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BRIEF REPORT

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Environmental attitudes and fertility desires among US adolescents from 2005–2019

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Abstract

Objective: This brief report examines links between environmental attitudes and fertility desires over time in the United States.

Background: To understand fertility decision making, it is important to identify factors that influence fertility desires. Concerns about environmental problems may be associated with lower desired fertility, especially in recent cohorts transitioning to adulthood. Youth may feel that having one less child can reduce their "carbon footprint" or may be unwilling to bring children into an uncertain and difficult future due to climate change.

Method: Data are from 12th graders in the Monitoring the Future study (2005–2019; $N = 34{,}104$). Regression is used to examine the relationship between number of children wanted and agreement that the government should deal with environmental problems even if it means paying more taxes.

Results: Those who endorsed that government should deal with environmental problems reported lower average fertility desires than those who did not. The association was driven by a decreased desire for large families (four or more children) rather than normatively sized families (2–3 children). Political identity and religiosity attenuated but did not explain the association. There was some evidence of stronger associations in 2017–2019.

Conclusion: Evidence showed associations between environmental attitudes and childbearing preferences that may have strengthened over time.

Implications: Environmental attitudes may be a factor in the recent decline in youth's fertility desires and could have consequences for future fertility.

Caroline Sten Hartnett: Affiliation at the time of manuscript writing.

KEYWORDS
climate, environment, fertility, fertility desires, fertility intentions, youth

INTRODUCTION

Record low fertility has stimulated interest in factors that shape fertility rates (Hamilton et al., 2021). This interest, in part, stems from the multifaceted consequences of low fertility such as changes in the population age structure, family structure, access to intergenerational support, and the gendered distribution of housework (Greenstein, 2000; Spitze & Logan, 1990). There is also interest in fertility desires to understand what people want and what helps or hinders them in getting the families they prefer. Documenting links between family size preferences and beliefs (e.g., about climate) can help ascertain how and why fertility desires—and perhaps fertility levels—vary. There are reasons to believe that thinking environmental problems must be tackled may be driving declines in desired parity. Public consternation around climate change has grown in recent years as scientists, the media, and social movements have sounded the alarm about current trajectories and their consequences (Leiserowitz et al., 2019). This discourse commonly features the argument that having one less child is a way individuals can mitigate their impact on the environment (Carrington, 2017). Anxiety about the future due to climate change may also lead to lower fertility desires (Schneider-Mayerson & Leong, 2020). It is unclear, however, whether environmental attitudes shape fertility desires.

RHETORIC CONNECTING ENVIRONMENT AND FERTILITY

The claim that having fewer children would alleviate environmental problems or mitigate climate catastrophe has become part of the media discourse that individuals have been exposed to. At times, the media has framed environmental issues as problems to be solved by reducing one's "carbon footprint"—a phrase first popularized by oil companies that shifts the focus from the fossil fuel industry to individual actors (Supran & Oreskes, 2021). Having one less child is commonly touted as the most impactful action that individuals can take (Carrington, 2017).

Alternatively, the public has also been presented with climate change discourse from social movements that tie narratives of ecological collapse and fertility. These strongly anti-natal narratives question the morality and strain of bringing children into a dying world (Conly, 2016). Recent youth movements such as Extinction Rebellion and Sunrise Movement discuss the coming ecological collapse and suggest breaking social norms to mitigate disaster (Stuart et al., 2020). Other groups explicitly fuse climate and fertility concerns; Conceivable Future highlights the ambivalence of childbearing when the future is bleak and BirthStrike members have pledged to remain childless due to the "ecological Armageddon" (Astor, 2018; Doherty, 2019).

While these ideas are present in the public discourse, whether they are shaping individual fertility desires, plans, and behaviors is an open question. Below we detail possible reasons why environmental attitudes and fertility desires could be linked as well as the limited, and conflicting, empirical findings regarding the association between them.

POTENTIAL CONNECTIONS BETWEEN ENVIRONMENTAL ATTITUDES AND FERTILITY DESIRES

Fertility desires, and what shapes them, interest researchers trying to understand how family formation decisions are made and enacted. Insofar as childbearing desires shape future fertility behavior (Schoen et al., 1999), these preferences can herald completed family size years before

people have finished family building and can foreshadow the contexts in which the next generation will be raised (e.g., cohort size, number of siblings, etc.). Even though fertility desires may not perfectly predict fertility (Rackin & Bachrach, 2016), studying them can show how family size norms shift and allow mapping of the complex associations between fertility desires and other beliefs (Bachrach, 2014).

Fertility decision making theories ground family and fertility decisions as originating, at least partly, from cognitive beliefs about families and connected domains that shape fertility preferences, desires, intentions, and norms (Johnson-Hanks et al., 2011). Climate concerns may be one such belief related to fertility desires. Young people who believe the government should take environmental actions, but see little action taken, may feel the need to do something, like have fewer children. Youth may want to reduce their "carbon footprint" by having one less child (Schneider-Mayerson & Leong, 2020). Or seeing an uncertain negative future may lower fertility desires (Vignoli et al., 2020). Climate anxiety (unobserved here but likely related to agreeing that there are environmental problems) may portray a bleak future in which it would be wrong or difficult to bring too many (or any) children into (Schneider-Mayerson & Leong, 2020).

The effect of environmental attitudes on adolescent fertility desires may be uniquely strong in recent cohorts. Today's youth are developing family ideals in a context of rising interest in solving environmental problems and fears of climate calamity (Leiserowitz et al., 2019). And young people are particularly concerned about the environment (McCright et al., 2016). Given the public discourse on the risk from climate inaction has intensified (Stecula & Merkley, 2019), having fewer children to reduce one's "carbon footprint" may be seen as an eco-friendly choice. Also, escalating climate anxiety as evidenced by recent movements and rhetoric, may make wanting children seem perverse when humanity itself feels imperiled (Blum, 2020). The recent decline in youth's intended parity may be related to swelling climate concern (Hartnett & Gemmill, 2020).

People's environmental beliefs and fertility preferences, however, may both be simultaneously shaped by religiosity and political identity. Beliefs are usually found in clusters of interrelated views shaped by broader ideologies and group identities (Cohen, 2003). In the United States, Republicans and those with more religiosity tend to question the reality of climate problems and also tend to value larger families; in contrast, Democrats and those with less religiosity tend to believe there are serious climate issues and want small or moderately sized families (Dunlap et al., 2016; Green, 2011; Hayford & Morgan, 2008). Links between environmental attitudes and desired fertility may be the result of being packaged together under the umbrella of beliefs flowing from broader group identities and ideologies rather than a direct independent association. Thus, controlling on religiosity and political identity may explain the climate–fertility desires link.

EMPIRICAL CONNECTIONS BETWEEN ENVIRONMENTAL ATTITUDES AND FERTILITY DESIRES

Research linking environment and childbearing attitudes is limited and offers mixed findings. Studies from low- and middle-income countries find that local environmental concerns and resource scarcity can be associated with either pro-natal or anti-natal attitudes, depending on the specific context and measures (Biddlecom et al., 2005; Ghimire & Mohai, 2005; Sutherland et al., 2004). In wealthier countries, results are also inconsistent. A 2011 study in Europe found an association between environmental concern and pro-natalism (De Rose & Testa, 2015). In contrast, two small-sample studies of Canadian college students found a negative association between environmental concern and fertility desires (Arnocky et al., 2012; Davis et al., 2019).

These prior studies offer useful data points, but many are limited by either small non-representative samples or older data. In addition, limited prior research examines the United States, where attitudes may be distinct. We use data from the Monitoring the Future (MTF) study, which is large, nationally-representative, with a long time series, and is fairly recent (through 2019).

We explore three questions: (1) Do youth who agree the government should deal with environmental problems, even if it means paying more, have lower fertility desires? (2) Has the environment–fertility desire association strengthened in recent years? (3) Do religiosity and political identity explain the prior associations? To examine these questions, we evaluate the relationship between numeric and categorical fertility desires among 12th graders using data from 2005–2019, then assess whether this relationship has changed over time. Our empirical approach also tests whether religiosity and political identity explain any observed associations.

DATA AND METHODS

The MTF study is a nationally representative survey of U.S. 12th graders conducted yearly. Approximately 130 schools are sampled annually, with up to 350 students per school (Monitoring the Future Project 2018). School participation rates range from 66% to 85% and the student response rate was 80% in 2019 (Miech et al., 2020).

We analyzed data from 2005 and 2019. The full, pooled sample is 35,332 and the number of missing cases is relatively small (see the Supporting Information Appendix Table SI.1). We used multiple imputation (five datasets) (Johnson & Young, 2011) and did not use imputed values for the dependent variables. For numeric fertility desires, we limited our sample to the 31,117 respondents who provided numeric responses (1,228 were missing and 2,987 stated "don't know"). The 2,987 with a "don't know" response were included when predicting categorical fertility desires.

We used the following measure of childbearing desires: "If you could have exactly the number of children you want, what number would you choose to have?" Answers were top-coded at six children and included one uncertain category (i.e., "don't know"). This measure was used to create two dependent variables. The first reflected numeric desires. Next, childbearing desires were recoded into four categories: small (0–1); normative (2–3); large (4 or more); and uncertain (don't know). Zero and one child were grouped because these groups were small (4.5% and 5.6%, respectively) and had similar associations with environmental problems. Two and three children also had similar associations with environmental problems and were combined.

The MTF study includes one environmental attitude measure that could be studied in conjunction with fertility desires. Respondents were prompted, "Government should take steps to deal with our environmental problems, even if it means that most of us pay higher prices or taxes" with response categories: "Disagree," "Mostly disagree," "Neither," "Mostly agree," "Agree." This was converted into three categories: disagree (disagree/mostly disagree); neither; and agree (agree/mostly agree). We refer to this as the environmental attitudes measure.

To examine how the association between the key variables has changed over time (with particular interest in the changes in the most recent period). We divided our 15-year time frame into five 3-year periods: 2005–2007, 2008–2010, 2011–2013, 2014–2016, and 2017–2019. We chose this measurement of time because the Akaike information criterion indicated it was a better fit than year indicators, 2-year indicators, or a continuous measure of time. Moreover, it is easier to understand than more complicated measures of time (e.g., polynomial functions).

We control for several variables in MTF that may shape environmental attitudes and fertility desires. These include: sex (female = 1, otherwise = 0), race (White, Black, Hispanic), mother's education (less than high school, high school, some college, BA or more), father's education (same coding as mother's), number of siblings, living in a large metropolitan statistical area (MSA), (yes = 1, otherwise = 0), region (South, West, Northeast, North Central), and

political identity (Democrat, Republican, independent, no preference, and other/don't know). We also include three scales, how much the respondent thought about having children (1 = not at all, 2 = some, 3 = a lot), religious attendance (1 = never, 2 = rarely, 3 = less than once per week, 4 = once per week or more) and religious importance (1 = none, 2 = little, 3 = pretty, 4 = very). Including scales as dummy variables did not change results.

In our analysis, we first present weighted annual time series data for measures of numeric childbearing desires and environmental attitudes over the study period (2005–2019). Second, we examine the association between environmental concerns and fertility desires in a multivariate framework. We show two panels: (A) ordinary least squares (OLS) regression to predict numeric fertility desires and (B) multinomial logistic regression to predict categorical fertility desires. Third, we test for over time changes in the environmental attitudes–fertility desires relationship. With the same dependent variables and modeling, we include interactions between environmental attitudes and time indicators. In the multivariable analysis we show two models. Model 1 adjusts for time indicators and all controls noted above with the exceptions of religiosity and political identity. Model 2 adds religious importance and attendance and political affiliation. All analyses were weighted.

As noted above and described in more detail here, we include uncertainty about childbearing in two ways. First, in all models we include a scale indicating how much the respondent has thought about having children. We do not show models with and without this scale because it has no impact on the relationship between environmental attitudes and fertility desires (it is a strong predictor of fertility desires, however). Second, we include an uncertain category when predicting categorical fertility desires.

RESULTS

Association between environmental attitudes and fertility desires

Descriptively, fertility desires declined over time and environmental concern rose (see Figures 1 and 2). Average desired fertility was 2.5 in 2005, rose to 2.6 in 2010, declined to 2.5 in 2014, and reached its 2.4 nadir in 2019, the last observed wave. The proportion agreeing the government should address environmental problems rose in the later years of the analysis; about half of respondents agreed from 2005 to 2014, and in 2015 this proportion began increasing and hit two-thirds in 2019. Proportions disagreeing or having neutral environmental attitudes hovered between 0.20 and 0.30 but declined in later years and reached the lowest proportions being neutral (0.19) or disagreeing (0.14) in the final year of analysis. Thus, in recent years, fertility desires declined while wanting the government to improve the environment increased.

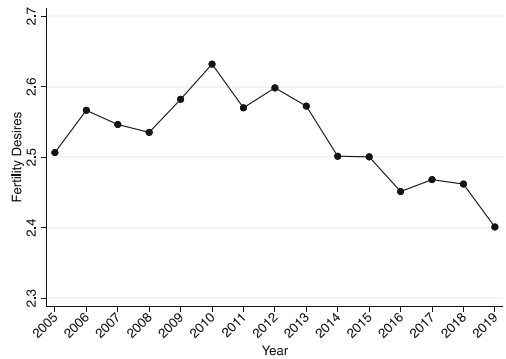

FIGURE 1 Average numeric fertility desires over time

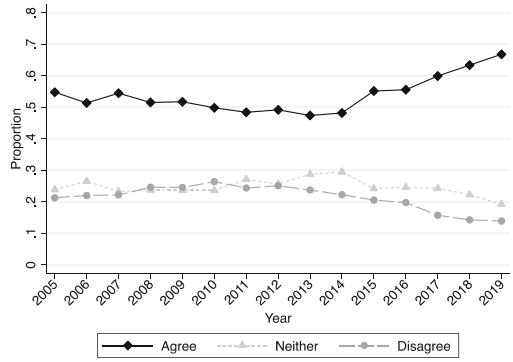

FIGURE 2 Level of agreement that government should deal with environmental problems over time

Next, we examined the association between childbearing desires and the environmental attitude measure within a multivariable framework (see Table 1). Panels A and B have different dependent variables: numeric fertility desires and categorical fertility desires, respectively. Panel B allows us to assess why environmental concerns are associated with fertility desires (e.g., if environmental attitudes were associated with wanting large or small families). In all models we controlled on indicators for time (measured in 3-year periods), and the key independent variable was agreement that the government should address environmental problems regardless of money (reference category = disagree). Model 1 included controls for sex, race/ethnicity, number of siblings, maternal and paternal education, living in a large MSA, region, and how much the respondent thought about having children. Model 2 added political affiliation and religiosity (i.e., religious importance and attendance scales).

Evidence suggests that environmental attitudes predicted fertility desires when examining the full 15-year time span (2005–2019). Before controlling on political affiliation and religiosity, those who agreed that the government should address environmental problems wanted 0.10 fewer children than those who disagreed or were neutral (see Table 1 Model 1A).

Religious and political beliefs explained nearly half of this association. Model 2A in Table 1 shows that the coefficient for agreeing with the environmental attitude measure was reduced by 45% from −0.10 to −0.055. Additional analysis (see Table SI.4 in the Supporting Information Appendix) reveals that this 45% reduction was significant ($p = .000$) and both religiosity and political affiliation were important mediators. However, even after taking religiosity and political identity into account, agreeing the government should deal with environmental problems predicted significantly lower fertility desires ($p = .006$). Thus, some, but not all, of the association between environmental attitudes and fertility desires was explained by religious and political beliefs.

While evidence suggests that those with environmental concerns had lower average fertility desires, it is unclear why. To better understand this association, we turn to Panel B which shows the risk ratios of wanting a small family (zero or one child), large family (four or more children), and being uncertain, compared to a normatively sized family (two or three children).

Reduced average desired fertility among those who agree there are environmental problems was primarily driven by a lower likelihood of wanting a large family (see Table 1 Model 2B). Agreeing something should be done about the environment, as opposed to disagreeing, was associated with a 13% lower likelihood of wanting a large family versus a normatively sized one. And a third of this relationship was explained by religiosity and political identity (see Supporting Information Appendix Table SI.4). Agreeing with the environmental problems measure, compared to disagreeing, was not associated with wanting a small family or being uncertain versus wanting two or three children.

TABLE 1 Predicting fertility desires by environmental attitudes

	Panel A. OLS numeric fertility desires		Panel B. Multinomial logistic categorical fertility desires					
			0–1 Kids (vs. 2–3)		4+ Kids (vs. 2–3)		Uncertain (vs. 2–3)	
	Model 1A	Model 2A	Model 1B	Model 2B	Model 1B	Model 2B	Model 1B	Model 2B
Government deal with environmental problems (vs. disagree)								
Neither	−0.00	0.01	0.85**	0.83***	0.92	0.95	1.12*	1.09
	(0.02)	(0.02)	(0.06)	(0.06)	(0.05)	(0.05)	(0.08)	(0.08)
Agree	−0.10****	−0.06***	1.06	0.98	0.81****	0.87***	1.01	0.99
	(0.02)	(0.02)	(0.06)	(0.06)	(0.04)	(0.04)	(0.06)	(0.06)
Year (vs. 2017–2019)								
2005–2007	0.10****	0.05**	0.79****	0.86**	1.13**	1.06	0.89	0.90
	(0.02)	(0.02)	(0.05)	(0.06)	(0.07)	(0.06)	(0.06)	(0.07)
2008–2010	0.13****	0.10****	0.90	0.96	1.22****	1.18***	0.96	0.96
	(0.02)	(0.02)	(0.06)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
2011–2013	0.11****	0.09****	0.79****	0.82***	1.11*	1.08	0.92	0.90
	(0.02)	(0.02)	(0.05)	(0.06)	(0.07)	(0.07)	(0.07)	(0.07)
2014–2016	0.02	0.01	0.95	0.98	1.04	1.02	0.95	0.93
	(0.03)	(0.03)	(0.07)	(0.07)	(0.07)	(0.06)	(0.07)	(0.07)
Constant	1.04****	0.84****	1.08	1.66***	0.02****	0.01****	1.10	0.78
	(0.06)	(0.06)	(0.17)	(0.28)	(0.00)	(0.00)	(0.18)	(0.14)
N	31,117	31,117	34,104	34,104	34,104	34,104	34,104	34,104

Note: Model 1 controls on sex, race, number of siblings, mother's education, father's education, living in a large MSA, region, and amount of thought put into having children. Model 2 adds religious attendance, religious importance, and political affiliation. Panel B shows relative risk ratios compared to wanting two or three children. Standard errors are in parentheses.
*$p < .10$. **$p < .05$. ***$p < .01$. ****$p < .001$ (two-tailed tests).

Over time variation in the association between environmental attitudes and fertility desires

It is unclear if differences in fertility desires between those who agree and disagree about government fixing environmental problems varied over time. To explore this, Table 2 mirrors Table 1 but includes interactions between environmental attitudes and time. The 2017–2019 period was omitted to examine if the environmental attitudes–fertility link was weaker in prior time periods. Panel A provides OLS estimates. The coefficient for agreeing with the environmental problems measure shows the 2017–2019 difference in the average number of children desired between those who agreed and disagreed that there are environmental problems (e.g., in 2017–2019 those who agreed there were environmental problems had fertility desires that were 0.23 lower than those who disagreed; see Model 1A). The time coefficients show the difference in average children desired when comparing those who disagreed at each time and those who disagreed in 2017–2019 (e.g., among those who disagreed, average fertility desires were nonsignificantly lower by .04 in 2005–2007 than in 2017–2019). The interaction terms show the gap in average fertility desires between those who agreed there were (or were neutral about) environmental problems and those who disagreed at that time as compared to the gap in 2017–2019 (e.g., the gap in average children wanted between those who agreed and disagreed was 0.19 larger in 2017–2019 than in 2005–2007). Panel B shows multinomial logistic analysis with time interactions. The terms can be interpreted as relative risk ratios which are compared to the reference group and, thus, are complicated (e.g., the main association of agreeing reflects

TABLE 2 Predicting fertility desires by environmental attitudes over time

	Panel A. OLS numeric fertility desires		Panel B. Multinomial logistic categorical fertility desires					
			0–1 Kids (vs. 2–3)		4+ Kids (vs. 2–3)		Uncertain (vs. 2–3)	
	Model 1A	Model 2A	Model 1B	Model 2B	Model 1B	Model 2B	Model 1B	Model 2B
Government deal with environmental problems (vs. disagree)								
Neither	−0.11	−0.07	1.01	0.97	0.71**	0.75*	1.03	0.98
	(0.07)	(0.07)	(0.18)	(0.18)	(0.11)	(0.12)	(0.19)	(0.18)
Agree	−0.23****	−0.15***	1.49***	1.31*	0.68***	0.76**	1.14	1.09
	(0.06)	(0.06)	(0.23)	(0.20)	(0.09)	(0.10)	(0.18)	(0.17)
Year (vs. 2017–2019)								
2005–2007	−0.04	−0.04	0.97	0.99	0.78*	0.77*	0.94	0.92
	(0.06)	(0.06)	(0.17)	(0.17)	(0.11)	(0.11)	(0.17)	(0.17)
2008–2010	−0.02	−0.02	1.36*	1.38*	1.02	1.02	1.01	0.99
	(0.06)	(0.06)	(0.23)	(0.23)	(0.14)	(0.14)	(0.18)	(0.18)
2011–2013	0.01	0.01	1.12	1.12	1.02	1.02	0.90	0.87
	(0.06)	(0.06)	(0.19)	(0.19)	(0.14)	(0.14)	(0.17)	(0.16)
2014–2016	−0.07	−0.06	1.18	1.18	0.92	0.93	1.14	1.10
	(0.07)	(0.06)	(0.21)	(0.22)	(0.14)	(0.14)	(0.21)	(0.21)
Envir × Year (vs. disagree 2017–2019)								
Neither × 2005–2007	0.11	0.08	0.98	1.03	1.61**	1.54**	1.14	1.17
	(0.08)	(0.08)	(0.22)	(0.24)	(0.31)	(0.31)	(0.27)	(0.28)
Neither × 2008–2010	0.22***	0.19**	0.66*	0.68*	1.51**	1.44*	1.13	1.17
	(0.08)	(0.08)	(0.15)	(0.16)	(0.29)	(0.28)	(0.27)	(0.28)
Neither × 2011–2013	0.06	0.05	0.95	0.96	1.20	1.19	1.31	1.31
	(0.08)	(0.08)	(0.21)	(0.22)	(0.23)	(0.23)	(0.32)	(0.32)
Neither × 2014–2016	0.08	0.06	0.76	0.77	1.11	1.08	0.90	0.90
	(0.09)	(0.09)	(0.18)	(0.19)	(0.22)	(0.22)	(0.22)	(0.22)
Agree × 2005–2007	0.19***	0.13*	0.74	0.82	1.58***	1.46**	0.87	0.90
	(0.07)	(0.07)	(0.14)	(0.16)	(0.26)	(0.24)	(0.18)	(0.18)
Agree × 2008–2010	0.16**	0.11	0.58***	0.63**	1.15	1.08	0.87	0.90
	(0.07)	(0.07)	(0.11)	(0.12)	(0.18)	(0.18)	(0.18)	(0.19)
Agree × 2011–2013	0.15**	0.11	0.56***	0.60***	1.06	1.01	0.93	0.94
	(0.07)	(0.07)	(0.11)	(0.12)	(0.17)	(0.16)	(0.20)	(0.20)
Agree × 2014–2016	0.12	0.09	0.81	0.83	1.17	1.14	0.77	0.78
	(0.07)	(0.07)	(0.16)	(0.17)	(0.20)	(0.20)	(0.16)	(0.17)
Constant	1.14****	0.92****	0.84	1.34	0.02****	0.01****	1.04	0.75
	(0.07)	(0.08)	(0.17)	(0.28)	(0.00)	(0.00)	(0.21)	(0.16)
N	31,117	31,117	34,104	34,104	34,104	34,104	34,104	34,104

Note: Model 1 controls on sex, race, number of siblings, mother's education, father's education, living in a large MSA, region, and amount of thought put into having children. Model 2 adds religious attendance, religious importance, and political affiliation. Panel B shows relative risk ratios compared to wanting two or three children. Standard errors are in parentheses.
*$p < .10$. **$p < .05$. ***$p < .01$. ****$p < .001$ (two-tailed tests).

the risk of agreeing compared to disagreeing in that fertility desires category versus the risk of agreeing compared to disagreeing in the reference category in 2017–2019). We therefore graph predicted probabilities from Model 2B (because Models 1B and 2B were similar, see Supporting Information Appendix Table SI.3) for each fertility desire category and show predictions for those who agree and those who disagree.

Before controlling on religiosity and political affiliation, those who affirm, rather than refute, environmental problems desire fewer children in most time periods and this gap was most pronounced in the last period (see Figure 3 Panel A: Model 1). In 2005–2007, those who agreed with the environmental problem measure had similar average desired family size as compared to those who disagreed (difference −0.04, $p = .266$), but by 2008–2010 those who agreed had marginally lower fertility desires than those who disagreed (−0.07, $p = .076$). In and after 2011, youth who agreed had significantly lower desired fertility than youth who disagreed (−0.08 in 2011–2013 and −0.12 in 2014–2016). The difference was quite large in 2017–2019—those who agreed wanted 0.23 fewer children than those who disagreed. This 0.23 difference was significantly larger than those found in most other periods (except 2014–2016, $p = .119$, see interactions in Table 2 Model 1A).

Taking religious and political beliefs into account, however, attenuated these differences; and agreeing predicted lower fertility desires than disagreeing only in 2017–2019 (see Table 2 Model 2A and Figure 3 Panel A). The gap between those who agreed and disagreed vastly narrowed in all years and became non-significant before 2017–2019. In 2017–2019, though, the gap remained substantial and those who agreed wanted 0.15 fewer children than those who disagreed. Thus, controlling on religiosity and political identity completely explained gaps prior to 2017 and explained over a third of the gap in 2017–2019; indeed, these variables mediated a significant portion of the gaps in all periods (albeit the indirect, or mediated, effect was only marginally significant in 2005–2007, $p = .076$, see Supporting Information Appendix Table SI.4). And in the final model, the agree–disagree gap was only marginally larger in 2017–2019 than in 2005–2007 (0.13, $p = .065$).

Multinomial logistic regression shows that lower average fertility desires for those who agreed there were environmental problems in 2017–2019 was because those who agreed, versus disagreed, were more likely to want small families and less likely to want large families, compared to normatively sized families (see Table 2 Model 2B). In 2017–2019, relative risks of wanting a large family versus a normatively sized family were 24% lower for those who agreed with environmental concerns than those who disagreed. And in this same time period, relative risks of wanting a small family, compared to wanting two or three children, were 31% marginally higher for those who agreed there were environmental problems than those who disagreed. As before, political beliefs and religiosity explained some but, not all, of these effects.

Youth who agreed there were environmental problems had a higher probability of wanting a small family than youth who disagreed in 2017–2019, and this agree–disagree gap significantly differed from gaps in 2008–2013 (see Figure 3 Panel B and Supporting Information Appendix Table SI.3). Only once, in 2017–2019, those who agreed were significantly more likely to want a small family than those who disagreed ($p = .035$). In prior periods, results showed: no difference (2005–2007); nonsignificant higher probabilities of wanting zero or one child among those who agreed than disagreed (2014–2016); or, unexpectedly, lower probabilities of wanting a small family for those who agreed than disagreed (nonsignificant in 2008–2010 and marginally significant in 2011–2013, $p = .091$). The 2017–2019 agree–disagree gap was significantly different than the 2008–2010 ($p = .012$) and 2011–2013 ($p = .007$) gap, in part, because in the last period youth who agreed had a higher probability of wanting a small family than youth who disagreed whereas the inverse was found in 2008–2013.

The probability of wanting a large family was lower for 12th graders who agreed that government should fix environmental problems than 12th graders who disagreed in most periods with the notable exception of 2005–2007 (see Figure 3 Panel B and Supporting Information Appendix Table SI.3). In 2005–2007, those who agreed (0.15) and disagreed (0.14) had similar

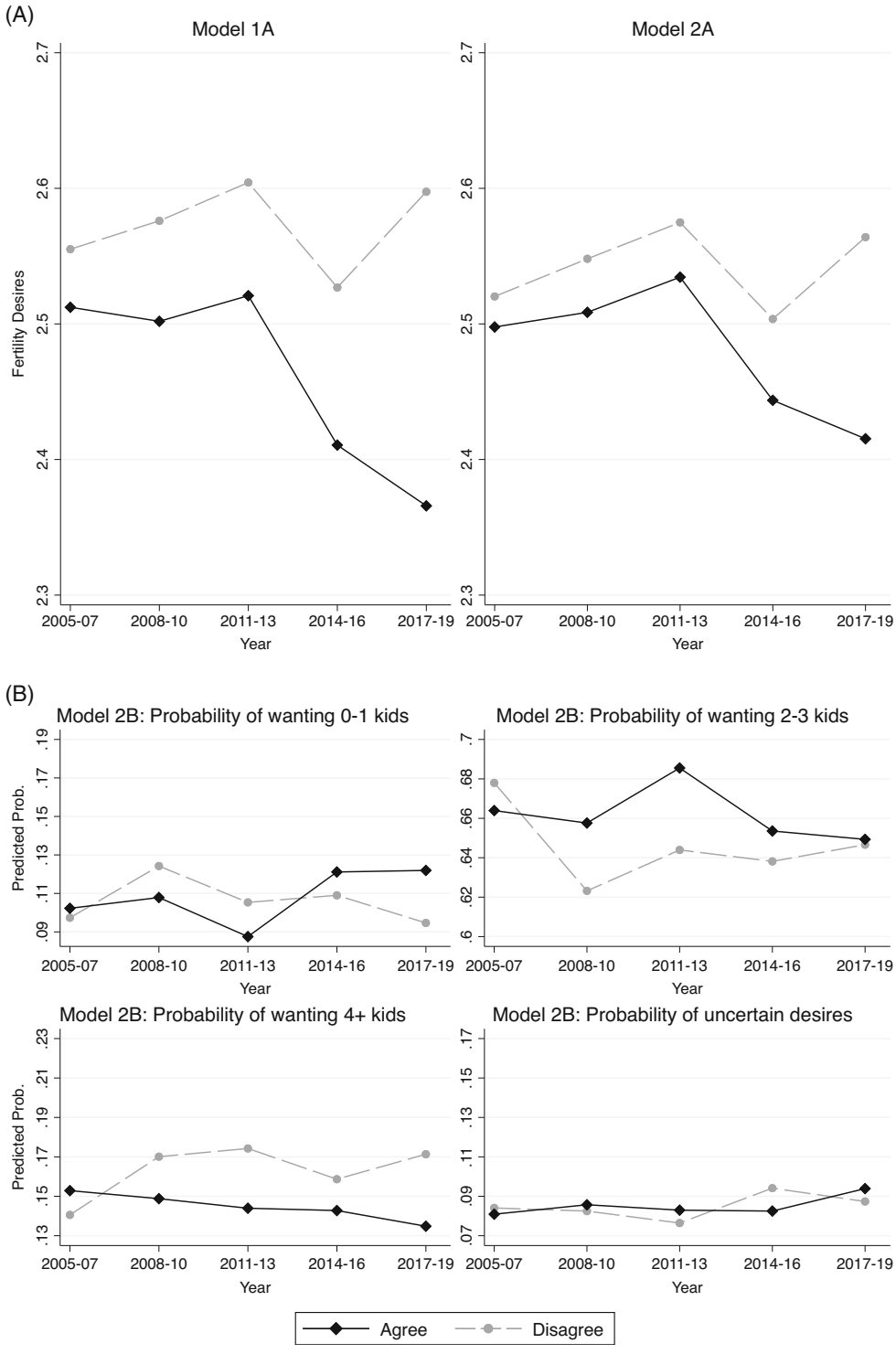

FIGURE 3 Predicted fertility desires by environmental attitudes over time: Estimated from Table 2. (A) Predicted average numeric fertility desires estimated from Table 2: Panel A. (B) Predicted probabilities of categorical fertility desires estimated from Table 2: Panel B

large family desires. In most later periods, however, youth agreeing there were environmental problems had lower probabilities of wanting four or more children than youth who disagreed (2008–2010 $p = .078$; 2011–2013 $p = .015$; and 2017–2019 $p = .026$). Compared to the small agree–disagree gap in 2005–2007, nearly all the other time periods (except 2014–2016) had larger agree–disagree gaps. For instance, in 2017–2019, the predicted probability of wanting a large family was .04 lower for those who agreed (.13) than disagreed (.17) and this −.04 gap was significantly larger than the 2005–2007 .01 gap.

Environmental attitudes did not predict uncertain fertility desires or normative fertility desires well. The predicted probabilities of uncertain desires were similar for those who agreed and disagreed that the government should deal with environmental problems and were relatively stable over time (around .08 to .09). Normatively sized families were highly desired—about two thirds of 12th graders wanted them. In 2005–2007, 2014–2016, and 2017–2019 those who agreed and disagreed had similar desires for two or three children. From 2008–2013, though, youth who agreed were more likely to want two or three children than youth who disagreed.

Sensitivity analyses

Because the environmental measure may reflect comfort with the government dealing with problems rather than environmental concerns, we reran analysis with a measure of level of agreement with the notion that U.S. pollution increased in the last 10 years. Similar associations were found (the magnitude of the association was largest in 2017–2019 and was attenuated though not explained by religiosity and political identity, but this association was driven by those disagreeing becoming more likely to want a large family; see Supporting Information Appendix Table SII.1). We also used a negative binomial model and found similar results.

CONCLUSION

Our study uses nationally representative data that allow us to examine the relationship between fertility desires and environmental attitudes. We found that agreeing that government should deal with environmental problems predicted lower fertility desires over the 15-year time span because these 12th graders were less likely to want large families than normatively sized families. Political identity and religiosity explained some, but not all of the overall association. There was also some evidence that the relationship between thinking there were environmental problems and fertility preferences was strongest in the most recent period. In 2017–2019, there were large gaps between those who agreed and disagreed on environmental problems and these gaps may have been larger than in the first period. These recent large gaps were due to differences in wanting large families and small families.

We found that political identity and religiosity explained the agree–disagree gap in every time period except 2017–2019. This attenuation may be because conservative ideology and religiosity are associated with espousing that environmental problems are not concerning and government intervention is problematic while large families are normative (Dunlap et al., 2016; Green, 2011; Hayford & Morgan, 2008; Stone, 2020). Liberal views and lower religiosity may be associated with sets of beliefs that prioritize climate concerns and see government as able to alleviate these concerns as well as value a diversity of family forms (including small families).

Political identity and religiosity did not explain the full association, however. Average fertility desires still differed in 2017–2019. The probability of wanting a small family was higher in 2017–2019 for youth who agreed than disagreed in government fixing environmental problems and this association differed from 2008–2013. Further, the probability of wanting a large family

was lower for those who agreed than those who disagreed in 2017–2019 (and at other times) and this association was stronger than in 2005–2007. Thus, environmental attitudes and fertility desires seem to be linked and the relationship may have been stronger in 2017–2019.

We suggested that youth who agreed with the environmental attitude measure may have had lower fertility desires either because having one fewer child is framed as a responsible choice that lowers an individual's "carbon footprint" or the specter of climate change paints a dark and uncertain future that cannot sustain children. Evidence lends some support to each. Young people who think there are environmental problems are less likely to want large families but still want normatively sized families, which suggests embracing having one fewer child as an individual solution to reduce their carbon footprint. In contrast, beliefs that the world will be devastated by climate change would seem to align with shifting to one or no children, but we found that wanting small families only became somewhat more likely in the last period. Perhaps in 2017–2019, climate devastation discourse and climate anxiety became more prevalent, leading to lower fertility ideals and wanting small families. We cannot disentangle these mechanisms, however, because we do not have measures of climate anxiety and importance of reducing environmental impact. Although qualitative research suggests that both may be important, a prior study found that respondents were more concerned about the future climate that their current or potential children would be subject to than the "carbon footprint" of having children (Schneider-Mayerson & Leong, 2020). We hope that our study, which uses one of the few datasets that includes youth's environment attitudes and fertility desires, will encourage researchers to collect data to explore the various pathways in which the specter of climate change could shape fertility.

This study has limitations. First, The MTF study only surveys youth attending public and private high schools so findings may not be generalizable to all older adolescents. Second, we only used one measure that captured environmental attitudes. This measure was preferable to a measure on pollution because the responses were more variable, and it incorporated the dimension of action or intervention to mitigate environmental problems (Crawley et al., 2020). Nevertheless, sensitivity analysis using the pollution variable showed similar results. Third, we lack information on why and how fertility and environmental attitudes are linked. This information would provide valuable context for the findings presented here. Fourth, we were unable to identify and exclude 12th graders who were already parents at the time of the survey, but an analysis of other MTF data indicates this proportion is likely small (about 1.6%). Fifth, our study focuses only on fertility desires, which may or may not translate to subsequent behavior. We cannot answer how environmental attitudes shape actual fertility intentions or behaviors.

Nevertheless, this study provides a rare opportunity to examine associations between fertility desires and environmental attitudes among youth in a large, national survey collected consistently over time. Results show that environmental attitudes do predict childbearing desires and perhaps more so after 2017. This suggests that environmental beliefs could be a factor in the recent decline in fertility expectations among young people which could drive broad cultural changes in family size ideals and/or have extensive societal effects if these desires translate into behavior (Hartnett & Gemmill, 2020; Schoen et al., 1999).

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SUPPORTING INFORMATION

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