Fertility Decisions in the Anthropocene:
Facets of the Demographic Transition, Rationalization and Environmental Concern

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B.S. in Sociology and International Affairs, August 2014, Florida State University

A Thesis submitted to

The Faculty of
The Columbian College of Arts and Sciences
of The George Washington University
in partial fulfillment of the requirements
for the degree of Master of Sociology.

August 31, 2020

Thesis directed by

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Acknowledgements

In the course of writing this thesis, I received invaluable assistance from many people.

I would first like to express gratitude for my advisor, Hiromi Ishizawa, whose thoughtful proficiency and patience ensured the completion of this project. Her astute and constructive advice allowed me to continue even when I was discouraged. I would also like to thank Antwan Jones, whose keen intellect refined and sharpened many aspects of this thesis.

I am especially indebted to Kelley Dennings, whose decision in summer of 2019 to bring me onboard for a survey project also led, indirectly, to the creation of this document. I would also like to thank Tony Panzera for his assistance in that project. I owe a special debt of gratitude to the Center for Biological Diversity. This project would never have occurred were it not for the funding and organizational resources they put into ensuring quality survey data.

Lastly, I am grateful for my parents, whose support has been incalculable during this time. Likewise, my brothers have been encouraging. I owe a special gratitude to my fiancé, Ryan Benk, who witnessed first-hand nearly all stages of this thesis. The tireless nights I put into this work were always alleviated by his kindness and care for me.

It is to all these people that I owe the sincerest gratitude. To them I attribute the strengths of this work, and none of the shortcomings.

Abstract

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Fertility decline is an increasingly global phenomenon with many and profound social, economic and political implications. Previous research has established myriad determinants of fertility rates and, especially, their decline. Absent from these theoretical and empirical contributions is the role environmental concern has on fertility decisions. Relevant literatures of fertility and environmental sociology are reviewed. An online survey was administered through the crowdsourcing platform Amazon Mechanical Turk. Respondents were asked questions that gauged their awareness and concern of current environmental issues, as well as questions regarding lifestyle choices and fertility intentions. Through logistic regression analysis of childless people who aged between 18 and 49, this study examines the effect various measures of environmental concern has on intention to have a child. Results indicate that a question about societal moral responsibility to prevent wildlife extinctions is associated with fertility intentions. More specifically, the findings suggest that those who expressed concerns regarding wildlife extinctions are less likely to intend to have children. This study has a relatively small sample size which may have influenced the results. These findings suggest that future research could further explore the association between wildlife extinctions and fertility decisions.

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INTRODUCTION

In recent years, purposeful childlessness in response to environmental problems has been the subject of popular discussions (Ludden 2016; Bailey 2019; Astor 2018; Gil 2018). The rationale for not having children may vary, but they generally fit into the following three categories: the first is that additional people redound to additional consumption of the world's finite resources; the second is that it is morally wrong to bring additional people into a world beset by environmental problems (that is, the child may suffer); and the third involves people remaining childless as a social and political demand for environmental policies. Regardless of the reason, such decisions are usually made by environmentally concerned people who believe that *not* having children will ultimately be beneficial for the environment.

The first reason is deeply interrelated with individuals' consumption; that is, how much resources someone will consume, usually measured on an annual or lifetime basis. One common representation of this is the carbon footprint, which is the average amount of carbon dioxide—a greenhouse gas that contributes to anthropogenic global warming—a typical person in each country emits, usually represented as an individual's annual contribution. Other measures of consumption may refer to the amount of land it takes to feed the average person, or the amount of trash the average person produces in their lifetime, and so on. The second reason, involving moral and ethical concerns, taps into people's sense of unease and uncertainty regarding the future stability and health of the biosphere. Because global warming is expected to trigger disruptions to agricultural supply chains (Vermeulen, Campbell and Ingram 2012) and other such status quo distortions, then some question if they should bring another human into this world. Still others may delay—

sometimes indefinitely—having children until enough national or international action is taken to address these environmental problems. This is a protest movement that intersects ideas of bodily autonomy and climate justice. Supporters of BirthStrike and other similar organizations exemplify this position. Regardless of their reasons, all people here described are united by a common factor: they are consciously deciding to have fewer, or no, children *because of* environmental issues, whatever matters those may be. As such, the topic may then be of interest to many academics and professionals across many fields.

Of all the complex issues of our time, perhaps none is more important than the issue of reproduction. This is true on the simplest level: the reproduction of human beings is necessary for the continued existence of human societies. Thus, it is necessary for scholars to understand, as thoroughly as possible, all the factors that may influence fertility decisions. It is especially important given one of the defining features of industrialized countries is their eventual low fertility rate. Today, fertility decline is a globalizing trend, one that will encapsulate and define nearly every country this century (Vollset et al. 2020). The world is industrializing, urbanizing, and modernizing—all of which are subsumed by the sociological concept of rationalization. Partly because of these monumental developments, the global population stands on the precipice of a sharp decline in birth rates, portending subsequent global population decline (Vollset et al 2020). Scholars have long theorized upon and researched various reasons for this low fertility rate found in nearly every industrialized country, and quickly diffusing to countries across the globe. Different academic fields have contributed to our understanding of fertility decline. For example, economics can inform our understanding of demographic processes (Meade et al. 1970), as can geography (Schuster, Padmadas and Hinde 2019) and other fields. Much of the

fertility literature emphasizes women. Research has established an association between fertility limitation and various socioeconomic indicators like higher educational attainment (Axinn and Barber 2001) and higher income (Vandenbroucke 2016). Research has also shown that social interactions and social networks have some effect on people's fertility decisions (Bernardi and Klärner 2014). However, we know little about the effect environmental concern has on fertility choices. This thesis, therefore, aims to contribute to the body of literature on fertility by examining the effect individuals' environmental concern has on their intention to have a child.

Why prominently situate the environment in a study of fertility? Scholars across many fields increasingly recognize the planet today as incalculably influenced by human activity, to the degree that a new geologic epoch has been proposed to adequately describe these planetary changes: the Anthropocene (see Moore 2015; Ruddiman 2013; Steffen et al. 2013). Various beginnings to this era have been suggested, from as far back as the Neolithic Revolution to as recently as the detonation of nuclear weapons in the mid-twentieth century (see Angus and Foster 2016). Regardless of the starting point, many scholars are united in the belief that human actions triggered this new geologic epoch and continue to shape it today. Its name is a sober recognition of human impacts on the planet. A thorough understanding of the interaction between humans and the natural world then receives newfound importance. Without such understandings, we risk a "business as usual" that further degrades the natural world.

To that end, in this research I will first synthesize and review the literatures of fertility in the context of its declining rate, and environmental concern as it relates to fertility choices. I situate fertility decline within the multitude of macro-level and micro-level explanatory

theories. I then discuss facets of environmental sociology that hold relevance to fertility. I propose how the fields of environmental sociology and fertility may coalesce for avenues of academic theory and research. The research question guiding this thesis is—does concern for environmental issues influence fertility plans? I define fertility plans as the expectation to have any children within one's life. It does not matter when or at what age someone plans to have children, only that they expect to do so at any point. I draw a hypothesis from past literature—there is an association between environmental concern and fertility plans. I introduce my study with an overview of the survey and the various methodologies deployed in its construction. I briefly explain descriptive statistics results. I then explain my statistical models for a binary logistic regression and the findings. I conclude by discussing the implications of this research, with special regard for how it is situated within the broader fertility and environmental sociology literatures. I close with discussion of the shortcomings of my study and suggestions for future research.

LITERATURE REVIEW

Fertility and the Demographic Transition

An enduring theory of the social sciences is the demographic transition theory (DTT). The theory holds that populations undergo a transformation in fertility, mortality and age structure. Pre-transition societies are generally defined by high mortality and high fertility rates. That is, life expectancy was much shorter, and people often had many children in these earlier societies (Davis 1945; Kirk 1996). These high mortality and fertility rates often cancel each other out, and population size remains relatively stable (wars, diseases

and disasters notwithstanding). As Morgan and Taylor (2006:375) write of these societies, "Many births, 5 or 6 per woman, do not guarantee population replacement if mortality is very high." This high prevalence of death, especially among infants, mean it is often difficult for individuals and families to precisely choose the number of children they had. Additional social and economic factors, like lack of family planning health services, lack of women's rights, religious beliefs and agricultural-based economies are believed to pressure women to have more children (Bongaarts 1978; Galor and Weil 1999; Gertler and Molyneaux 1994; Mauldin, Berelson and Sykes 1978; Westoff, Moreno and Goldman 1989). These conditions contrast in an almost mirror-like fashion to societies that have successfully undergone the demographic transition, which are marked by low fertility and low mortality rates (Strulik and Vollmer 2013). Furthermore, post-transition societies are defined by many advancements to family planning and other forms of healthcare, women's political rights, religious beliefs, urbanism and economies. This process is generally believed to have begun in western European countries and has since become a global phenomenon. How the world shifted from these regimes of high fertility and high mortality to regimes of low fertility and low mortality underpins much of the research in this thesis. These social processes have profoundly transformed the world within a few centuries.

The theory is also a model that guides much modern demographic research. According to sociologist Dudley Kirk (1996:361):

> Stripped to essentials [the demographic transition theory] states that societies that experience modernization progress from a pre-modern regime of high-fertility and high mortality to a post-modern one in which both are low. The term

> ‘modernization’ is not defined, nor does it include the crucial questions about causation that form the subject of much modern demographic literature.

Once the mortality rate begins to fall, the fertility rate remains high and this leads to a period of rapid population growth (Galor 2011). Eventually, the fertility rate declines too, and the two rates are, once again, at an equilibrium. However, societies defined by this new equilibrium of mortality and fertility rates are markedly different from pre-transition societies because they are defined by *low* mortality and *low* fertility. That is, people live longer lives and have fewer children. These changes eventually transform the age structures of whole societies, and induce a host of economic, political and social changes, which will be discussed later.

To assess fertility rates globally, demographers and social scientists often rely on the Total Fertility Rate (TFR), or simply the fertility rate. The TFR is the average number of children expected to be born to a woman over the course of her lifetime. The fertility rate has two assumptions: one, that the woman lives throughout the childbearing years, which is commonly ages 15-49 (with slight variations); and two, that the woman bears the average number of children for each age or age group. For this second assumption, demographers typically create average numbers of children for either each individual year of a woman’s life, or groupings of years of their life (see MEASURE Evaluation). For example, demographers can calculate the average number of children for a 21-year-old woman, or they can calculate the average number of children for women aged 20-24; both are called age-specific fertility rates (ASFRs). In either case, these average numbers of children for each age or range of ages are then summed for all childbearing years to obtain a TFR.

A defining feature of industrialized countries is their low fertility rate. These countries' rates often fall below the replacement level, which is usually 2.1 (Searchinger et al. 2013). The replacement level is the TFR which will result in zero net population growth, absent immigration. Sometimes, TFRs fall quite low, as evidenced by Italy's 1.29, Singapore's 1.14 and South Korea's 0.98 fertility rates in 2018 (World Bank 2020). In these cases, the affected countries can experience population decline if deaths exceed births and if there is an absence of immigration levels that offset population declines. Male-female ratios and mortality rates also affect population growth rates.

The TFR is most often applied at the nation-state level, though sometimes it is useful to look at the rate on a global scale. Globally, the fertility rate has been declining for many decades. According to a 2017 United Nations (UN) report on world fertility, the global TFR declined from nearly 5 in 1950-1955 to 2.3 in 2010-2015. However, there is significant variation among countries and even among continents, as North American and European countries have the lowest fertility rates and African countries have the highest rates (UN World Fertility Report 2017). Demographers generally predict all countries to eventually experience declines in the TFR. It is unknown and debated among scholars whether these rock-bottom fertility rates are a permanent or transient feature of developed countries.

The transition theory, though, is not without its critics (see Kammeyer 1970 for an overview of the criticisms of DTT). For one, it is teleological; it implies that countries' population regimes will follow a similar "modernization" process first experienced by Western countries. Yet, the theory has proved quite dependable, as many countries from all parts of the world seem to follow this path. Indeed, demographers rely on the theory to

predict the global population decades into the future. The model can be disrupted by a variety of mechanisms, like wars, diseases and disasters. The Black Death in medieval Europe is an illustrative, if dramatic, example of this disruption to the model. The plague killed as much as one-third of the European population and, in doing so, profoundly disrupted and distorted birth and death rates for the continent. The demographic "recovery" to normal, pre-plague patterns took centuries to complete (Livi-Bacci 2017:42-47). Despite its criticisms, the theory continues to be relied upon today by demographers around the world. See Figure 1 below for a visual representation of population change in accordance with the theory.

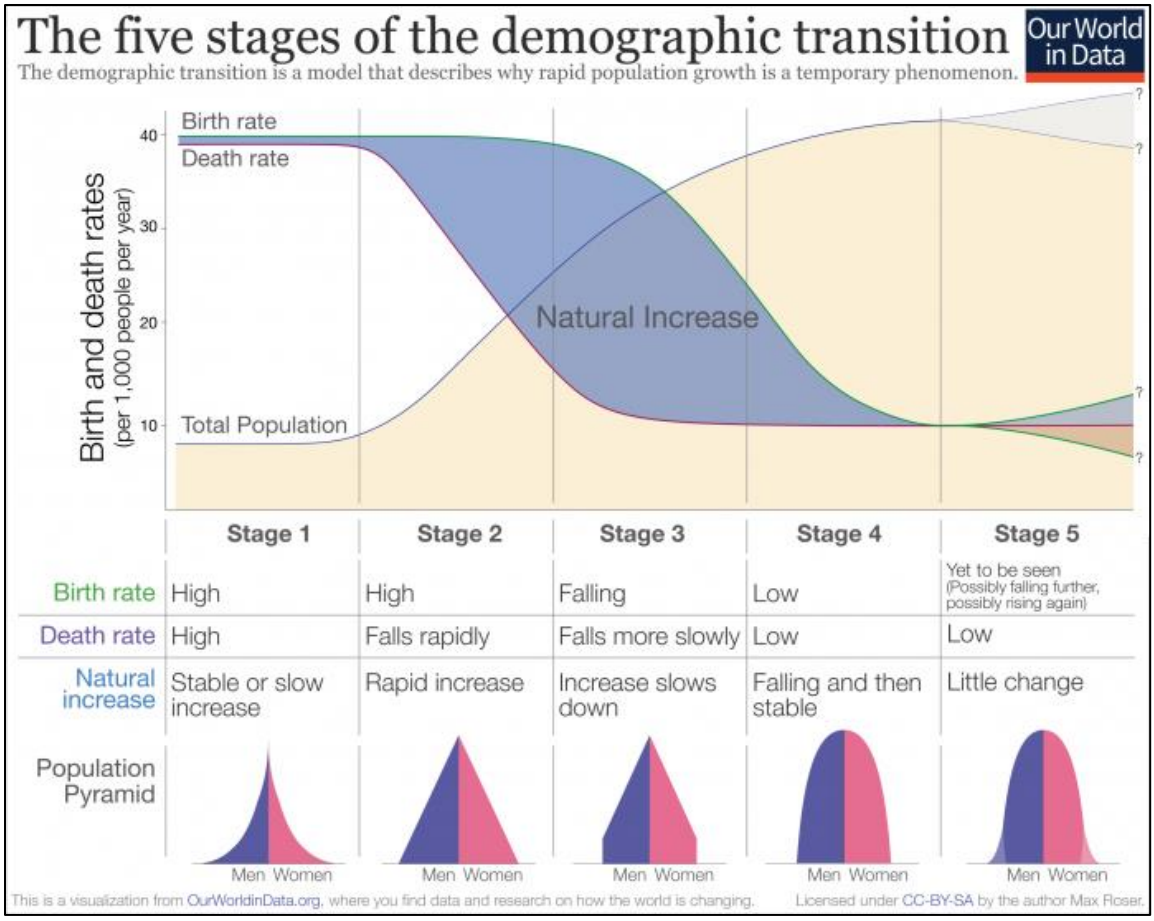

Figure 1. The demographic transition model, a visual representation of the population processes of the demographic transition theory. (Published online at OurWorldInData.org. Retrieved from: https://ourworldindata.org/world-population-growth).

Causes of low fertility rates. The causes of low fertility rates are many and deeply interrelated with one another. Early proponents of the DTT argued that declining mortality is the major cause of rapid population increase (Davis 1945), but more recent scholars have called this assumption into question (Bernardi and Klarner 2013; Freedman 1979). It is difficult to isolate the causes of fertility decline; we know generally that the contributors to low fertility rates include women's rights, rising incomes, urbanization, expanded education (especially among women), liberalizing public attitudes, children becoming an

economic liability, and the legalization of birth control and abortion (see Galor 2011). All these social processes have coalesced, in various iterations and degrees of strength, and with significant spatial and temporal variability, to produce the low fertility rates observed in industrialized countries. As such, it is often difficult to disentangle the strength a single factor has in lowering the fertility rate.

It is important to note that micro-level and meso-level decisions like the decision to have a child are shaped by macro-level phenomena, pressures and processes. The economist Richard Easterlin (1996) agrees that a country's transition from higher fertility rates to lower ones is largely attributable to the significant reduction in mortality, especially among infants. Easterlin (1996:108) writes,

> This enormous decrease in mortality at younger ages has revolutionized the reproductive outlook of parents. When mortality is high, as in pretransition circumstances, parents find it difficult to achieve their desired family size and consequently have as many children as they can.

This illustrates the overlap of structural and interpersonal factors regarding fertility and fertility intentions. The macro-level factors—reductions in mortality, economic prosperity, etc.—structure the micro-level (individual) and meso-level (e.g. family and other small groups) decisions to have children.

Lower fertility rates are also inextricably intertwined with ideas of rationality and modernity, especially as these concepts apply to women and their reproductive capacities. Rationalization and modernization are processes evident on both the macro-level and micro-level. In *The Protestant Ethic and the Spirit of Capitalism*, Weber was clear that

rationalization, in addition to being a macro-level phenomenon that he believed gave birth to capitalism, was also manifest in the way individuals conducted their daily lives (Weber [1920] 2011). So, rationality as a guiding force within private lives logically extends to include peoples' fertility decisions. Modernity and rationality enable people and their families to more precisely choose their preferred family size, at least relative to the pre-modern, pre-transition era. Family size is now more predictable and controllable by family preferences, rather than being subjected to chance (in reference to high infant mortality) or tradition (as in social expectations of childbearing women).

Nargund (2009:191) summarizes the interplay of both macro-level and micro-level factors as follows:

> Developed countries tend to have a lower fertility rate due to lifestyle choices associated with economic affluence where mortality rates are low, birth control is easily accessible and children often can become an economic drain caused by housing, education cost and other cost involved in bringing up children.

So, people in developed countries experience a set of structural factors that favor them having fewer children. In a later section I will discuss fertility intentions; but, first, I will discuss the macro-level repercussions of this tendency to have fewer children.

Effects of low fertility rates. What are the societal effects of such low fertility rates? Declining fertility levels can lead to population decline, which engenders a multitude of social, political and economic effects. There is no consensus on the effects of population decline; scholars may view the phenomenon from a positive, negative or neutral

perspective. Those offering positive perspectives on population decline most often cite environmental benefits and reduced use of public goods (Ehrlich 1971; Hardaway 1997; Jöst and Quaas 2010). Emphasis on environmental benefits of smaller population size is derivative of Malthusian concerns of overpopulation and overconsumption of finite world resources. Garrett Hardin's classic article *Tragedy of the Commons* (1968) succinctly conveys this perspective.

The negative repercussions of population decline tend to receive more attention. Proponents of this perspective most often emphasize the negative economic effects of a shrinking population size. Declining populations can hinder economic growth, diminish tax bases and reduce demand for products and services, among other such problems. This issue is especially important in the context of welfare states because a shrinking population redounds to the evaporation of government revenues for social programs. This issue becomes doubly important given that declining populations often accompany an aging of the population, which can increase certain government outlays for programs like pensions and healthcare. Thus, public revenues decline while public expenditures increase. To remedy this, governments may have to raise taxes or cut services, both of which are likely to be met with some level of disdain from the population. A final form of harm associated with population decline stems from the intellectual loss associated with fewer people. Simply put, fewer people mean fewer scientific advancements, less entrepreneurship, less creativity and so on (see Kremer 1993).

Of course, countries have some tools at their disposal to ameliorate the problems generated by population decline. Modern-day Japan offers a snapshot of a country confronted with a shrinking population. The government has pursued some policies designed to address the

above-mentioned problems. Indeed, Japan is sometimes cited as a successful example of a country that maintains its strong economic position despite population decline. On the one hand, the country has been able to achieve economic growth while the fertility rate has remained among the lowest in the world. In 2018, Japan had the lowest unemployment rate of all G7 countries, and its share of the working age population in employment was at the highest level since the 1960s (Romei 2018). However, these indicators, and those like it, belie far more worrying trends. Japan's population declined by over 500,000 people in 2019, its ninth consecutive annual decline. Additionally, annual births—at around 900,000 in recent years—are the lowest since 1874. Japan's government estimates the workforce will shrink from 65.3 million in 2017 to 52.5 million in 2040, a 22 percent decline. These trends have prompted various policies designed to boost the fertility rate and the foreign-born worker population (Harding 2019a, 2019b; Dooley 2019).

Still other significant societal consequences flow from low fertility rates. For one, low fertility rates will alter the age structure of a society, eventually leading to overall older populations. Changing age structures of populations can induce what some scholars call a "demographic discontinuity." The term refers to "the disproportionate increase (or decrease) of a particular age group segment relative to other age segments" (Carlson and Kangun 1988:60). Carlson and Kangun suggest this demographic discontinuity may have contributed, alongside other social forces, to the surge in activism in the late 1960s and early 1970s and even to the consumerist "movement" that occurred in roughly this same period. In short, the authors claim the social unrest and consumerism of this time can be partially explained by the large spike in the youth population, who themselves were the result of high fertility rates beginning in the late 1940s, commonly known as the baby

boom. Additionally, shifting age structures can prompt political changes as older and generally more conservative political constituencies conflict with younger and more liberal ones (Frey 2015; Torres-Gil and Demko 2018-2019).

Conversely, a baby "bust" can induce significant social changes as well. Phillip Longman argues a baby bust could induce social-psychological changes that lead to a deep anti-war attitude. He writes, "In countries where parents generally have only one or two children, every soldier becomes…a soldier whose loss would mean overwhelming devastation to his or her family" (Longman 2004:70). This is also a demographic discontinuity, but it is an inversion of the earlier example. Here, the discontinuity stems from *fewer* younger people, rather than more.

Globally, these population processes will also transform national and regional economies, as well as geopolitical power alliances. In a comprehensive study published in the Lancet in 2020, researchers found that the global demographic composition will be radically upended this century (Vollset et al. 2020). By 2100, 183 countries will have a TFR lower than the replacement level, and many countries like China, Japan and Spain will experience steep population declines (of approximately 50 percent) compared to 2017 levels. Conversely, some countries like Nigeria, Egypt and Afghanistan will experience steep population increases. Furthermore, the age structures of most countries will be radically transformed by the century's end (Vollset et al. 2020).

In short, these examples highlight the metamorphic possibilities of the seemingly humble TFR. And we can see how demography, far from being a field situated exclusively in the realm of raw numbers, is deeply imbricated in manifold social forms and processes.

Fertility rates in the U.S. How alike or different is the U.S. regarding these demographic processes? Well, for one it has experienced the decline of fertility rates like other industrialized countries. The rate—1.73 in 2018—remains higher than most of its peer countries (World Bank 2020) but is still below the 2.1 replacement level. Secondly, the U.S. has had, especially over the last several decades, higher immigration levels than most other industrialized countries. Immigrants and their children and grandchildren were responsible for 55 percent of the U.S. population growth from 1965 to 2015 (Pew Research 2015). The U.S. fertility rate is buoyed by the fertility rate of its foreign-born population, which is higher than the native-born population. Though, by the second and third generations these higher rates often decline (Pew Research 2015). This is typical of most countries, but again, this feature is more pronounced in the U.S. because of this country's greater immigrant proportion in the population. According to a 2020 U.S. Census Bureau report on population projections, the U.S. would experience population decline over the next few decades if all immigration to the country immediately ceased (Johnson 2020). In 2017, 13.6 percent – or 44.4 million – people living in the U.S. were foreign-born (Radford 2019).

Fertility intentions. A micro-level manifestation of the rationalization mentioned earlier is evident in fertility intentions. As its name suggests, fertility intentions refer to a plan to have a child. Given it's individual-level focus, it is a concept frequently used by psychologists; though, it is a topic nonetheless important to many scholars in various fields. Conceptually, fertility intentions imply the number of children one has is the result of a reasoned or rational decision; it assumes a primacy of individual preferences regarding

family size. Theoretical and empirical contributions to fertility intentions often draw from the broader Theory of Planned Behavior (TPB) put forth by Icek Ajzen (1985). TPB is a social-psychological concept in which "perceived behavioral control is added to the theory of reasoned action as a determinant of intentions" (Bagozzi 1992).

A distinction must be made between ideal and intended number of children; the difference may appear subtle, but it is of crucial importance. Some studies have shown that people's ideal number of children is high. For example, decades-long polling on the subject by Gallup has shown Americans' *ideal* number of children to be stable at 2.6 children between 1978 and 2013 (Newport and Wilke 2013). However, an ideal is different from an intention. People may have a large ideal family size, but they may not necessarily intend to realize that ideal. Intentions are more precise and, thus, better suited for empirical research (see Miller 2011). A thorough investigation of fertility intentions requires a panel study in which researchers first record a respondent's intended number of children at some point in their life and follow up throughout the respondent's life to determine if the intentions are realized. Given this, complete analyses of fertility intentions will prove difficult.

That point aside, if we are to grant that the number of children is largely within the control of individuals, then how useful may discussions of fertility intentions be? An intention, after all, is simply an aim or a goal, which may be highly variable and unreliable as a meaningful subject of inquiry. Fortunately, empirical research shows fertility intentions to be a strong predictor of fertility behavior, though they often interact with other factors like income and partners' fertility intentions (Schoen et al. 1999; Thomson 1997; Westoff and Ryder 1977).

Unplanned pregnancies are an obvious complication to fertility intentions. Unplanned pregnancies accounted for 45 percent of all pregnancies in 2011; though, some of these desired pregnancy at a later point (Finer and Zolna 2011). So, unplanned pregnancies do not necessarily upend one's desired number of children, though they do upend the timing. Unintended pregnancies are also not evenly distributed across a population; it tends to be concentrated among Hispanic and black populations, as well as among people in poverty (Tapales and Finer 2015). Given its variability, a subset of research on fertility intentions focuses on the factors responsible for the realization or frustration of these intentions. These can be structural or personal factors. For example, the strength of a country's reproductive or family planning healthcare infrastructure can exert a great influence here (Bongaarts 1992).

Fertility intentions contribute to our understanding of fertility rates because they allow demographers "to get a better understanding of fertility behaviour and improve the accuracy of fertility forecasts" (Philipov 2011:38). As such, fertility intentions are a behavioral or cultural dimension to our understanding of fertility rates.

Environmental Sociology and Fertility Decisions

A burgeoning public debate in recent years centers around the efficacy of personal lifestyle solutions to environmental contamination or destruction. Some people make deliberate choices to reduce their impact on the environment, such as by eating less meat, driving a fuel-efficient vehicle or avoiding single-use plastics, among other similar lifestyle changes (DeSilver 2019). One major change these environmentally conscious people may make is

the decision to have fewer, or no, children. The rationale behind this decision may vary, but all are united by an overarching concern for the environment. There are several explanations for why people may choose not to have a child because of environmental concerns, as mentioned in the Introduction. To revisit, the first explanation is that people avoid the environmental impacts that are generated by an additional person over the course of their lifetime; this is essentially a neo-Malthusian concept that aligns with ideas of overpopulation and ecological planetary boundaries. The second explanation is that people avoid the ethical or moral dilemma associated with bringing additional people into a world beset by global warming and environmental catastrophes; this reasoning assumes that environmental calamities of various kinds will intensify over time in such a way that it is morally or ethically questionable to bring another human being into the world, knowing that these children will likely face hardships. The third explanation is that people choose to not have children as a political movement to demand pro-environment action. This form is unlike the previous two because the involved people don't necessarily intend to have fewer or no children indefinitely; rather, they are refusing to have children until enough pro-environmental changes are made.

Little research has been done to explore the relationship between individual-level environmental concern and fertility decisions, much less in accordance with the three explanations outlined above. One exception is the study by Arnocky, Depuis and Stroink (2012). They found environmental concern to be associated with fewer *intended* number of children, though the study was restricted to students of a single Canadian university. The study, one of the few done on this subject, found generalized environmental concern and health-related pollution concerns to be negatively associated with anticipated future

number of children. The study also found those students concerned about the environment generally had a less positive attitude toward having children (Arnocky, Depuis and Stroink 2012).

This issue expands beyond academia, too. In fact, the issue has permeated into the discourse of everyday life. In 2019, a UK woman named Blythe Pepino founded BirthStrike, a non-profit organization for people who decide to not have children because of the ecologically devastated world into which they will be born. In an interview with The Guardian, BirthStrike charitable campaigns manager states that the organization functions both as a support group and as a political statement (Hunt 2019). The following quote from the organization's FAQ summarizes the point of the movement:

> Members of Birth Strike have decided to make their personal decision not to bear children public as a way of drawing attention to the urgency of the climate crisis. A large majority of the earth's privileged population live in systemic disavowal of the danger we find ourselves in. We are in need of stories which break through these cognitive barriers and make our state of emergency a lived experience (BirthStrike n.d.).

Furthermore, U.S. Congresswoman Alexandria Ocasio-Cortez voiced similar concerns during an Instagram live-stream in 2019 when she said, "It is basically a scientific consensus that the lives of our children are going to be very difficult, and it does lead young people to have a legitimate question: is it OK to still have children?" (Hunt 2019)

Thus, it appears to be a salient concern for some, perhaps especially among young people. The decision for such people is an act of amelioration of perceived environmental harm,

relating, in various degrees, to the three iterations of concern mentioned earlier. These above-mentioned examples do not necessarily conform to the three explanations I outlined.

A popular paradigm in environmental sociology is the Ecological Modernization Theory (EMT). The theory draws from the broader Modernization Theory and other ideas related to rationalization. These ideas developed in the Industrial Revolution era, when sociologists, philosophers and other writers and thinkers theorized about the origins, implications and trajectories of those Western nation-states that rapidly transformed from agrarian, rural societies to industrial, urban ones (see Kumar 2016). The various economic, political and social transformations have generally been subsumed under rationalization. EMT postulates that environmental considerations will be increasingly included in political, economic and social decisions (Mol and Sonnenfeld 2000). The theory was developed by Western academics in the early 1980s to incorporate environmentalism into the social sciences; until then, the two fields had largely remained separate. EMT originally tended to emphasize environmental dimensions of technological innovations, private markets and Western nation-states, but more recently has come to emphasize consumption, non-European countries and global processes. According to Mol and Sonnenfeld (2000:6), EMT especially refers to "social and institutional transformations which have been and still are at the core of much current scholarship on ecological modernization."

Yet, EMT and its parent Modernization Theory are rife with criticisms. For one, modernization, since its genesis in the Enlightenment, has been an effort to emancipate society from tradition, authority and, crucially, from nature. If nature is to have a role in this new, "enlightened" world, it is to be the subject of domination. As Horkheimer and Adorno (2002:2) write in *Dialectic of Enlightenment*, "What human beings seek to learn

from nature is how to use it to dominate wholly both it and human beings." The representation of humanity and nature as a dualism or as antithetical, antagonistic forces provides an epistemological foundation that centers humans and disregards nature, which is constructed as "other."

This bifurcation of humans from nature is anthropocentric, and that criticism forms the basis for the new environmental paradigm (NEP), another central perspective in environmental sociology. The founders of the NEP, William Catton and Riley Dunlap, criticize (1978) the anthropocentricism of traditional sociology, which they condemn as thoroughly imbued with a "Human Exceptionalism Paradigm (HEP)" that obfuscates the role environmental factors play on sociological phenomenon. "The rise of environmental problems," write Catton and Dunlap, "signalled sharp departures from the exuberant expectations most sociologists had shared with the general public" (42). Furthermore, the authors argue, it has been easy for sociologists to believe in progress narratives when natural resources sufficiently provided for human societies. The recognition in recent decades of finite resources and ecological boundaries has cast doubt on indefinite human progress. In a word, these new realities amount to a new paradigm in sociology. They call for rethinking the "traditional Durkheimian norm of sociological purity" (44) and to include environmental factors in the study of social problems (Catton and Dunlap 1978).

I believe *aspects* of EMT can be combined with DTT and NEP to produce groundbreaking environmental sociology knowledge. Parts of the three concepts can be synthesized to explain demographic processes and their environmental implications. For one, the cultural dimensions of the DTT may be far more significant than many scholars have realized. Freedman (1979:2) writes that:

> Detailed study of the European fertility transition has shown that many areas that were culturally similar (for example in language or ethnicity) also moved together in changing fertility, without prime reference to socioeconomic developmental indices critical to transition theory.

If cultural similarity engendered a proliferation of similar fertility decisions among similar groups, then this gives weight to the possibility that environmental concern may spread among culturally similar people. This receives newfound importance given that culture has become increasingly globalized (Adams 2008; Baltzis 2005; Berger 1997; Holton 2000; Kearney 1995; Suárez-Orozco and Qin-Hilliard 2004; Von Eschen 2006). The growing interconnectivity of different cultures through the Internet is one critical manifestation and facilitator of cultural similarity. Global homogenization of culture may then wield a powerful influence upon fertility.

Specifically, an integration of these theories and perspectives could lead us to believe that in countries that have undergone the demographic transition, then an ecological enlightenment or awareness among residents of such countries may influence birth rates. The incorporation of environmental factors into demographic concepts and theories may yield important findings for a twenty-first century that is increasingly defined by environmental problems. We already know from DTT that birth rates dramatically decline, often to below replacement levels. We also know from EMT that countries undergo a "modernization" process which entails a transformation of politics and economy in such a way to include environmentalism in decision-making practices. NEP informs us that environmental factors have largely been excluded from sociological theories, research and discussions, and this occlusion may no longer be tenable given environmental crises. It

seems that DTT and EMT are approximately referring to the same countries; the two theories merely emphasize different social processes. Because demographic processes influence environmental conditions, and vice versa, a synthesis of these three concepts may prove fruitful.

So, as an empirical step in this new syncretic direction, it is important to examine environmental concern as an explanatory factor for plans to have children. In the following section, I examine how public concern for several environmental issues manifests in ways that shapes plans to have a child. I specifically analyze measures of environmental beliefs and actions and peoples' intended number of children in the hopes of gleaning greater insights into a perhaps significant influence upon fertility rates in the modern era.

DATA AND METHODS

Data

The data described here were collected through an online survey administered by the Center for Biological Diversity (CBD), a national, U.S.-based environmental non-profit organization. The scope and orientation of the survey was set by the CBD. The limitations inherent to the analysis of any pre-existing survey data apply here. I was a member of the data collection team.

The survey consisted of 29 questions, most of which were multiple-choice. The questions' subject matter encompassed a wide breadth of environmental issues, from climate change to wildlife extinctions and human population growth. These questions were sometimes

empirical, like 'Approximately how many listed threatened and endangered species do you think there are in the United States?', and sometimes they were ideational, like 'Do you think our society has a moral responsibility to prevent wildlife extinctions?' Respondents were also asked questions about their lifestyle habits and choices, often as they relate to the environment. For sensitive questions, like 'How many biological or adopted children do you already have?', respondents had the option to select 'I prefer not to answer.' Some questions were Likert-scale, but most were standard multiple-choice questions. Towards the end of the survey, we asked respondents a suite of demographic questions with categorical answer choices. These questions asked of their gender, race, educational attainment, income and other similar subjects.

The survey questions' structure lent itself to statistical analysis. Frequency proportions and logistic regression analyses were employed to better understand respondents' answers. Thus, the research question 'Does concern for environmental issues influence fertility plans?' could be answered through statistical analysis of these survey responses. I will now explain in greater depth the different measures taken to ensure a quality sample and a robust statistical analysis.

The desire for a nationally representative data set necessarily entailed a large sample size. Two criteria influenced the determination of sample size: a confidence level of at least 95 percent, and the limited availability of resources. To calculate a minimum sample size for a 95 percent confidence level, we used the Sample Size Calculator available online at OpenEpi[2]. We assumed a large population (N = 1,000,000), a 50 percent frequency in the

[2] Source: https://www.openepi.com/SampleSize/SSPropor.htm

population of each measure with +/- 3.5 percent confidence limits, and a design effect of 1.00. Given these criteria, a 95 percent confidence level required a minimum of 784 survey respondents. Given availability of resources, the CBD was able to fund a total of 899 surveys, after quality control removals (discussed later).

The survey was administered online: Survey Monkey was the survey platform; and the sample was recruited from the Amazon platform Mechanical Turk (MTurk). As these websites are relatively new, I will briefly explain how they function, and how we used them to deploy the survey.

MTurk allows "workers"—that is, anyone who signs up to MTurk—to complete "Human Intelligence Tasks" (HITs) from "requestors" for a set amount of pay. Most of the tasks on MTurk are surveys, often from market research firms or advocacy organizations like ours, or other kinds of small online tasks, like verifying receipts or Google searches. For this study, the CBD was the requestor and the 899 survey respondents were the workers. The workers were paid between $.60 - $1.00 per survey; this amount varied because of fluctuating availability of organizational resources and language considerations, discussed below. MTurk has the option to filter the available pool of workers by allowing requestors to set various requirements. These requirements can either be "Public", "Private" or "Hidden." Each category corresponds to the degree of visibility of the requirements to the workers. We applied the "Hidden" feature under "Task Visibility" in MTurk, which displayed our survey link to only those workers who met our criteria. Our only criteria were the state in which the worker lives.

Geographic representativeness to the U.S. population was paramount for the CBD and, thus, structured the deployment of this survey. We sought to recruit a sample with state

population proportions that approximated the estimates in the 2018 Current Population Survey (CPS). To achieve this, we made use of an MTurk feature that allowed us to limit the survey to workers by U.S. state. We then established minimum quotas for each of the 50 U.S. states and the District of Columbia proportionate to the population estimates found in the 2018 CPS for a total sample of 784. In addition to the MTurk state criteria, a survey question within the SurveyMonkey interface asked respondents the state in which they reside. Although we allotted a set number of surveys for each state through the MTurk interface criteria, some respondents selected a state that differed from their allotted state once in the SurveyMonkey survey. We used the self-reported state when categorizing respondents into states and then regions because we thought it to be more accurate than the MTurk state categorization. Because of this, and the Spanish version deployed without regard to U.S. state (discussed below), there emerged some geographic discrepancies in the final sample. However, we ultimately corrected for these discrepancies through the implementation of survey weights, discussed in the next sub-section. These states were then aggregated into larger U.S. regions—Northeast, Southeast, Midwest and West—for regional analyses. These regions conform to U.S. Census Bureau standards for regional divisions. Table 1 compares weighted sample proportions with 2018 CPS regional population estimates. Finally, the sample was also restricted to adults 18 years and older. Additional age verification within the survey ensured no one under the age of 18 took the survey.

Table 1

Regional Sample Composition, Compared to 2018 CPS Estimates

Region	U.S. Estimates	Total Sample (n=899)	Analytic Sample (n=424)
Northeast	56.1m (17%)	158 (18%)	74 (18%)
Midwest	68.3m (21%)	187 (21%)	88 (21%)
South	124.8m (38%)	341 (38%)	143 (34%)
West	78.0m (24%)	213 (24%)	119 (28%)

The survey was primarily administered in English, though a Spanish version was administered in a more limited capacity to increase participation by Hispanic respondents. As mentioned above, the CBD sought a large sample as representative to the U.S. population as possible. After administering the English survey to 762 respondents (22 respondents were removed for quality control reasons), Hispanics were underrepresented, registering at only 7.4 percent of the sample. In order to increase response rate among Hispanics, CBD deployed a national Spanish version of the survey, without regard to respondents' state of residence. These efforts succeeded, and the total Hispanic sample proportion increased to 14.6 percent.

Item non-response was intended to be an irrelevant factor in this survey because the structure of the SurveyMonkey interface is such that survey respondents cannot progress through each survey page with outstanding blank answer choices. While this method secures a complete sample, it also selects for respondents who want to answer the question. Respondents who do not want to answer the question may have simply exited the survey window. Given this structure, there should not have been any missing data in the final data

set. However, there existed a handful of missing data points, presumably owing to an occasional glitch somewhere in the survey administration and data downloading process. Given the exceedingly rare nature of such occurrences, I believe these missing data do not meaningfully alter the results or findings.

Weighting. Because geographic representativeness was of principal concern to the CBD, survey weights were constructed and applied to achieve a desirable proportion of respondents by state. Because we deployed surveys in proportion to their state's population proportion relative to the national U.S. population, these geographic weights amounted to only small corrections to the data. Survey weight values ranged from .523 in Wyoming to 1.156 in Michigan.

Quality control. Four quality control measures were implemented into this survey. Any survey respondent who met one of four criterions was eliminated from the sample and their responses were not included in any analysis herein contained. We eliminated respondents who completed the survey in less than four minutes because in trial surveys taken by the team, it took at least two minutes to get through the whole survey clicking but not reading anything. Given that the survey contains 29 questions, including a few elaborate matrix and logic questions, the team decided that if someone completed the survey in less than four minutes, then they very likely did not thoughtfully and purposefully read the questions contained there within.

The second quality control measure involved discrepancies in age and birth year. At the start of the survey, we asked for respondents' age and towards the end of the survey we asked for respondents' birth year. We eliminated any respondent whose age and age-calculated-birth year differed by more than one.

Third, we included in one of our matrix questionnaires a row that stated: "As part of our quality control, please choose 'not sure' for this row". We eliminated respondents who failed to select the answer choice.

The last quality control measure also concerned a matrix question. In a question that allowed multiple answers to be chosen yet some directly contradicted each other, if contradicting choices were chosen, we removed the record from the dataset. The relevant question asked respondents to select multiple answers regarding their willingness to talk to their partner, family and friends about the number of children they want; if they selected answers that directly contradicted one another, then the respondent was eliminated. For example, one respondent was eliminated because they selected all the following answer choices: "Currently doing this," "Will do this," "Wouldn't do this" and "Hadn't thought about it." Clearly, the answer choices are nonsensical and impossible.

In all, although some respondents may have been wrongly removed from the study, we believe these quality control measures ultimately ensured the integrity of the data. Respondents were removed ex post facto; that is, no respondent was shut out mid-survey based upon a disqualifying action at the time. Instead, all data were downloaded after survey completion, and I then applied the above-mentioned quality control measures, in sequential order, and removed respondents for any violation. In all, 81 records were removed from the data set.

Total and analytic sample. Geographic composition is represented in Table 1, above. In addition to its geographic representativeness, the total and analytic samples also closely resemble the racial and ethnic composition of the U.S. population. Racial and ethnic descriptive statistics for both samples alongside the 2018 CPS U.S. estimates are shown in

Table 2. In order to better understand the relationship between environmental concern and expected number of children, the analytic sample is restricted to respondents who a) currently have no children; and b) who are between the aged between 18 and 49. The age range was chosen to conform with standard demographic analytical standards for child-bearing age. Respondents of all genders were included in this study. After applying the above two metrics, there remains a final sample size of 424.

Table 2

Racial and Ethnic Sample Composition, Compared to 2018 ACS 1-Year Estimates

Race	**U.S. Estimates**	**Total Sample (n=899)**	**Analytic Sample (n=424)**
White[a]	236.2m (72%)	641 (71%)	285 (67%)
Black	41.6m (13%)	71 (8%)	29 (7%)
American Indian and Alaska Native	2.8m (1%)	9 (1%)	2 (1%)
Asian	18.4m (6%)	69 (8%)	49 (12%)
Native Hawaiian and Other Pacific Islander	.6m (0.2%)	2 (0.2%)	1 (0.3%)
Two or more races	11.3m (3%)	14 (2%)	7 (2%)
[a]*White alone, not Hispanic or Latino*	197.0m (60%)	583 (65%)	285 (67%)
Hispanic or Latino (any race)	59.8m (18%)	131 (15%)	73 (17%)
Non-Hispanic	267.4m (82%)	768 (85%)	351 (83%)

Measures

The dependent variable is the answer to the following survey question, “How many additional biological children do you expect to have in the future? (Mark only one)” The

answer choices are, “Zero,” “One,” “Two,” “Three,” “More than three” and “I prefer not to answer.” I recoded the responses as 0 indicating a preference for no children, and 1 indicating a preference for one or more children. Those who selected “I prefer not to answer” were not included in this study.

Key independent variables and their recoding are shown in greater detail in Table 3. These variables were included in the study because they measure a respondent’s level of environmental concern. The variables are an amalgam of measures of beliefs and actions. For example, one variable measures a respondent’s ranked importance of the climate crisis, while another variable measures if the respondent has reduced their personal consumption. Measures of beliefs and actions capture different aspects of environmental concern. For this study, beliefs and actions are treated equally; that is, one variable is not privileged as being indicative of more environmental concern than another. The first column from the left shows the survey question text, the second column shows response categories as they appeared on the survey and the last column shows how each item is recoded. A score of 0 indicates a non-environmentally friendly answer choice; a score of 1 indicates an environmentally friendly answer choice. There are seven dichotomous independent variables.

Table 3

Independent Variable Detailed View

Survey Text	Possible Answer Choices	Dichotomization
Please indicate the level of importance each topic listed below is to you: Climate Crisis	1) Not at all important 2) Slightly Important 3) Moderately Important 4) Very Important 5) Critically Important	0=(answer choices 1,2&3) 1=(answer choices 4&5)
Please indicate the level of importance each topic listed below is to you: Wildlife Extinctions	1) Not at all important 2) Slightly Important 3) Moderately Important 4) Very Important 5) Critically Important	0=(answer choices 1,2&3) 1=(answer choices 4&5)
Do you think our society has a moral responsibility to prevent wildlife extinctions? (Mark only one.)	1) Yes 2) No 3) Not sure	0=(answer choices 2&3) 1=(answer choice 1)
Do you think the United States is doing too much, too little, or the right amount to protect natural resources like water, air, wildlife and land? (Mark only one.)	1) Too much 2) Too little 3) Right amount 4) Not sure	0=(answer choices 1,3&4) 1=(answer choice 2)
Do you think the average American consumes (mark only one):	1) Too many natural resources 2) Too few natural resources 3) About the right amount of natural resources 4) Not sure	0=(answer choices 2,3&4) 1=(answer choice 1)
In comparison to the average American, do you think you consume (mark only one):	1) More resources than the average American 2) Fewer resources than the average American 3) About the same amount of resources as the average American 4) Not sure	0=(answer choices 1,3&4) 1=(answer choice 2)
What activities below have you done in the past? (Check all that apply): Reduced my personal consumption by buying only what I need	(Check box style question)	0=(did not check the checkbox) 1=(checked the checkbox)

A continuous age variable and a categorical education variable were used as control measures. Age was chosen to further account for the effects of age, beyond the restrictions imposed in the analytic sample. The levels within the education variable are "High school or less," "Some college and Associate's degree" and "Bachelor's and graduate degree." The category "High school or less" is the reference category. Educational attainment was chosen as a control variable because it is a common predictor of women's fertility plans (Brand and Davis 2011), and because there exists an *inverse* relationship between educational attainment and *unintended* pregnancy (Finer and Zolna 2011).

Analytic Strategy

In order to examine the association between environmental concern and fertility choices, this research uses logistic regression analysis. As mentioned earlier, the research question guiding this thesis is 'Does concern for environmental issues influence fertility plans?' Different measures of environmental beliefs and actions are used to predict whether respondents intend to have any children in the future. Logistic regression is the most suitable because this thesis explores if having *any* children could be meaningfully predicted by various measures of environmental beliefs and actions. Because the dependent variable is dichotomous, I conducted a binary logistic regression. This statistical model is best suited because outcomes of having children vs not having children is a naturally binary measurement. The seven independent variables are also dichotomous, though this is not a requirement for the model. Educational attainment, measured categorically, and age, measured continuously, are the control variables. I ran two binary logistic regression models, the first is without the control variable and the second is with the control variable.

RESULTS

Descriptive statistics for the dependent and independent variables are shown in Table 4. Fifty-one and a half percent indicated they expect to have no children, 41.7 percent indicated they will have some children and 6.8 percent indicated they prefer to not answer. Of all the independent variable measures of environmental concern, the highest level of concern expressed are those who answered yes to a question, "Do you think society has a moral responsibility to prevent wildlife extinctions?" Eighty-seven percent of respondents agreed with this statement. Conversely, the measure that generated the least agreement was the question that asked, "In comparison to the average American, do you think you consume (mark only one)" wherein 48.3 percent of respondents believed they consume fewer resources than the average American. High concern for the climate crisis and wildlife extinctions—measured as those who selected "very important" or "critically important" in a Likert-scale question—generated 70.4 percent and 54.7 percent agreement, respectively.

Table 4

Descriptive Statistics of Dependent and Independent Variables

	Those with No Children and Ages 18-49
Dependent Variable Those who want no future children (yes=1)	55.3%
Independent Variables Has high concern for climate crisis[a]	70.4%
Has high concern for wildlife extinctions[a]	54.7%
Society has moral responsibility to prevent wildlife extinctions	87.1%
U.S. doing too little to protect natural resources	79.4%
Average American consumes too many natural resources	80.0%
In comparison to the average American, respondent consumes fewer resources	48.3%
Has reduced personal consumption	67.2%

[a] High concern includes those who indicated the variable as "very" or "critically" important

The results of the binary logistic regression are shown in Table 5 below. Results in Model 1 show that belief that society has a moral responsibility to prevent wildlife extinctions is statistically significant at the .05 level. Additionally, reducing one's personal consumption is statistically significant at the .10 level. However, the association loses its statistical significance when the control variables are added to the model. In Model 2, belief in a societal moral responsibility to prevent wildlife extinctions remains significant, though now at the .10 level. Reduction in personal consumption no longer remains statistically

significant. Results for the educational attainment variable are somewhat surprising, as they show that respondents with a Bachelor's or graduate degree are more associated with a plan to have a child. This contradicts some of the literature that establishes educational attainment as a predictor of fewer children. However, this finding may be because this model measures an intention to have children, not actual number of children. Similarly, results for age show the association increasing with older respondents.

Analysis of the odds ratio yields more findings. People who believe society has a moral responsibility to prevent wildlife extinctions are about half as likely to intend to have children, both with and without controlling for education and age. Furthermore, without controls, people who reduced their personal consumption are 45 percent more likely to intend to have children. Both control measures generated statistically significant results. For the educational attainment variable, those with a Bachelor's or graduate degree are associated with plans to have a child. Higher age, measured in years, is also associated with plans to have a child.

Table 5

Binary Logistic Regression Predicting Plan to have a Child, Odds Ratio		
	Model 1	**Model 2**
Environmental Concern Measures		
Concern for climate crisis	1.123 (.268)	1.264 (.284)
Concern for wildlife extinctions	.928 (.231)	.807 (.245)
Society has moral responsibility to prevent wildlife extinctions	.468 (.360)**	.506 (.377)*
U.S. doing too little to protect natural resources	1.306 (.292)	1.564 (.314)
Average American consumes too many natural resources	1.309 (.281)	1.055 (.298)
In comparison to the average American, respondent consumes fewer resources	1.051 (.208)	1.041 (.219)
Reduced personal consumption	1.454 (.222)*	1.364 (.235)
Educational Attainment		
High school or less (ref)	–	–
Some college, Associate's degree, trade, technical, or vocational training	–	1.485 (.380)
Bachelor's or graduate degree	–	2.255 (.363)**
Age [in years]	–	.904 (.017)***
Constant	.683 (.183)	9.802 (.607)
Chi-square	4.995 (7 df)	10.817 (8 df)

Note: Numbers in parentheses are standard errors
* p < .10; ** p < .05; *** p < .01

CONCLUSION

This foregoing study is an important beginning inquiry into the intersection of environmental concern and fertility decisions. From the descriptive statistics, it is noteworthy to find that a question about the morality of preventing wildlife extinctions generated the most agreement, while a question about respondents' personal consumption relative to others generated the least agreement. The two questions refer to different aspects of environmental protection: a social responsibility and a personal responsibility, respectively. These may reflect respondents' political beliefs or worldview. The question about wildlife extinctions refers to *society's* responsibility to protect species from extinction, whereas the question about reducing personal consumption relative to other Americans refers to the *personal* responsibility of individuals. The societal moral responsibility to prevent wildlife extinctions question touches upon broader political dialogues about the role of the state in environmental protection. The logistic regression results suggest that belief in a societal moral responsibility to prevent wildlife extinctions is associated with people's plan to have a child, albeit with a weak statistical significance. However, it is possible this weakness is attributable to the rather small sample size (n=424). Intriguingly, this belief was the most—and only—statistically significant association of an environmental concern variable with future number of children among childless people, when controlling for education and age. Furthermore, the only independent variable that produced odds ratios of less than one involved wildlife extinctions. Without controls, people who believed in a moral responsibility to prevent wildlife extinctions are about 50 percent less likely to intend to have any children. Given that many scientists state that Earth is currently undergoing a mass extinction event, the sixth in this planet's history (Barnosky

et al. 2011; Ceballos, Ehrlich and Dirzo 2017; Wagler 2012; Wake and Vredenburg 2008), this connection takes on a new meaning. Yet, what is the connection between belief in people's belief in *societal* moral responsibility to prevent wildlife extinctions, and the *personal* imperative to have fewer children? This research does not answer that question, but it establishes that such a connection exists. Future research could begin on this point. Furthermore, this research connects the human and the environmental spheres of inquiry, two categories that have long been bifurcated in Western thought. Understanding that human fertility plans are influenced by belief in a societal moral responsibility to prevent wildlife extinctions is a critical reconnection of disparate, yet greatly important phenomena: population processes and planetary wildlife extinction. This research helps us to better understand the Anthropocene and the effects it will continue to induce among people.

This study is not without its limitations. For one, measures of perceptions, attitudes and actions are self-reported in surveys; though this limitation is a general feature of this research method. Another criticism may be the wording of the questions. For example, the phrase 'climate crisis' implies a sense of urgency and calamity that may induce bias among respondents. However, respondents' Likert-scale ranking of 'wildlife extinctions' *did not* produce statistically significant results either, despite the similar negative connotation and the sense of urgency implied in 'extinctions.' The survey contained twenty-nine questions in total, and only a few questions were about fertility. An important limitation arises from the sample recruitment platform MTurk. The MTurk population is not the general U.S. population. Notably, the use of this sampling frame *does not* entail a simple random sampling method; rather, users choose to take our survey. MTurk also generated a sample

that skewed younger and more educated. It is then probable that respondents' beliefs and actions were skewed in a more pro-environmental direction, as younger Americans tend to be more environmentally conscious (Funk and Tyson 2020). Although the sample approximated state population proportions, there was nonetheless an undersampling of older and less-educated Americans, as well as a slight under sampling of some (notably Hispanic and black) racial and ethnic groups. However, this sample's youthful skew may inadvertently be advantageous to this study, as younger Americans are the population most responsible for childbearing and, thus, more likely to have a fertility intention. Despite its drawbacks, MTurk is a suitable means for obtaining a quality sample, as the platform has been used in peer-reviewed and published academic articles (see Paolacci and Chandler 2014 and Shank 2016 for an overview of the MTurk platform). A final criticism of this research may be that environmental concern is not necessarily an environmental factor, as it is a human mental state. In response, I believe that environmental concern can only exist if people have some concept of a verifiable, outer environment. External environmental conditions exert influence on people's mental states, which can be measured. That someone is concerned about wildlife extinctions is itself proof of the environment inducing changes within people.

There are important implications of this study. Since belief in a societal moral responsibility to prevent wildlife extinctions is associated with plans to have children, then more consideration ought to be given to environmental concerns as determinants of plans to have children. Demographers may incorporate these environmental factors in their calculations of global fertility rates. Specifically, the connection between moral responsibilities regarding wildlife conservation and childbearing plans deserves further

analysis. Epistemologically, this research touches upon sociology, demography, development studies, environmental studies, psychology and philosophy, especially ethics.

These findings point to possibilities for future research. For one, the connection between belief in moral responsibility to prevent wildlife extinctions and intention to have children requires further examination. It is unclear if the morality or wildlife extinction aspect of the independent variable is more determinative of fertility intentions. Deeper connections could be made between the ongoing wildlife extinction crisis and people's fertility intentions (or other measures of environmental actions). NEP scales have been constructed to assess people's ecological worldview (Dunlap and Van Liere 1978; Dunlap et al. 2000), and these scales have been successfully applied in various kinds of environmental sociology research (see Burn et al. 2012; Evans et al. 2007; Kaltenborn, Bjerke and Strumse 1998; Kanagy and Willits 1993). Subsequent research could employ these measurements to more methodically assess people's degree of environmental concern. Future research could, more broadly, further interrogate the role of morality and worldview in fertility intentions.

As the world fertility rate continues to fall, the effects of global population decline will become increasingly apparent. Indeed, in some parts of the world the effects of low fertility are already a reality. There are certainly going to be profound effects of this worldwide below-replacement fertility rate. From shrinking workforces to increased social program outlays and greater need for immigration, the demographic processes of the twenty-first century will dramatically reconfigure economic power and reshape the world. There will also be environmental effects resulting from demographic changes because there is no hard division between the social and natural world. The rich history of sociology, demography

and other fields provide us the tools to better understand these demographic forces. Vast bodies of scholarly works have explored the various determinants of fertility rates, to which we are indebted. However, heretofore environmental concern has largely been excluded from these analyses. Part of this deficiency stems from the ideological parameters set by sociology and other social sciences that have generally excluded environmental factors in favor of factors deemed purely "social." Yet, in recent decades these parameters—destabilized by environmental conditions like oil crises and global warming—have slowly been redrawn to include ecological characteristics and variables. Still, many scholars in the social sciences neglect the environment. Given the impending disruptions and uncertainties presented by the Anthropocene—like global warming and a widespread extinction crisis—these academic parameters will continue to destabilize. Social scientists must include the environment in future theoretical and empirical works.

In this thesis, I attempted to wed our understandings of fertility and environmental concern, a largely unexamined and neglected scholarly intersection. The most notable results show there exists some connection between moral responsibility, wildlife conservation and personal fertility intentions. Future research can either scrutinize this relationship in greater detail, or further expound upon others such connections. A more complete understanding of our world is possible only when our theoretical and empirical boundaries are redrawn to include social-environmental components, in all their forms.

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