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ADVANCED REVIEW



A scoping review of the green parenthood effect on environmental and climate engagement

Trisha R. Shrum¹ | Natalie S. Platt² | Ezra Markowitz³ | Stylianos Syropoulos⁴ ^D

¹Department of Community Development and Applied Economics, University of Vermont, Burlington, Vermont, USA

²Department of Psychology, University of Vermont, Burlington, Vermont, USA

³Department of Environmental Conservation, University of Massachusetts Amherst, Amherst, Massachusetts, USA

⁴Department of Psychological and Brain Sciences, University of Massachusetts Amherst, Amherst, Massachusetts, USA

Correspondence

Trisha R. Shrum, Department of Community Development and Applied Economics, University of Vermont, Burlington, VT 05405-0160, USA. Email: tshrum@uvm.edu

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Abstract

We review the existing literature on the role of parenthood as a motivator of environmental engagement (the green parenthood effect), focusing particularly on climate change. We find that parenthood is severely understudied as a mechanism that may influence climate change-relevant behavior. The literature on the role of parenthood in driving environmental engagement is mixed, due in part to the role of baseline individual and group characteristics that lead to different impacts of parenthood on environmental engagement as well as to the countervailing impact of intense time and budget constraints imposed by parenthood. Some studies suggest that parenthood increases proenvironmental engagements, while others find no effects or negative effects. We theorize that potential mediators and moderators need to be taken into account to get a clearer picture of how parenthood influences pro-environmental engagement. We highlight underlying proposed mechanisms that might be activated during the transition to parenthood (i.e., legacy motives, generativity, perceived responsibility), potential moderators of the green parenthood effect, and insights for public engagement.

This article is categorized under:

Climate, Nature, and Ethics > Climate Change and Global Justice

- Perceptions, Behavior, and Communication of Climate Change > Social Amplification/Attenuation of Climate Risks
- Perceptions, Behavior, and Communication of Climate Change > Behavior Change and Responses
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KEYWORDS

climate change, environmental behavior, generativity, legacy, parenthood

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1 | INTRODUCTION

In 1990, Margaret Thatcher implored the Second World Climate Conference to act swiftly on climate change by appealing to the sense of duty we have to leave a legacy for our children and grandchildren, "We must remember our duty to Nature before it is too late... It will weigh on our shoulders for as long as we wish to dwell on a living and thriving planet, and hand it on to our children and theirs." (Thatcher, 1990). Twenty-three years later, President Barack Obama called on Americans to consider the impact of climate change on today's children: "As a President, as a father, and as an American, I'm here to say we need to act. I refuse to condemn your generation and future generations to a planet that's beyond fixing" (Obama, 2013). Framing his call to action as coming from his role as a parent, in addition to his role as the President, reflects a rhetorical approach that is often used to relate the motivations that drive people to take action to reduce climate change. President Obama went on to pose a question that focuses his audience on their climate legacy by envisioning the future looking back on our present-day choices: "...someday, our children, and our children's children, will look at us in the eye, and they'll ask us, did we do all that we could when we had the chance to deal with this problem and leave them a cleaner, safer, more stable world?" This problem frame brings together parenthood with a focus on legacy and a call for responsibility for the future impacts of current choices as a way to spur action on climate change—but does it work? These topics are understudied in the multi-disciplinary environmental behavior literature (for a call to study these issues, see Shiel et al., 2020).

This cross-disciplinary scoping review evaluates the state of science on the role of parental status in driving climate concern, climate-specific personal and political actions, and general pro-environmental behaviors (Section 2). The "green parenthood effect," as we call it in this review, is the theoretical idea that parenthood increases proenvironmental engagement (i.e., attitudes, concerns, and behaviors). Becoming a parent may increase one's legacy focus, generativity, and sense of responsibility for younger generations; each of these mechanisms has well-established ties to pro-environmental engagement (Section 3); there are also important moderating factors that may increase or decrease the green parenthood effect (Section 4). With this theoretical basis, we review the empirical literature to evaluate the evidence for and against the "green parenthood effect" (Section 5). We find mixed evidence of a pattern pointing to two critical factors in the green parenthood effect: (1) the countervailing force of the limitations parenthood places on people's time, money, and attention, and (2) the importance of baseline environmental values and beliefs, with the shift to parenthood intensifying latent beliefs into drivers for engagement.

Parents also have a key role in the intergenerational transmission of pro-environmental engagement with the transmission of values and behaviors moving both from parents to children and from children to parents (Section 6). The research on the topic of the green parenthood effect is quite diffuse and sparse, and we lay a framework for future research by bringing together key themes and findings from the literature (Section 7). Parents make up a majority of the adult population across the world, and tailored outreach efforts may help amplify the green parenthood effect and lead to deeper public engagement in the fight against climate change (Section 8).

2 | REVIEW SCOPE

This review focuses primarily on quantitative studies that explore the intersection between parenthood and climate change as well as legacy and/or generativity and climate change. We have attempted to compile a thorough crossdisciplinary account of the literature at these two specific intersections. Much of the quantitative work at these intersections arises from the field of psychology; however, we also review quantitative and some qualitative work from sociology, economics, anthropology, education, gender studies, political science, and interdisciplinary social science. After a primary search via google scholar and web of science focusing on paired search terms: parent*, mother*, father*, intergenerational, legacy, or generativity AND climate or environmental, we looked for additional papers not found in the primary search but cited by relevant studies we reviewed. Although comprehensive, our search is still likely to have missed potentially valuable published work.

All papers from reputable peer-reviewed journals that measured and reported a quantitative relationship between parenthood and pro-environmental behavior met our inclusion criteria. In addition, we include qualitative studies that provide additional insights into parenthood and pro-environmental behavior. We cite representative papers and discuss the much larger literature on intergenerational considerations in climate change and other issues that span long time periods, but we do not attempt a full review of that literature. We also discuss the connections of these topics to research on psychological distance, identity, and gender socialization theory. However, thoroughly covering those subjects is outside the scope of this review.



2.1 | Parenthood

Parenthood can be broadly interpreted beyond biological and adoptive parents to include long-term guardians and caregivers regardless of their legal or biological relationship. Depending on the emotional closeness of various extended relationships to a younger person, the concept of parenthood could extend to varying degrees to godparents, aunts and uncles, professional caregivers, and friends. Indeed, the sense and strength of identity as a parent or guardian is potentially more important than the formal nature of the relationship between the adult and child. As children grow into adults, parenthood continues to connect older adults to younger generations even though the nature of that relationship changes. The role of a grandparent also takes a special place under the category of parenthood. We broadly define grandparents as elders with close emotional bonds to young people who belong to a generation at least twice removed from the elder's generation. While we argue for a broader definition of parenthood, most studies define parenthood narrowly, specifically focusing on adults with children ages 18 or younger. This is a limitation of the current literature.

Further, arguments exist proposing that having fewer children, or not having children at all, constitutes a choice that potentially has the largest environmental impact, bigger than that of any pro-environmental behavior in which an individual could engage (Nakkerud, 2021). Such arguments present an interesting nuance to our focus on the interaction between parenthood and climate legacy. Environmentally conscious individuals may make the decision to forgo having children to minimize their ecological impact or because of their concern for the state of the environment their potential children would be left with in the future (Helm et al., 2021). With one out of four child-free adults citing concerns about climate change as a major or minor reason contributing to their decision to not have children (Morning Consult, 2020), it is possible that environmentally motivated decisions to refrain from parenthood could create downward bias in the green parenthood effect.

3 | PSYCHOLOGICAL MECHANISMS AS PATHWAYS FOR THE GREEN PARENTHOOD EFFECT

Before reviewing the empirical literature, we first turn to the psychological mechanisms and logistical factors that may drive or inhibit the green parenthood effect. Some of these are fairly straightforward, such as increased time, attention, and budgetary demands that parenthood creates, especially when children are young. Other mechanisms may be more nuanced and indirect in their impacts, operating in part through the activation of key underlying psychological mechanisms that are known antecedents of attitudes and behaviors relevant to climate change (and the environment in general). Here, we focus on three mechanisms that have been empirically and theoretically identified in recent research and are also related to parenthood: (1) legacy, (2) generativity, and (3) perceived responsibility towards future generations.

Although conceptually overlapping to some extent, each of these factors constitutes a unique and distinguishable pathway toward pro-environmental decision-making. Legacy motives are defined as "an enduring meaning attached to one's identity and manifested in the impact that one has on others beyond the temporal constraints of the lifespan" (Wade-Benzoni, 2019). Legacy motives focus attention on how individuals can make sense of their own mortality and cope with said mortality in a way that is prosocial and positively impactful to (future) others.

In contrast, generativity is defined as "the propensity and willingness to engage in acts that promote the well-being of younger generations as a way of ensuring the long-term survival of the species" (Flett, 2018). Generativity is distinguishable from legacy motives primarily through the exclusive focus on other-oriented action and concern, with no theorized connection to coping with concerns about one's own mortality (McAdams & Aubin, 1992; Wade-Benzoni & Tost, 2009).

Perceived responsibility towards future generations is "a sense of (moral) obligation towards future generations" (Watkins & Goodwin, 2019). Whereas generativity is theorized to focus on the desire to transfer specific skills and knowledge to future generations and legacy motives involve both altruistic and egoistic drives to provide for future others, perceptions of responsibility are generally theorized as less specific with respect to behavioral targets and more all-encompassing due to their moral nature. Although these mechanisms are positively correlated with one another, empirical evidence supports the theoretical distinctions being made among them (e.g., Zaval et al., 2015). Moreover, and critical from a behavior-change perspective, research has illustrated that distinct factors activate each of these three pathways.

3.1 | How parenthood activates intergenerational psychological mechanisms

The transition to parenthood has significant and wide-ranging impacts on our psychological makeup. One relevant impact in the context of climate change engagement is increased existential anxiety (i.e., concerns about one's mortality, see Solomon, 2019). For example, mortality salience (i.e., being aware of one's own mortality) has been linked to increased accessibility of parenthood-related cognition (Yaakobi et al., 2014). Given this impact of mortality salience, parents may sometimes focus on building a lasting legacy as a method of dealing with this existential threat. Supporting this claim, one study finds that parents have higher legacy motives than nonparents (Shrum, 2021) and experimental studies find that mortality salience manipulations increase the endorsement of legacy concerns and subsequent climate-friendly action (Hurlstone et al., 2020; Zaval et al., 2015).

The impact of parenthood on generativity is even more direct. Although generativity is thought to be a psychological phenomenon present across different stages of life, there is some evidence to suggest that it is more salient in midlife (McAdams et al., 1993; Newton & Stewart, 2010) and later stages of life (Gruenewald et al., 2012; Stewart & Vandewater, 1998). Importantly, evidence has emerged linking parenthood (Aubin & McAdams, 1995; Newton & Baltys, 2014) and grandparenthood (Newton & Baltys, 2014) with increased generativity; this highlights a fairly straightforward pathway from parenthood to climate change engagement. For example, Milfont et al. (2020) proposed generativity as the link between parenthood and pro-environmental engagement. With a separate study on generativity, motivated by their work on the green parenthood effect, Milfont and Sibley (2011) found that generativity predicted environmental attitudes and behavior even after controlling for future orientation and humanitarian values, a finding confirmed by contemporaneous work (Urien & Kilbourne, 2011).

Although the link between parenthood and perceived responsibility towards younger generations has received relatively less empirical attention, there are two main theoretical arguments for its existence. First, (most) parents exhibit a sense of responsibility towards their children, and they strive to raise them in a responsible manner. Second, caretaking includes the motivation to raise children in a safe and protected environment. These arguments come together and extend into future generations to create an ethical argument for parents' special duty to address climate change (Cripps, 2017; Gheaus, 2016; Howarth, 1992).

3.2 | Intergenerational psychological mechanisms, climate change, and proenvironmental engagement

3.2.1 | Legacy motives

Work by Wade-Benzoni and colleagues has provided conclusive evidence for the prosocial effect of legacy motivation in intergenerational decision-making contexts (Fox et al., 2010; Wade-Benzoni, 2019; Wade-Benzoni & Tost, 2009). Experimental studies have shown that making legacy motives salient increases pro-environmental decisions with regard to climate change (Bang et al., 2017; Grolleau et al., 2021; Shrum, 2021; Wickersham et al., 2020; Zaval et al., 2015) In a similar vein, Hurlstone et al. (2020) illustrate that activating participants' legacy motives by using persuasive messages promoting death awareness, highlighting power asymmetries, or instilling a desire for stewardship towards future generations because of the generosity of past generations mitigates the negative effect of intergenerational discounting in a climate change goods game.

3.2.2 | Generativity

Although studies linking generativity with specific climate change attitudes are scarce, a plethora of evidence links generativity with general pro-environmental attitudes and behaviors. One line of research has determined that engaging in generative behaviors is a crucial part of forming an environmentalist identity (Alisat et al., 2014; Chan, 2009; Horwitz, 1996; Matsuba et al., 2012). Research has also linked generativity with pro-environmental attitudes (Jia et al., 2015; Jia et al., 2016; Milfont & Sibley, 2011; Wells et al., 2016). Generativity has also been shown to explain the effects of political ideology on pro-environmental attitudes (Barnett et al., 2019). In terms of individual behaviors, increased generativity is associated with increased green consumption values and purchasing behavior (Giménez García-Conde et al., 2016; Shiel et al., 2020; Urien & Kilbourne, 2011), with this effect mediated by elevated environmental concern (Afridi et al., 2021). Generativity in young people has also been linked to increased environmental behaviors (Pratt et al., 2013). Thus, even though the link between generativity and climate change has not been studied extensively, generativity has clear and wellestablished impacts on pro-environmental identity, attitudes, and behaviors.

3.2.3 | Perceived responsibility

The positive effects of perceived responsibility on intergenerational stewardship and climate change engagement are similarly consistent. Research by Syropoulos et al. (2020) illustrated that perceived responsibility towards future generations positively relates to belief in climate change, higher pro-environmental attitudes, and elevated pro-environmental policy support. Further, Syropoulos and Markowitz (2021) found that increased perceptions of responsibility towards future generations related positively to 18 different pro-environmental outcome variables. Experiments that manipulated perceptions of past generations found that when past generations sacrificed resources for the benefit of the present generation, perceived responsibility towards future generations increased, which was linked to increased self-reports of environmental engagement (Watkins & Goodwin, 2019).

4 | MODERATORS OF THE LINK BETWEEN PARENTHOOD AND CLIMATE ENGAGEMENT

Considering the mixed evidence for the effect that parenthood has on environmental and climate change engagement, it is important to explore likely boundary conditions and moderating factors that can help account for the heterogeneity in the literature.

4.1 | Demographic factors

4.1.1 | Gender

Early research on the green parenthood effect focused on the "Parental Roles Hypothesis," which predicts that parenthood heightens women's environmental concerns and dampens men's environmental concerns. The hypothesis arose from the observation that women tend to be more concerned about environmental issues than men (Stern et al., 1993) and gender socialization theory, which focuses on how women tend to be socialized to focus on caregiving, leading to higher sensitivity to concerns about health and safety while men are socialized to focus on providing, leading to higher sensitivity to concerns about income and economics (Davidson & Freudenburg, 1996). A review of the literature on gender and environmental concern examined the "Parental Roles Hypothesis" and found a fairly consistent positive green parenthood effect for women and mixed results for a negative green parenthood effect for men (Davidson & Freudenburg, 1996). This effect is more prominent in environmental justice activism, where women outnumber men by a strong margin (Bell & Braun, 2010), but more systematic studies are needed.

4.1.2 | Socioeconomic status (income and education)

Having a child increases both the per capita environmental footprint of a family as well as the material costs of supporting the family (Nordström et al., 2020; Poortinga et al., 2004). Families without tight income constraints have more available resources to contribute to issues that exceed the scope of day-to-day life, such as climate change. A family of higher socioeconomic status will be more able to afford an electric vehicle, solar panels, and organic products, but will tend to have a higher environmental impact due to higher levels of income and consumption. However, to date, socioeconomic status has not been well explored as a moderator of the parent-environment effect.

4.1.3 | Political affiliation and ideology

Political affiliation or ideology may influence the link between parenthood and climate change (for a review, see Jacquet et al., 2014). Meta-analytical research conducted on 69 studies published from 1974 until 2014 illustrates that

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those who identify with a more politically right-leaning party or hold politically conservative beliefs express less concern towards the environment (Cruz, 2017). In fact, political ideology has been shown to moderate the link between climate change beliefs and climate-related worry in representative samples of 23 different European countries (Gregersen et al., 2020). The extent to which a parental identity might amplify a pro-environmental identity could be moderated by political identity. Thus, we theorize that those who hold beliefs or identify with political groups that place less emphasis on environmental sustainability might also be unaffected by the potential green parenthood effect on pro-environmental attitudes and behaviors.

4.2 | Culture

4.2.1 | Individualism–Collectivism and Tightness–Looseness

In a recent perspective, Eom et al. (2016) discuss how a nation's cultural orientation towards individualism versus collectivism could potentially moderate the association between pro-environmental attitudes and action. On one end of this cultural dimension is an emphasis on individual goals, behaviors, and rights (i.e., individualism), while on the opposite end, emphasis is placed on group goals, collective well-being, and personal relationships (collectivism; Triandis et al., 1988). In individualistic cultures, pro-environmental actions are influenced primarily by a person's environmental attitudes, while in collectivist cultures, pro-environmental decision-making relies more heavily on expectations and norms set by the group (Eom et al., 2016; Tam & Chan, 2017). Thus, it is possible that in nations where greater emphasis is placed on social relationships, group norms, and expectations, becoming a parent might elicit a greater sense of obligation towards one's offspring, thus leading to an elevated concern for the environment. In individualist cultures, there may be a stronger tendency for parenthood to increase a bunker mentality in response to climate change concerns where the focus is placed on shoring up financial resources for one's own family.

A similar relationship is expected for the cultural orientation of tightness. Nations with a greater degree of cultural tightness emphasize adherence to and punishment for deviance from norms to a greater degree than nations characterized by a loose culture (Gelfand et al., 2011). In fact, a study focusing on the moderating factors for the link between personal values and pro-environmental action found that cultural tightness is a significant moderator, such that those who place greater emphasis on adherence to group norms had a stronger association between their (self-transcendence) values and pro-environmental behaviors (Elster & Gelfand, 2021).

4.2.2 | Existing attitudes

A final potential moderating factor is existing beliefs and concerns about the environment, legacy motivations, and generativity, as well as the individual role one has in pro-environmental efforts. It is possible that parenthood might not elevate concerns for the environment for those who were already not concerned about such an issue. Instead, those who had a preexisting concern about the environment could become even more concerned after the birth of their child. For example, the impact of a climate legacy intervention was strongest for people who reported (postintervention) a strong sense of climate action efficacy or a high level of concern that climate change would negatively impact their kids (Shrum, 2021). Similarly, in another experimental study, the perceived efficacy of individual pro-environmental behavior was found to be a critical moderator of affinity with future generations on environmental stewardship (Hensen et al., 2016).

5 | EMPIRICAL EVIDENCE ON PARENTHOOD AND ENVIRONMENTAL ENGAGEMENT

Our review of the evidence suggests that while becoming a new parent does not necessarily increase general environmental concerns and pro-environmental behaviors, it may increase the intensity or priority of existing environmental concerns. We review five areas of pro-environmental engagement: environmental health concerns, general environmental and climate change concerns, support for environmental policy, household pro-environmental behavior, and participation in environmental movements.

WIREs

5.1 | Children's health risks and environmental concern

Early research on the green parenthood effect on environmental engagement began with a series of studies focused on the rising concern about toxic waste exposure, with parents identified as a key driver of public demand for remediation (Hamilton, 1985a, 1985b; Howe, 1990). (Table 1 provides a summary of studies with findings related to children's environmental health risks). Similarly, parents have been shown to have heightened risk perceptions of asbestos exposure (Johnson, 2004). Research has consistently found that parents are more willing to purchase sustainable food products (Laroche et al., 2001; Loureiro et al., 2002), possibly driven by concerns about their children's exposure to harmful chemicals. Drawing from risk perception theory (Slovic, 1987), it may be that dread risks, like nuclear exposure, or unknown risks, like pesticide exposure, interact with a parent's urge to protect their children's health from "the unimaginable" and lead to heightened concerns (Table 1).

However, not all studies have linked parenthood to increased concern about environmental health risks (Blocker & Eckberg, 1997; George & Southwell, 1986). These studies found that the link between concerns about environmental pollution and risks was moderated by gender, with women showing increased environmental concern with parenthood (George & Southwell, 1986) and men showing decreased environmental concern with parenthood (Blocker & Eckberg, 1997; George & Southwell, 1986). Additionally, "environmental pollution," the focus of the U.S. General Social Survey underlying both Blocker and Eckberg studies, may be too vague to evoke a connection to children's health, thus decreasing the potential green parenthood effect.

5.2 | General environmental and climate change concern

Studies that measure the relationship between parenthood and concern or worry about climate change are concentrated on survey data from the period 2000–2010, with the most recent survey data from 2011 and 2015 (See Table 2, which is sorted by data collection year). No studies using survey data from before 2010 found a connection between parenthood and climate change or environmental concerns (Blocker & Eckberg, 1997; McCright, 2010; McCright & Dunlap, 2013; Price & Bohon, 2019; Sundblad et al., 2007; Xiao & McCright, 2014, 2015), but more recent surveys from Turkey and Sweden have found a positive green parenthood effect on climate change concerns (Ekholm, 2020; Ekholm & Olofsson, 2017; Ergun & Rivas, 2019).

Parenthood and Environmental Health Risks				
Citation	Years	Population (sub-population)	Outcome variable	Parenthood effect
Hamilton, 1985a	1984	United States	Toxic waste concerns	+
Hamilton, 1985b	1984	United States	Toxic waste concerns	+
		(Female)	Toxic waste concerns	+
		(Male)	Toxic waste concerns	+
Howe, 1990	1985	United States	Concern for child exposure to toxic waste	+
George & Southwell, 1986	1986	United States (Male)	Opposition to proposed nearby nuclear plant	-
		(Female)	Opposition to proposed nearby nuclear plant	+
Blocker & Eckberg, 1997	1993	United States (Male)	Worries about effects of pollution	_
		(Female)	Worries about effects of pollution	0
Laroche et al., 2001	Unknown	North America	WTP for environmentally friendly products	+
Loureiro et al., 2002	2000	United States	WTP for eco-labeled products	+

TABLE 1 Summary of published literature on the green parenthood effect on environmental health

Note: + affirms a positive green parenthood effect, 0 indicates insignificant and/or null results, – indicates a negative parenthood effect, and ^ indicates a positive green parenthood finding in a qualitative study.

TABLE 2 Summary of published literature on the green parenthood effect on environmental concern

Citation	Years	Population (sub-population)	Outcome variable	Parenthood effect
Blocker & Eckberg, 1997	1985	United States	Environmental concern	0
			Lack of concern for economic impact of existing environmental protection	0
		(Male)	Lack of concern for economic impact of existing environmental protection	0
		(Female)	Lack of concern for economic impact of existing environmental protection	+
Sundblad et al., 2007	2005	Sweden	Perception of climate change risk	0
McCright, 2010	2001-2008	United States	Climate change concern	0
Xiao & McCright, 2014	2001-2008	United States	Environmental concern	0
Xiao & McCright, 2015	2000, 2010	United States	Environmental concern	0
McCright & Dunlap, 2013	2001-2010	United States	Environmental concern	0
Price & Bohon, 2019	2010	United States (Female)	Climate concern	0
		(Female $ imes$ number of children)	Climate concern	_
		(Male $ imes$ number of children)	Climate concern	0
Ekholm & Olofsson, 2017	2010	Sweden	Climate worry for self	+
			Climate worry for future generations	+
Ekholm, 2020	2011	Sweden	Climate concern	+
		(Female)	Climate concern	+
		(Male)	Climate concern	0
		(Female)	Climate concern for next generation	0
		(Male)	Climate concern for next generation	+
Ergun & Rivas, 2019	2015	Turkey	Concern for climate change	+

Parenthood and Environmental or Cimate Concern

Note: + affirms a positive green parenthood effect, 0 indicates insignificant and/or null results, – indicates a negative parenthood effect, and ^ indicates a positive green parenthood finding in a qualitative study.

While more research is needed to clarify this relationship, the pattern in the available research points to existing attitudes and concerns as a key moderator of the relationship between parenthood and climate/environmental concerns. In addition to more recent surveys finding a connection between parenthood paired with some, albeit mixed, evidence that climate concern has risen over time (Funk et al., 2020), there are also geographical patterns in the green parenthood effect that align with underlying differences in overall levels of climate concern. Both Turkey (Barker, 2013) and Sweden (Funk et al., 2020; Poushter & Huang, 2019) have shown much higher levels of concern about climate change than the United States (Barker, 2013), and studies in Turkey and Sweden found a green parenthood effect on climate concern while studies in the United States found no such relationship.

5.3 | Support for environmental policy and collective action

While it is unclear from the existing literature whether becoming a parent increases climate concern, there are indications that parenthood may drive people to increase the priority they give to existing climate concerns, providing further support for the importance of existing attitudes and beliefs as a key moderator of the green parenthood effect. For example, a New Zealand study found that support for pro-environmental policies predicts intentions to vote for the main pro-climate-action party for parents but not for nonparents (Milfont et al., 2012). This indicates that while many people support pro-environmental policies, it is not often a top priority when it comes to voting; however, the voting



TABLE 3 Summary of published literature on the green parenthood effect on support for environmental policy or other collective mitigation action

Parenthood and Support for Policy and Collective Mitigation						
Citation	Years	Population (sub-population)	Outcome variable	Parenthood effect		
Blocker &	1993	United States	Support for environmental regulations	0		
Eckberg, 1997			Willingness to bear costs to protect the environment (higher prices, taxes, lower living standard)	-		
Teal & Loomis, 2000	1990	United States - California	WTP for wildlife protection programs	0		
Dupont, 2004	1995	Canada	WTP for environmental goods improvements	+		
Milfont et al., 2012	2007	New Zealand (High support—climate action))Voting intentions for pro-climate party	+		
		(Low support—climate action)	Voting intentions for pro-climate party	0		
Shrum, 2021	2015-2016	6 United States	Willingness to donate to a CO ₂ -mitigating charity	/+		

Note: + affirms a positive green parenthood effect, 0 indicates insignificant and/or null results, – indicates a negative parenthood effect, and ^ indicates a positive green parenthood finding in a qualitative study.

priority of climate concerns rises when people become parents. Once again, the research here is extremely limited. To the best of our knowledge, only four other studies measured the relationship between parenthood and environmental policy support; two found no relationship (Blocker & Eckberg, 1997; Teal & Loomis, 2000) and two found positive impacts on the increased willingness to pay for environmental improvements (Dupont, 2004) and donations to a climate mitigation nonprofit (Shrum, 2021; Table 3).

5.4 | Household pro-environmental behavior

The focus on parenthood in environmental behavior began in the field of consumer research. First, Brooker (1976) found that having children was the strongest demographic predictor of demand for socially and environmentally conscious consumer products. This finding has remained consistent for sustainable food products (See Section 5.1), but in other areas of household-level pro-environmental behaviors, the green parenthood effect is either null or negative in most studies (Table 4).

If a person already has higher than average levels of environmental concerns, the birth of a first child appears to increase the desire to perform pro-environmental behaviors (Thomas et al., 2018). Yet, the higher motivation may be countered with higher barriers. The increased time constraints and higher mental load that come with parenthood, especially when children are young, tend to decrease parents' willingness to perform pro-environmental behaviors, especially those that are logistically challenging (e.g., taking public transportation), require additional mental load (e.g., bringing reusable bags), or reduce household comfort (e.g., reducing winter heating) (Nordström et al., 2020; Thomas et al., 2018). A comprehensive analysis found that in Sweden, parents have a higher carbon footprint than non-parents due to more carbon-intensive food options (e.g., kid-friendly meals tend to have more meat) and local travel methods, likely to save time and reduce stress (Nordström et al., 2020).

5.5 | Environmental movement participation

Traditional gender roles place women as caretakers, and for some, that role has been extended to include care of the environment, especially in advocating for environmental action to protect children's health (Bell & Braun, 2010). Even in the late 1800s, women-led environmental campaigns and their involvement were seen as an "extension of traditionally feminine responsibilities" (Rome, 2006, p. 442). Mothers who are environmental activists often point to motherhood as a transformative driver of their activism (Logsdon-Conradsen & Allred, 2010), with examples in campaigns related to the Three Mile Island disaster (Culley & Angelique, 2003), toxic wastes (Brown & Ferguson, 1995; Peeples & DeLuca, 2006), and a dam project in Africa (Braun, 2008). Parent organizations that focus on mobilizing political action on air pollution and climate change have proliferated in the past decade. Nearly 500 parent organizations signed on to TABLE 4 Summary of published literature on the green parenthood effect on household-level pro-environmental behavior

Citation	Years	Population (sub-population)	Outcome variable	Parenthood effect
Brooker, 1976	Unknown	United States—Chicago	Various environmentally friendly products	+
Blocker & Eckberg, 1997	1993	United States	Tendency to live a "greener lifestyle" (organic foods, reduce meat, reduce driving)	0
			Personal activities (recycling, prioritizing environment, action difficulty, petition)	0
		(Women)	Tendency to live a "greener lifestyle" (organic foods, reduce meat, reduce driving)	+
		(Men)	Tendency to live a "greener lifestyle" (organic foods, reduce meat, reduce driving)	_
Lutzenhiser et al., 2002	2001	United States—California	Household energy conservation behaviors	+
Nordström et al., 2020	2008-2009	Sweden	Preference for foods with low CO_2 emissions	-
			Preference for transportation with lower CO ₂ emissions	-
Thomas et al., 2018	2009-2013	United Kingdom	Household pro-environmental behaviors	0/-
		(New parents)	Desire to increase green lifestyle	0
		(New "eco-parents")	Desire to increase green lifestyle	+
Milfont et al., 2020	2009-2015	New Zealand	Made sacrifices to standard of living to protect the environment	0
			Made changes in daily routine to protect the environment	0
Xiao & McCright, 2014	2010	United States	Private environmental behaviors	0
Hensen et al., 2016	2016	European Union	Consumer environmental stewardship	0
			Consumer environmental stewardship	0

Note: + affirms a positive green parenthood effect, 0 indicates insignificant and/or null results, – indicates a negative parenthood effect, and ^ indicates a positive green parenthood finding in a qualitative study.

a letter "on behalf of the children [they] love" to leaders of the COP26 climate summit urging for an end to new fossil fuel financing (Doğru et al., 2021; Flynn et al., 2021). The historical, anthropological, and sociological literature makes a strong case for the role of motherhood in environmental movement participation.

However, focusing on empirical studies of general population surveys may lead to skepticism that motherhood or parenthood is a widespread driver of environmental activism, as most find no significant increase in environmental activism among parents (Gillham, 2008; Park & Raridon, 2017; Xiao & McCright, 2014). Similar to private pro-environmental behaviors, the countervailing forces of increased time and energy demands of parenthood reduce the likelihood that parents will engage in activism, which in the context of the social movements is called biographical availability (McAdam, 1986).

Instead of looking for a singular impact of parenthood on activism, studies need to examine interactions between environmental concern and parenthood as well as other potential moderating factors, especially identity, characteristics of environmental threats, and the framing of the issue and associated movements. Alignment between a person's identity and the collective identity of a movement is seen by social movement scholars as a central prerequisite for activating movement participation (Polletta & Jasper, 2001; Snow & McAdam, 2000). Alignment can occur through identity convergence (Snow & McAdam, 2000)—those who identify as environmentalists are more likely to see a natural alignment with the identity of the environmental movement. Alignment can also occur through identity construction (Snow & McAdam, 2000)—people who have environmentalist identity when they become parents by amplifying or extending a nascent environmentalist identity if it converges with their highly salient role as parents. The hypothesis that people who hold pro-environmental values are activated by parenthood or parent-environment appeals to engage in public pro-environmental behaviors remains untested in quantitative studies (Table 5).

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TABLE 5 Summary of published literature on the green parenthood effect on environmental movement participation

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Parentnood and Environmental Movement Participation						
Citation	Years	Population (sub-population)	Outcome variable	Parenthood effect		
Rome, 2006	1890s-1920s	United States	Environmental Activism	٨		
Blocker & Eckberg, 1997	1993	United States	Participation in environmental organization or demonstration	-		
Park & Raridon, 2017	2000 and 2010	United States	Likeliness to sign an environmental petition	^		
Xiao & McCright, 2014	2010	United States	Public (political/activist) environmental behaviors	0		
Logsdon-Conradsen & Allred, 2010	-	-	Environmental activism	^		
Culley & Angelique, 2003	1998	United States	Anti-nuclear activism	۸		
Brown & Ferguson, 1995	-	United States	Activism against toxic waste	^		
Peeples & DeLuca, 2006	-	United States	Engagement in environmental activism	٨		

Note: + affirms a positive green parenthood effect, 0 indicates insignificant and/or null results, – indicates a negative parenthood effect, and ^ indicates a positive green parenthood finding in a qualitative study.

6 | INTERGENERATIONAL TRANSMISSION OF ENVIRONMENTAL ENGAGEMENT

Beyond the impacts of the life and identity transition of becoming a parent on pro-environmental engagement, the attitudes, actions, and communications between parents and children can also have strong, evolving effects throughout parenthood. In this section, we explore how the green parenthood effect may include deeper environmental engagement that is passed on to the next generation and may also be influenced by knowledge, values, and behavior learned from children.

6.1 | Parents to children

There are countless aspects of knowledge, culture, and behavior that parents pass on to their children. Such behavior is often conceptualized as the product of generativity, intentions to leave a positive legacy, and a sense of responsibility towards their children. More concretely, parents' civic orientation and civic participation lead to higher levels of civic orientation and participation in their children during both their youth and adult lives (Beck & Jennings, 1982). Studies that have investigated the role that parents play in the formation of climate change-relevant beliefs and behaviors of their children consistently indicate a strong connection: parents' pro-environmental attitudes and behavior tend to increase adolescents' pro-environmental attitudes and behaviors (Grønhøj & Thøgersen, 2009; Katz-Gerro et al., 2020; Lawson et al., 2019; Pratt et al., 2013), including those specifically related to climate change (Lawson et al., 2019; Nche et al., 2019). Parents, especially mothers (Pratt et al., 2013), pass on their environmental concerns and behaviors to their children, which may affect how they parent their own children in the future (Jia et al., 2015), indicating a multigenerational transmission of environmental engagement. Parental generativity is also related to a greater attempt to socialize pro-environmental values in the adolescent (Pratt et al., 2013). As children today will bear more climate impacts than their parents, Nche et al. (2019) underscore the importance of deliberate and intentional parenting regarding the ecological crisis and its crucial role in raising children who are climate change actors, as opposed to climate change victims.

6.2 | Children to parents

Pro-environmental concerns and behaviors can also be passed up to older generations from children. Studies focused on the environmental education of children demonstrate impacts on environmental engagement and behavior for both children and their parents in energy savings (Boudet et al., 2016) and general measures of environmental attitudes and behavior (Leeming et al., 1997). In a randomized control experiment that trained U.S. teachers in intergenerational learning curriculum, both children and their parents showed substantial increases in climate change concern, with the highest gains among politically conservative parents (Lawson et al., 2019). Parth et al. (2020) found that, while intergenerational transmission of knowledge did not significantly influence behavior in Austrian and German parents, it did increase climate change knowledge among parents whose children were in a climate change education project compared to a control group. A study in Zimbabwe that sought to teach children climate adaptation methods found that children's learning did not translate to changes in parental behavior (Chineka & Yasukawa, 2020); however, the behavioral changes measured were more complex, had higher barriers, and were related to food production vital to the families' livelihoods, quite different from the behaviors and attitudes studied in the Global North contexts. This is similar to the more limited success of flood preparation education for young children translating to behavioral changes in households (Williams et al., 2016)—there may be a limit to the types of problems that parents will look to their children to help solve.

Crucially, at the center of the intergenerational exchange of information, knowledge, and beliefs reside three key psychological mechanisms: legacy motives, generativity, and perceived responsibility. These mechanisms have been shown to drive individuals' (usually parents) intentions to engage in such behaviors (See Section 3). Further, since children are often exposed to such intergenerational beneficence from their parents when they transition into parenthood themselves, they may seek to reciprocate this behavior (Min Bang et al., 2017).

7 | A FRAMEWORK FOR FUTURE RESEARCH

Our wide-ranging review of the parenthood–climate change engagement relationship reveals a number of critical gaps in the existing literature, each of which is a future direction for research deserving of attention. Perhaps the most critical of these gaps is a lack of clarity regarding the key moderators of the parenthood–climate engagement relationship (See Section 4). Our review makes clear that this relationship can take multiple forms and signs, ranging from positive to negative. To us, these decidedly mixed findings suggest that there are likely to be key moderating factors that help account for differences both across studies and within populations, only a few of which researchers have begun to explore (e.g., effects of pre-existing environmental attitudes; socio-economic indicators).

Second, and in a related vein, there is a lack of research that explores plausible mechanisms that can help explain how parental status (including the transition to parenthood) affects climate change engagement. That is, research on the mechanisms by which parental status comes to shape climate change engagement is still in its infancy (pun intended). Although we speculate above on some key mechanisms that are known to relate separately to both parenthood and to climate change engagement, almost no extant research has attempted to systematically trace these effects in a single study or sample. In addition to exploring key moderators, work that reveals important mechanisms that transmit the positive and negative effects of parenthood on climate change engagement represents a critical area for future research.

Third, almost all of the work that examines the effects of parenthood on climate change engagement relies on crosssectional research that takes a "snapshot" approach to explore this relationship. Milfont et al. (2020) is one prominent outlier, but even that work relies on a relatively short longitudinal design. Given the many and slowly evolving ways in which the transition to parenthood (and then changes in parenthood over the lifespan of a child) affects household decision-making, as well as the complexities of individual differences in parental attitudes and preferences, it seems clear that the effects of parenthood on climate change engagement may similarly evolve over time, perhaps even switching signs (e.g., from negative to positive) over the course of many years. Although carefully designed crosssectional research may be able to disentangle some of these over-time effects (e.g., by breaking parental status down into multiple discrete periods such as prebirth, early childhood, later childhood, and adulthood), the strongest approach will require the development of longitudinal research designs that can accurately track subtle changes in climate change engagement over long time horizons.

Fourth, and as discussed in further detail below, new research is needed to identify ways in which parenthood (especially the transition to parenthood) can be leveraged to promote greater levels of proactive engagement with climate change (including changes to household decision-making). Although some initial efforts have been made to find ways to leverage parenthood-related factors to promote greater engagement (e.g., work on legacy motives by Shrum (2021) and Zaval et al. (2015))—and various real-world efforts are ongoing that directly attempt to connect parental

status with climate change engagement (e.g., DearTomorrow, OurKidsClimate, Moms Clean Air Force)—much work remains to be done to further identify tools that can be used to promote positive effects and inhibit negative effects of parenthood on climate engagement (see below for some initial ideas on possible tools and approaches).

Finally, there is a need to explore whether the transition to parenthood is a particularly powerful time to engage adults on the issue of climate change (and, relatedly, how to do so in a productive rather than counterproductive manner). Work on the habit discontinuity hypothesis (Verplanken et al., 2008) suggests that major life transitions including becoming a parent—represent key moments when individuals may be more open to changing deeply held beliefs and behavioral patterns that shape a wide variety of daily decisions. It may even be the case that early parent-hood represents a sort of "critical period" with respect to reorienting individuals' perspectives on what matters in life and what risks should be taken more or less seriously; this may be particularly true with respect to affecting people's perceptions of and orientations toward time and the future, as their new status as parents may make them newly aware of the far-future and its implications for their own children. At the same time, early parenthood is a highly stressful and resource-constrained time for many parents, and thus efforts to engage new parents must be carefully calibrated to increase engagement without producing counterproductive effects.

8 | INSIGHTS FOR PUBLIC ENGAGEMENT ON CLIMATE CHANGE

For people who are already concerned about climate change, evidence suggests that parenthood could be a strong frame to motivate engagement with climate change. A few recent studies have tested specific parent or intergenerational-focused interventions (Hanus et al., 2018; Hensen et al., 2016; Shrum, 2021).

Empirical evidence reviewed here suggests that asking parents, especially those with young children, to take on proenvironmental behaviors that do not have a direct health impact on their own children is unlikely to be an effective strategy. Instead, advocates should focus on outreach to new parents to increase the awareness of the health impacts of household products and environmental pollution with an emphasis on how this directly affects the health of their own children.

Through an increased focus on children's health and related environmental risks, becoming a parent may lead to an on-ramp into new environmental concerns that are closely tied to children's health. Developing an awareness of the potential for harm from commonly used products could be a gateway to developing concern for broader environmental issues (Logsdon-Conradsen & Allred, 2010). Moreover, the transition to parenthood is "a personally transformative experience [that] radically changes what it is like to be you, perhaps by replacing your core preferences with very different ones" (Paul, 2015). In this time of identity flux, many preferences, including those related to the environment, may be more likely to shift compared to other more static periods of life (Daly et al., 2012). However, the timing and targeting of such appeals is critical in their success (Schäfer et al., 2012).

Framing appeals in ways that align with important identities, such as that of a parent or mother, is likely to be an effective way to increase participation in movements by aligning existing salient individual identities with the collective identities of the movement (Snow & McAdam, 2000). Environmental communications that appeal directly to the role of a parent in protecting the health and safety of their children are likely to be effective in both deepening engagements from parents who are already environmentalists (identity convergence) and developing new engagement from parents who may previously have not seen themselves as environmentalists (identity construction). The underlying identity processes are well-established in the social movement literature but have not been well-explored in the literature on individual-level behavior.

The literature examining legacy motives, generativity, and affinity with future generations is largely in agreement that these are important motivators of pro-environmental behaviors and their precursors. Advocates interested in leveraging legacy motives, generativity, and perceived responsibility to future generations to promote beneficent intergenerational decision-making must carefully consider which pathway may be most effective in a given setting (and for a particular target decision-maker) and then carefully design interventions that target the desired pathways. It is also important to pair a focus on legacy with a focus on climate action efficacy (Hensen et al., 2016).

Parents tend to be focused on their legacy through their child's safety, both in the present and the future. Engagement with parents that focuses their attention on the impacts that climate change may have on their children and their roles in reducing that impact elevates support for climate change actions, especially among those who already hold climate concerns and a sense that climate actions are not futile.

Importantly, parent-based frames may have an impact among nonparents as well. One study found that anthropomorphizing nature as "Mother Nature" increases connection to nature and pro-environmental behavior intentions (Liu et al., 2019). Van Vugt and coauthors suggest that this approach may activate pro-environmental behavior via a sense of kinship, as suggested by kin selection theory (Van Vugt et al., 2014).

9 | CONCLUSIONS

Parenthood is more likely to increase environmental engagement for people who already have environmental concerns, values, and identities; believe that climate and environmental action can be effective; have more resources to meet the financial and time demands of parenthood; are exposed to information about environmental health risks for children as they enter parenthood, and engage with narrative frames that drive alignment between the role of a parent as a potential hero of their family's part of climate history. Further study of the green parenthood effect is warranted to identify key boundary conditions and moderating factors as well as to explore effective ways to leverage parenthood to promote greater climate change and environmental engagement.

Historical and sociological analysis of environmental movements suggests that parenthood, especially for women, may drive engagement in environmental issues. Strong theoretical and empirical links between the connection to future generations (i.e., legacy, generativity, and perceived responsibility for future generations) and both climate change engagement and parenthood suggest strong reasons to hypothesize that parenthood has a strong potential role in climate change engagement. However, the existing literature suffers from a lack of continuity and a failure to draw in moderating factors such as existing beliefs about climate change and environmental health impacts. As it stands, we are faced with many open questions that merit deeper exploration.

Parenthood is a transformative experience that a strong majority of people will experience at some point in their lives. Understanding how this experience affects environmental and climate change behavior could add an important element to the ongoing puzzle of climate change behavior.

AUTHOR CONTRIBUTIONS

Trisha R. Shrum: Conceptualization (lead); funding acquisition (lead); investigation (equal); project administration (lead); writing – original draft (lead); writing – review and editing (equal). **Natalie S. Platt:** Investigation (lead); writing – original draft (supporting); writing – review and editing (supporting). **Stylianos Syropoulos:** Conceptualization (supporting); investigation (supporting); writing – original draft (supporting); writing – original draft (supporting); writing – review and editing (equal). **Ezra Markowitz:** Conceptualization (supporting); investigation (supporting); writing – original draft (supporting); writing – review and editing (equal).

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CONFLICT OF INTEREST

Dr Shrum and Dr Markowitz serve in unpaid advisory roles to the nonprofit project, DearTomorrow, which focuses on parents and climate change engagement. Dr Shrum is also a co-founder of DearTomorrow.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

ORCID

Trisha R. Shrum [®] https://orcid.org/0000-0001-8660-155X Natalie S. Platt [®] https://orcid.org/0000-0001-6091-2704 Ezra Markowitz [®] https://orcid.org/0000-0002-8140-2970 Stylianos Syropoulos [®] https://orcid.org/0000-0001-5622-1417

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