broadly conceived and, second, exploring the many scenarios in which science does not necessarily produce a clear message or dictate for the public and lay illness representations emerge without such guidance. One might imagine that in these sorts of situations lay illness representations would be even more influential than they would be in scenarios with scientific guidance, but future research is needed to assess whether this is in fact the case.

The study reported here is limited in that it is cross-sectional and the results are descriptive. Longitudinal studies are necessary to examine how perceptions of the female fertility timeline are constructed over time. Continued research assessing how such perceptions are formed and maintained over the life course would benefit scholars, practitioners, and patients. Researchers should also continue to examine how to measure lay perceptions of fertility, and the fertility timeline, to ensure that measurement is consistent with the underlying explications of each construct.

Limitations aside, the current study contributes to the understanding and promotion of reproductive and sexual health. Strengths of this research include use of a stratified sample representing equal numbers of men and women, a wide age range, and more than half of the sample representing individuals without a high school degree. The latter is especially valuable given that the bulk of contemporary research on fertility perceptions skews strongly in favor of more highly educated populations. Furthermore, this study was the first to assess public perception of the female fertility timeline as a whole.

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