



No future, no kids—no kids, no future?

An exploration of motivations to remain childfree in times of climate change

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Accepted: 4 March 2021 / Published online: 16 March 2021
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Abstract

Individuals around the world believe global climate change is a major threat, with media attention and polling suggesting young adults may decide to go childfree as a result. Yet, there is limited research on the link between environmental concern and reproductive attitudes. The purpose of this research was to explore how climate change-related concerns affect reproductive attitudes and motivations to remain childfree. Two studies were conducted: study 1 consisted of a content analysis of reader comments on articles discussing going childfree in response to climate change, and study 2 featured semi-structured interviews conducted in New Zealand and the USA. The impact of future children on the planet, in the context of overpopulation and overconsumption, was a major theme in both studies. Perspectives of doom and hope emerged simultaneously, indicating how climate anxiety influences reproductive attitudes. Study findings point at implications for public policy makers regarding this largely neglected perspective on climate change adaptation and mitigation and potential psychological and societal effects.

Keywords Fertility intentions · Reproductive attitudes · Reproduction · Environmental concern · Childfree · Climate change · Overconsumption · Overpopulation

Introduction

Climate change is an increasingly top-of-mind issue for many individuals, especially for teenagers and young adults, exemplified by activists such as Greta Thunberg and Climate Strikes (Pew Research Center, 2019a). As public concern about climate

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change grows, anecdotal evidence reported in the media points to a group of people who are questioning their fertility desires and intentions. Articles published in the New York Times and the Guardian have featured discussions about individuals deciding to go childfree¹ due to climate change concerns (e.g., Fleming, 2018; Miller, 2018). Polls have reported that almost 38% of Americans aged 18 to 29 believed that couples should consider climate change when deciding to have children (Relman & Hickey, 2019), and about 33% of American men and women, aged 20 to 45, cited climate change as a reason to have fewer children (Miller, 2018; Ojala & Bengtsson, 2019). Overall, public discourse demonstrates a prevalent discussion about individuals going childfree in response to climate change concerns.

If remaining childfree becomes a widespread decision among young people worried about climate change, environmental, societal, and psychological outcomes need to be addressed. Yet, where previous research has explored going childfree (e.g., Blackstone, 2014; Blackstone & Stewart, 2012, 2016), researchers have yet to investigate the concerns and motivations of individuals who are considering going childfree in *response* to climate change. This highlights the need to revisit an important issue in population-environment; examining how changes in the natural environment impact individuals' reproductive attitudes and fertility intentions (Brauner-Otto & Axinn, 2017).

Through a multi-method research design, this study explored in-depth the role of climate change considerations in the formation of reproductive attitudes and motivations for going childfree. First, content analysis (Kolbe & Burnett, 1991) was used to examine reader comments on online press articles in order to familiarize ourselves with the broad range of opinions surrounding pro-childfree climate change debates. Second, semi-structured interviews were utilized to delve deeper into the motivations (Malhotra, 2010) for going childfree. Combining these methods allows for methodological triangulation (use of multiple methods of data collection) (Guion et al., 2011) and data source triangulation (collection of data from different types of people) (Salkind, 2010).

In presenting primary data on factors determining young adults' reproductive attitudes in the context of the climate change threat, our study extends previous research which examined environmental pollution-related concern and fertility intentions (Arnocky et al., 2012; Davis et al., 2019) and those which employed quantitative secondary data to link concern about climate change and fertility intentions (De Rose & Testa, 2015a, b). Through our findings, we derive implications for public policy makers regarding this largely neglected perspective on climate change adaptation and mitigation and potential psychological and societal effects.

¹ 'Childless' refers to individuals who desire to be parents but are unable to, 'childfree' indicates individuals who choose to not procreate even though they have the ability to do so and is a result of socio-cultural shifts in social norms and personal values (Blackstone & Stewart, 2016).

Literature review

Linking overpopulation, resources, and climate change

Though perceived as a highly individual choice, having children has numerous positive and negative externalities for society irrespective of climate change. The Intergovernmental Panel on Climate Change (IPCC) asserted that human economic and demographic growth are indisputably the primary drivers of the world's environmental problems including climate change (IPCC, 2018). Each new child that is born results in increases to resource use such as water, food, and energy, while simultaneously causing further pollution to land, water, and air (Pimentel et al., 1994). Yet, additional children can be beneficial by increasing the amount of future tax income to fund pension, education, and healthcare schemes (O'Neill & Wexler, 2000).

Inadvertently, individuals may be responsible for the emissions of their descendants (O'Neill & Wexler, 2000; Satterthwaite, 2009; Van Basshuysen & Brandstedt, 2018), and reproductive decisions have environmental implications that span generations (Andrijevic & Striessnig, 2017). Wynes and Nicholas (2017) calculated that having one fewer child would lead to an average of 58.6 tonnes CO₂-equivalent (tCO₂e) annual emission reductions for a person living in a developed country, which is more impactful in terms of emissions reductions than any other studied activity (e.g., living car-free, avoiding airplane travel).

Going childfree in response to environmental changes and concern

The decision to have children is a complex one. Among other factors, environmental concerns may affect individuals' reproductive attitudes, which Davis et al. (2019, p. 93) defined as "the positive and negative evaluations people hold toward having and raising children, which impact fertility intentions (e.g., ideal number of offspring) and behavior (e.g., pregnancy rates)". Previous research has indicated that reproductive attitudes and fertility intentions are influenced by a multitude of personal, social, and economic factors (Ajzen & Klobas, 2013; Merz, 2012). For example, income, education, age, labor market participation, access to child support and care, personality traits, beliefs about gender roles, life values, and religiosity can influence an individual's fertility intentions (e.g., Ajzen & Klobas, 2013; Fahlén & Oláh, 2015; Thévenon, 2011). The literature on voluntarily going childfree has examined both macro- (i.e., the feminist movement, labor force changes) and micro-level explanations (i.e., freedom from childcare responsibility, experiences in childhood), finding the decision is conscious, deliberate, and longitudinal (i.e., not instantaneous) (Blackstone & Stewart, 2016). Research has also shown that people have fewer children in tumultuous times. Historically, events resulting in political turbulence (Bradatan & Firebaugh, 2007), macro-economic uncertainty (Basten et al., 2013; Fahlén & Oláh, 2015; Miettinen & Szalma, 2014), and war (Rowland, 2007) have had negative implications for fertility intentions and birth rates. Recent research has indicated that individuals are increasingly pessimistic about the future prospects of the

next generation, especially due to climate change (Stokes, 2017) and may choose to go childfree as a result (Blackstone, 2019).

Previous studies have found natural environmental changes and environmental concern to have an impact on reproductive attitudes and fertility intentions. Some related studies have been carried out in developing nations. For example, Ghimire and Mohai (2005) found that decreased agricultural productivity in Nepal was linked to increased use of contraceptives (i.e., when resource scarcity was high). Conversely, Brauner-Otto (2014) found that when confronted with poor environmental conditions, individuals were less likely to use contraception. Indeed, some families desired higher fertility when natural capital was declining (Sasson & Weinreb, 2017). Thus, based on ideas about the economic and cultural value of children (Cain, 1983; Caldwell, 1982), the vicious circle model (Dasgupta, 1993) suggests that resource scarcity increases the demand for child labor and thus leads to greater child births (Sasson & Weinreb, 2017).

Yet, in developed nations, results differ. In Canada, Arnocky et al. (2012) found that pollution-related health concern was related to lower fertility intentions, with an ecologically conscious worldview (New Environmental Paradigm) and also related to a less positive attitude toward reproduction. Having an ecologically conscious worldview was associated with negative reproductive attitudes, whereas those with self-oriented (egoistic) and human-centric environmental concerns had pro-reproductive attitudes (Davis et al., 2019). Andrijevic & Striessnig, (2017) noted that the fear of climate change and the potential threat of an ‘eco-crisis’ in Austria were potentially enough for some individuals to abstain from having children but found that individuals still intended to have two children. Along similar lines, research across 27 EU countries indicated that individuals’ intended number of children is not strongly correlated with their concerns about climate change (De Rose & Testa, 2015a).

Overall, existing research indicates that the relationship between concern for climate change and people’s motivation to have or not have children remains ambiguous. Among other research needs, a more nuanced study of reproductive attitudes and fertility intentions among young adults in developed countries is needed (Miettinen & Szalma, 2014). A focus on developed countries is important because consumption levels and contribution to greenhouse gas emissions is disproportionately higher (Satterthwaite, 2009); for example, the birth of a child in North America has a relatively higher impact than a birth in Africa or Asia (Andrijevic & Striessnig, 2017; O’Neill & Wexler, 2000). It is also important to focus on younger adults as they more likely perceive climate change as one of the biggest problems currently faced by society (Pew Research Center, 2019b) and to consider having children. Moreover, with the exception of Andrijevic and Striessnig (2017) who applied a multi-method approach, previous research exclusively utilized quantitative data, usually survey data (Arnocky et al., 2012; De Rose & Testa, 2015a, b; Ghimire & Mohai, 2005).

Thus, this study employed a qualitative research design to specifically focus on the role of climate change considerations in the formation of reproductive attitudes and motivations for going childfree. The novelty and underexplored nature of our research topic led to a two-step approach to data collection. First, a content analysis (Kolbe & Burnett, 1991) of readers’ comments on online articles was conducted (study 1). Utilization of a nonreactive research method enabled us to unobtrusively observe a variety

of perspectives on the debate about going childfree in response to climate change and did not interfere with the ‘natural habitat’ of online users (Janetzko, 2008). This type of exploratory approach leads to a description and understanding of an area of social life (Stebbins, 2001) and consequently provided familiarity with the broad range of pro-childfree debates in addition to initial themes/topics to explore. However, a limitation of such method is that the more ‘extreme’ sides of the debate are highlighted (Taylor et al., 2016). Furthermore, we were unable to discern how involved commentators were in their personal reproductive decision-making, and how strongly certain themes or topics might in actuality affect such decisions. As we were interested in understanding specific climate change-related *motivations* to go childfree, a more in-depth exploration was needed. Thus, a second study was conducted with participants who were considering not having children due to climate change concerns (study 2). For study 2, semi-structured interviews among young adults (aged 18 to 35 years old) were used in order to further explore the motivations identified in study 1, as well as additional, specific motivations (Malhotra, 2010) for going childfree. Thus, study 2 allowed for expanding and triangulating the findings from study 1. This triangulation facilitated validation of data through cross verification from more than one source and research method (Guion et al., 2011; Salkind, 2010).

Study 1

Method

Internet-based opinions (online comments) are emerging and powerful voices in the climate change issue debate, highlighting as well as influencing public opinion and political support for climate action (De Kraker et al., 2014). Readers’ comments posted in response to online news articles give the public a medium for expressing their perspectives and beliefs about current issues (Henrich & Holmes, 2013). Comments yield a gauge of public attitudes on issues that is immediate, spontaneous and (presumably) honest (Collins & Nerlich, 2015; Henrich & Holmes, 2013). Although reader comments cannot be taken as representative of the views of the general population, the high number of comments available on certain articles can serve as an indicator of the perspectives of a large segment of the population (Henrich & Holmes, 2013).

Online reader comments to topical articles were collected following a step-wise procedure (De Kraker et al., 2014). A Google search using the terms ‘climate change’, ‘no kids/children’, and ‘birthstrike’ was conducted. The contents of identified articles were screened for topicality and whether the articles included comment threads (i.e., a collection of comments from readers all belonging to one article; Schuth et al., 2007). Next, the number of comments in a thread was used as inclusion criterion based on the assumption that the number of comments was indicative of the importance of an article to readers with readers commenting on articles that most resonate with them (Henrich & Holmes, 2013). This approach seemed useful, as we wanted to better understand the breadth of the public argument on our research topic. We identified articles from English-language newspapers, then used

the number of reader comments to rank these articles, as suggested by Collins and Nerlich (2015). The top 10 commented articles were selected and the number of comments ranged from 1406 to 127 in each article. These 10 articles resulted in a total collection of 6397 online reader comments, published on eight different newspaper websites between July 12, 2017 and September 22, 2019. The comment threads of these articles were stored as separate electronic files. In order to keep manageable sample size (Collins & Nerlich, 2015), we selected every fourth comment to code which resulted in 1948 comments. Within this initial set, we classified 791 comments (about 40%) as off-topic or uncivil and therefore eliminated them from further study. Some commentators underscored a factual and deliberative comment with personal attacks and incivility (Collins & Nerlich, 2015)—we did not remove those mixed comments.

We employed content analysis, which can be both a qualitative and quantitative research technique that allows for the systematic analysis of various forms of communications in an unobtrusive way (Kolbe & Burnett, 1991). Content analysis enables the examination of communications quantitatively to determine trends, frequencies, and relationships among the topics of interest. The technique also allows for interpreting and understanding narratives, incorporating them into the quantitative, analytical procedure (Grbich, 2012). In the initial coding phase, the three authors independently applied open coding to ten of the comments. Open codes were compared, coding discrepancies reconciled, and the codebook was created that was subsequently applied to all comments. Code frequencies were determined and summary reports for each code compiled. The major codes (i.e., present in more than 2% of comments) are presented in Table 1 and discussed below.

Findings

Three overarching themes were identified from the reader comments pertaining to issues perceived to contribute to climate change, reasons to continue to reproduce, and motivations to go childfree. First, much of the discussion presented in the comments consisted of readers debating what they perceived to be drivers of climate change. Of these, overpopulation—or the belief that there are too many people on the planet—was the most prevailing concern and constituted the largest share of total comments. Within this discussion, some commentators suggested that while population growth was an issue, it was not necessarily the cause of climate change in and of itself. Instead, overpopulation was noted to correspond to other issues such as overconsumption in developed countries and high birthrates in developing countries, leading some to question who should cease to reproduce: those living in high-carbon/high-income countries or those living in low-carbon/low-income countries. Second, reading articles examining the relationship between reproduction and climate change triggered many commentators to justify their own reasons for having children. Many commentators used population growth in developing countries and the perceived risk to Western societies (for example, due to potentially increasing immigration) to defend their pro-reproduction position. Moreover, the decision to forgo childbearing in response to climate change was considered by this group of commentators to be

Table 1 Code summary

Main code	Sub-code	Description	Total	%
Issue	Overpopulation	Too many people on Earth	200	17.2
	Overconsumption	Resources are overused and/or wasted	38	3.3
	Corporations/economic system to blame	The economic system as well as corporations, greed and power are leading to climate change and our inability to change	32	2.8
		<i>Main-code total</i>		23.2
Why reproduce	Others will continue to reproduce	Other people will continue to have children. Perspectives include Global North versus Global South and racial divides	66	5.7
	Society and need to reproduce	Reflect that human nature may be to reproduce, society needs young people (i.e., tax system), and we should at minimum replace ourselves	56	4.8
	Hope - educate them	Provide an opportunity to educate and bring up children to change the world	47	4.0
	Love, joy and happiness	Children bring individual happiness and love, a purpose to life	37	3.2
		<i>Main-code total</i>		17.7
Why not reproduce	Doom	See doom for the future, no changes will be made as it's too hard and thus, the world is doomed, it's already too late	59	5.1
	Cost	Kids as a resource-issue. Cost of kids or even living nowadays is too expensive. Supportive infrastructure needed.	80	6.9
	No desire to have kids	Doesn't have or did not have a desire to have children	62	5.3
	Sadness or unease about kid's future	Kids are likely to have a worse outlook on life and parents can't offer quality of life	41	3.5
	Selfish for having kids	Feel having kids is selfish/irresponsible, or that not having them is selfish	35	3.0
	Other sustainable behaviors	Sustainable behaviors also implemented, vegetarian diet, public transport use	32	2.8
	No kids 'most' impact	Not having children is the best course of action on an individual's carbon footprint	30	2.6
	Adoption	Compensate for not having children by adopting	24	2.1
		<i>Main-code total</i>		31.3

unprecedented: reproduction was described as an inherently positive experience tantamount to human nature and essential to the functioning of many social and economic systems—in addition to providing an opportunity to educate and bring up children who will change the world. Third, the negative implications of having children in the current environmental climate were echoed in the views of many readers. A pervasive sense of ‘doom’ overshadowed much of the anti-reproduction debate and many expressed significant unease regarding the future. Commentators conveyed sadness and anxiety about the anticipated quality of life for the children born today, which they considered to be much worse than that of previous generations. Having children was also believed to contribute to issues related to overpopulation and overconsumption. In comparison with other sustainable behaviors, *not* having biological children was identified as the best course of action to reduce one’s carbon footprint. Consequently, having children in light of climate change was considered by this group of commentators to be selfish. For this reason, adoption was proposed as a compromise and that those with children should look to other sustainable behaviors to reduce their carbon footprint such as following a vegan diet or decreasing their transportation use. The cost involved in raising a child—as well as the communicated desire to never have wanted children in the first place—were additional prevalent issues, both of which were not linked to climate change.

Interpreting the findings from study 1 led to some overarching insights about how people assess the decision to go childfree due to climate change concern. Firstly, overpopulation was the main concern for commentators and the issues that overpopulation brings, such as overconsumption and depleting resources for current and future generations. Secondly, tensions between individual (hope and happiness) and biological and social motivations (family pressure and societal need to reproduce) on fertility intentions and reproductive attitudes still exist and juxtapose pro- and anti-reproduction sentiments within and among individuals. Third, among those expressing concern about climate change, the issue of not wanting to have biological children was discussed as a legitimate—if not logical—consequence.

In response to several limitations of this first study, we conducted a second study. Study 1 involved the collection of opinions from a sample of publicly available comments on the issue of going childfree due to climate change, with the goal of an initial exploration of opinions and positions. Guided by the initial insights of study 1, we identified the additional research need of exploring the justifications and reasons for going childfree in more depth. Thus, a triangulated approach was needed to validate (Guion et al., 2011) and increase the confidence in the research data (study 1), giving a clearer understanding of the motivations to go childfree (Thurmond, 2001)². Specifically, data validation was achieved through both methodological triangulation (use of multiple methods of data collection) (Guion et al., 2011) and data source triangulation (collection of data from different types of people) (Salkind, 2010). While the content analysis allowed us to familiarize ourselves with a broad view of

² Researchers influenced by positivist or postpositivist philosophies believe triangulation overcomes the limitations to only using one approach to research, providing a means to verify the findings of different methods (Salkind, 2010). Conversely, researchers influenced by a constructivist philosophy believe the

opinions surrounding pro-childfree climate change debates, study 2 enabled us to further explore the motivations identified in study 1, as well as additional, specific motivations (Malhotra, 2010) for going childfree. Further, commentators tended to be polarized and provided only short explanations of their positions, thus limiting the analysis of motivations and their significance for the decision to have or not have children. Consequently, through method and data triangulation (Salkind, 2010), study 2 explored whether the emerging themes from study 1 would re-occur, with a greater emphasis on themes/codes regarding the motivation to not have children. Through the collection of primary data on individual motivations and anticipated consequences of remaining childfree, we increased the reliability of our findings in study 1.

Study 2

Method

We conducted 24 semi-structured interviews with young adults (18 to 35 years old) in New Zealand and the USA. Interviews allow for an exploratory, in-depth understanding of phenomena, which is appropriate given the underexplored nature of the topic (Stebbins, 2001; Malhotra, 2010). We focused on young adults as previous research has shown this age group is more likely to consider climate change as one of the biggest issues (De Rose & Testa, 2015b) and about a third consider climate change in their childbearing decisions (Miller, 2018; Ojala & Bengtsson, 2019; Relman & Hickey, 2019). Data collection took place in Tucson (USA), Auckland (New Zealand), and Christchurch (New Zealand), with 12 interviews conducted in each country. Data was collected between October and December 2019, using a convenience sample of young adults who considered their knowledge of climate change to play an important part in their reproductive decision-making. Participants were recruited through local and university sustainability clubs and forums, posting messages on social media pages, and through snowballing. Of the 24 participants, 17 identified as women, four as men, and three as gender non-conforming (see Table 2 for participant demographics). Post hoc considerations of sample size prompted by a reviewer led us to consider whether data saturation could be achieved with 24 participants. Previous research of a similar nature indicates that between 6 and 20 participants are needed to achieve thematic saturation (e.g., Francis et al., 2010; Guest et al., 2006; Kuzel, 1992), suggesting that we had a sufficient amount of data in the current study.

Interviews were conducted at university facilities (usually an office), were audio recorded with permission, and lasted approximately 25 min to 1 hr. Emerging themes from study 1 were used to inform the interview guide. Participants were asked questions regarding their understanding of the drivers of climate change, visions for the

Footnote 2 (continued)

benefits of triangulation are in its ability to provide multiple viewpoints on the phenomenon of interest and deepen the understanding of the research question (Salkind, 2010).

Table 2 Participant demographics

Alias	Gender identity	Country	Race/ethnicity	Age
Jessica	Woman	USA	White (non-Hispanic/Latino/Latina)	35
Hannah	Woman	USA	White (non-Hispanic/Latino/Latina)	20
Sarah	Queer Woman	USA	White (non-Hispanic/Latino/Latina)	24
Ryan	Man	USA	White (non-Hispanic/Latino/Latina)	30
Brandon	Man	USA	White (non-Hispanic/Latino/Latina)	35
Amanda	Woman	USA	White (Hispanic/Latino/Latina)	33
Samantha	Woman	USA	White (non-Hispanic/Latino/Latina)	20
Kayla	Woman	USA	White (non-Hispanic/Latino/Latina)	23
Taylor	Woman	USA	White (non-Hispanic/Latino/Latina)	29
Josh	Man	USA	Asian	23
Lauren	Woman	USA	White (non-Hispanic/Latino/Latina)	35
Melissa	Woman	USA	White (non-Hispanic/Latino/Latina)	32
Nancy	Woman	NZ	NZ European	25
Ruby	Woman	NZ	NZ European	20
Jessie	Woman	NZ	Half NZ European, half Chinese	20
Carmen	Woman	NZ	NZ European	35
Alice	Woman	NZ	American	34
Joyce	Woman	NZ	NZ European	31
Jackie	Woman	NZ	Dutch	32
Sarah	Woman	NZ	Canadian	30
Caitlyn	Non-Binary Woman	NZ	NZ European	31
Alex	Non-Binary	NZ	NZ European	19
Camille	Woman	NZ	Columbian	26
Monty	Man	NZ	NZ European	21

future (societal and individual), motivations for—and anticipated consequences of—having children or not, and associated emotions and considerations.

Thematic analysis was used to analyze transcripts through the use of NVivo 12 and hand-drawn mind maps. Two coders employed both deductive and inductive coding. An a priori template of codes was developed based on the objectives of the research (e.g., codes for ‘overpopulation’ and ‘uncertain future’ as specific motivations); these were then either kept or divided into new inductive codes where new themes emerged (e.g., ‘burden of responsibility’ as an additional specific motivation; Fereday & Muir-Cochrane, 2006). Consistent with thematic analysis, we were interested in exploring the motivations and concerns with going childfree and therefore, rather than providing a table with codes as done with study 1, we discuss each theme in-depth below. In analyzing the interviews, credibility was improved using triangulation through source triangulation (i.e., using quotes from different participants; Creswell & Miller, 2000), while transferability was addressed through thick descriptions in the findings (below) to increase the transferability of the findings to

other contexts and individuals (Lincoln & Guba, 1985). We use pseudonyms when referring to individual study participants below.

Findings

Participant reflections often centered on the impact of future children on the planet, with participants particularly concerned with contributing to overpopulation and overconsumption; seeing children as additional consumers of resources. Participants were uncertain about the future, feeling a sense of guilt of potentially bringing up a child in a world which they often considered bleak or doomed. However, participants also felt tensions between their childfree perspective and other demands such as partner and parental expectations. Participants' childfree perspectives were influenced by how they saw their own responsibility as individuals and consumers, and how they believed change, whether individual or systemic, could be enacted for climate change.

Motivations

All participants mentioned that not having children was the biggest positive choice one can make for the environment. The decision to have children or not varied between all participants with some still considering their options and acknowledging that their situations may change in the future (i.e., partners, feelings), while others were more adamant or fixed about their childfree decision. Some participants noted that they would still like to have their own children, often limiting to one or two. Other participants were strongly against having any biological children, with some mentioning adoption as a 'low-carbon alternative'. A few participants mentioned compensating for not having children by keeping animals/pets.

"I don't need to be adding another person into the world who would consume resources and who would continue to add to climate change when there's already kids who are in need and who already are doing that. I wouldn't be adding, I would be just taking care of those kids." (Sarah)

Overall, there were three climate change-related reasons not to have children. These were (a) overconsumption, (b) overpopulation, and (c) an uncertain future which resulted from (a) and (b) and as a consequence of changing and worsening environmental, social, and political conditions.

Almost all participants worried about how having children contributes to resource overuse with regard to current and future consumption levels in society. Reflecting on this issue of overconsumption, participants felt responsible and uneasy about the greenhouse gas (GHG) emissions that would be emitted by their potential child(ren).

"That is literally another human who will be consuming resources, who will be contributing to climate change." (Brandon)

Participants saw overconsumption linked to a wasteful society and expressed concern that, now and more so in the future, resource shortages (i.e., food, water)

will loom. They were concerned about raising a child in a future where they would have to face hardship. There were feelings of guilt, both for bringing a child into an unknown world and not guaranteeing a good quality of life, and for contributing to climate change through an increased footprint. Overall, for their own possible children and children of the future in general, there was a great sense of regret and sadness that the young would have to deal with significant environmental decline, loss, and hardship.

“There are a lot of societies that are already struggling with water scarcity and within even 30 years, places that have had water will likely be looking at other options to get water.” (Amanda)

“I know that I may not see the worst of it as people who are younger than me now or people who are yet to be born will definitely have to experience more of it than I will.” (Taylor)

Another serious concern and motivation to go childfree for some participants was overpopulation. While expressing that every person had the right to make their own choices in regard to having children, they viewed having more than two as problematic and even selfish as it ‘over-replaced’ themselves.

“I would never have more than two children, because then I’m contributing to population growth. If I have one or two I’m not contributing. I’m not actively doing something bad.” (Jackie)

Overpopulation was also discussed in terms of an ‘us vs them’ mentality. Participants believed low-income countries produced more children but also noted those countries have lower per capita consumption. Current as well as future climate change consequences were described with great concern for social inequity. Many participants reflected on how climate change would affect people in other countries, especially lower economic regions more than themselves. They acknowledged that even being able to reflect upon having children and their futures was a privilege.

“Fortunately or unfortunately, depending how you look at it, I’m really privileged in the life that I live. So, I would probably assume that a lot of people in poor regions would unfortunately feel the effects of climate change before I would, which is not really fair at all.” (Sarah).

A third motivation related to uncertainty about the future. For many participants, the bleak or uncertain outlook on the future implied that bringing a child into such a world is not a good idea. Yet, there was some reflection about how throughout history we have been through turmoil, such as war and famine, but still continued to produce children. Acknowledging this, participants still felt emotionally conflicted and guilty if they did produce children, knowing (believing) that the world would be a worse place for them.

“I don’t know if this is different than any other time in history, but it does feel like kind of a gamble bringing a very young person into a world that you really are very unsure about the future of.” (Brandon)

Indeed, most participants expressed a serious concern for the future and battled with climate change anxiety. For most participants there was a sense of doom. Many participants did not believe that necessary changes will be made as these are too complex, hard, and would come too late.

“...it looks dark, it looks not good [...] It makes me sad to know that there’s already a lot of people suffering right now because of climate change. It’s not something that’s about to happen, it is already happening. [...] a lot of people are not going to survive these devastating changes that come with the changes to the planet that we’re causing.” (Ryan)

“Honestly, I literally feel like I’m in that movie *The Day After Tomorrow*, except rather than the day after tomorrow is in 50 odd years and it’s just snowballing towards it.” (Ruby)

However, emotions associated with climate change were often mixed. Hope emerged from the belief that actions to mitigate climate change were being undertaken, that younger generations are more climate aware and concerned, and that technology and future political action could ameliorate problems. The ‘doom’ perspective was often contrasted to the positive change children could bring. When reflecting on other consequences of having children, many believed the next generation could contribute to improving the environment through increased awareness and climate change action. However, other participants also reflected that such perspectives about educating the next generation may burden children.

“Maybe you could bring a child into the world who’s incredibly conscientious and considerate of how they’re living their lives and kind to animals and could [...] teach other people how to be good humans [...]; create a little change maker.” (Alice)

For some participants, children bring the general idea of hope; a hope for a better and brighter future. The love and happiness that children bring to one’s life was also a key reflection.

“I read a podcast, or a blog or something in which the woman was talking about how giving up on having kids is essentially giving up hope. And if we choose to not have kids whilst we continue to fight to create change, then in a way we are also giving up the fight that we’re in.” (Nancy).

Some participants also reflected on their desire to be free to dedicate their life to other causes such as their careers where they hoped to influence environmental policy/change, dedicate oneself to teaching the next generation to be more sustainable, and spend time helping to raise other children in their family and community. Yet, these motivations for going childfree battled against some individual as well as social tensions and pressures.

Concerns and tensions for going childfree

There was a tension between the decision to go childfree and social norms and pressures, as well as conflicting beliefs in individual and systemic change for climate change. On a personal level, many participants felt misunderstood by their relatives and friends. Participants indicated their family members (i.e., parents) expressed a strong desire for them to have children, believing that they (participants) would change their minds as they aged. A few participants were also reflective about their potential future partners, willing to compromise and have children, while others were worried about what that would mean for their future partnerships (i.e., breakup). A few participants also had religious considerations for having children.

“The world that we were given has everything in it for the needs of the humans [...] And while we’re meant to be environmental stewards of it, we are also meant to be clever and look for answers to the problems that we face [...] climate change, in and of itself, is not a reason to stop bringing children into the world because we believe that children have a purpose here.” (Amanda)

Similarly, a tension existed between personal concerns and behaviors. To overcome anxiety and stress about climate change, participants reflected on how they felt they and others could contribute towards climate change mitigation. A tension emerged between feeling responsible for one’s impact on the environment, wanting to enjoy life, and feeling like one’s small actions might not have an impact on the planet anyway. While many participants did not believe their actions had a direct impact on the planet, especially due to continued systemic failures (i.e., environmental regulation) and other individuals’ unsustainable behavior, a sense of guilt was felt if they did not participate in sustainable activities. Believing that remaining child-free was the best sustainable action one could take in their life, they allowed themselves liberties with other non-sustainable activities such as travelling. This feeling of personal responsibility was contrasted with a continual sense of hopelessness in politicians and corporations. For example, while most participants felt that individuals could and should make adaptations in their lives, they doubted this could lead to large-scale change. There was also a sense of anger and blame for those who contributed most towards climate change but did not take countermeasures while there still was time, namely, older generations, politicians, and corporations.

“Watching all of these governments and these multinational companies just stand by while we’re losing so many animals and plants and habitats and everything like that, it’s frustrating, and I feel like a lot of companies have turned it towards the individual consumer and said that it’s more our fault, ‘don’t use straws’...” (Samantha)

Among participants, the role of companies and the economic system was addressed frequently. While some felt corporations and ‘the system’ were to blame for spurring climate change, most regarded corporations as a necessary partner in reducing the rate of environmental degradation.

“...at the end of the day, if large institutions like our military industrial complex aren’t willing to change, then I won’t be able to make up for that.” (Hannah)

Many participants believed young people would be more climate aware and actively contribute toward a better future. This perspective set up hope for the future and also demonstrated that, in some ways, climate change can be addressed individually, with these actions giving purpose, direction, and empowerment.

Overall, this tension between wanting to hope for a better future, wanting to contribute towards this better future, and wanting to experience the joy, hope, and happiness associated with having children brought many participants feelings of conflict and highlights the long ranging effects of eco- or climate anxiety.

Discussion

This research explored how concern for climate change affects reproductive attitudes and motivations to go childfree. The two studies highlight the emotional reactions to climate change and the proposed solutions. Most interview participants expressed a serious concern for the future and were dealing with climate change anxiety. Indeed, anxiety about the future is associated with an increased reluctance to have children (Adler, 1997). Yet, many remarks in the content analysis of the online reader comments routinely attacked and criticized other commentators and the article author of overreacting, with some provoking arguments around climate change denial. Despite changing societal norms, childfree individuals—particularly women—are often seen as deviant or their choices are disbelieved or disregarded (Blackstone, 2014; Gillespie, 2000). Research suggests people who elect to not have children are seen as less nurturing, less mature, more materialistic, more selfish, and less well-adjusted (Park, 2002). Indeed, commentators frequently belittled those who chose to go childfree, referring to them as ‘evolutionary outcasts’, less mature, and more selfish (i.e., unwilling to sacrifice time, money to raise children). Other commentators also criticized those who chose to go childfree, questioning who should cease to reproduce (low vs high-income countries), using population growth in developing countries and the perceived risk of increasing immigration, as justification for continued reproduction. In contrast, interview participants drew on the statistics that a birth of a child in a high-income country has a relatively higher impact than a birth in lower-income countries (Andrijevic & Striessnig, 2017; Murtaugh & Schlax, 2009; O’Neill & Wexler, 2000). In another line of critique, commentators also reflected on the need for reproduction to continue the economic system and fund pension schemes (O’Neill & Wexler, 2000).

The interview findings highlight that individuals are choosing to go childfree for biospheric as well as altruistic reasons (Davis et al., 2019). Specifically, overconsumption and overpopulation were seen as the key contributors towards climate change, and that having children means an automatic increase in climate change. Overpopulation was the main concern and motivator for going childfree in study 1, but for participants interviewed in study 2, overconsumption of resources was the main concern. Our findings show that there is not a missing conceptual link between

individuals' childbearing intentions and environmental considerations as literature suggested (i.e., Andrijevic & Striessnig, 2017; Arnocky et al., 2012). In addition, participants were worried about the future impacts of climate change on environmental, social, and political conditions, even mentioning specific concerns about resources such as food and water and jobs. As a result of these concerns, most interviewees and some commentators felt selfish for having children. They saw the decision to go childfree as a safeguard against exposing unborn children to environmental risks (De Rose & Testa, 2015a). Yet, despite these concerns, some participants believed they may have children, but not more than two, which is consistent with previous findings (Andrijevic & Striessnig, 2017; Basten et al., 2013). Specifically, interview participants were concerned with the quality of life offered to children in the future and such reflections brought unease and anxiety.

In order to manage their concerns, interview participants partook in climate change actions, such as through their work, community engagement, and other sustainable behaviors. Some commentators also reflected on such behaviors as following a vegan diet or decreasing their transportation use. Interview participants felt an individual responsibility towards climate change (i.e., going childfree, eating no/less meat), but yet believed their actions to have little impact. Similar findings of hopelessness, helplessness, and commons dilemma ('will others behave sustainably?') are found in other environmental behavior research (Aitken et al., 2011; Landry et al., 2018; Salomon et al., 2017). Instead, they thought systemic change (i.e., economic, social) was needed and placed blame for climate change on corporations and government more so than on individual consumers. Similar reflections occurred in article comments with commentators critiquing the economic system and the need for systemic change, particularly consumption patterns. Here, cognitive dissonance theory may help to explain why individuals are motivated to maintain attitude-behavior consistency. Specifically, if individuals behave in a manner inconsistent with their pro-environmental attitude, they will change either their attitude or their behavior (Gifford & Sussman, 2012) and experience anxiety and guilt if they do not, which are typical emotions associated with cognitive dissonance (Gregory-Smith et al., 2013). Both studies show that unsustainable behaviors may be justified by believing in the need for systemic rather than individual change. Both studies also provided reflections on how reproduction as well as climate change would affect people (i.e., lower income regions, younger generations), more than participants themselves. It was this concern for others and future generations that demonstrated participants' complex, altruistic, lengthy, and emotional considerations for going childfree. Indeed, research has found that individuals are increasingly concerned and disheartened about the future prospects of the next generation (Stokes, 2017).

The interviews demonstrate how future children are seen as additional unneeded consumers and how this realization battles with tensions such as social pressure, love of children, and a hope for future generations as change agents. Such a reflection about creating more consumers was unique to the interviews. Conversely, commentators were mostly concerned about the systematic need for less people on earth. Interview participants and article comments also reflected on the hope new children could bring towards effectively battling climate change through their actions and future careers. In a similar vein, commentators critiqued those concerned with

climate change going childfree, frequently referring to the movie *Idiocracy* to demonstrate that then the world would be run by the people not interested in ‘saving’ the world (i.e., less well informed, aware, and concerned).

Implications for public policy makers

Our research findings point at immediate implications for society. Further decreases in the birth rate in high-income countries will affect the social system and economy. For example, a low birth rate leads to labor market shortages, and strain on tax and social security revenues, along with negative effects on pension systems (Heer et al., 2020; Johnson, 1990), as noted by several commentators. Given current demand-driven economic paradigm, reductions in consumption resulting from raising fewer children and adopting a less resource-intensive lifestyle would negatively affect corporate bottom-lines and reduce economic growth. Study 2 participants in particular recognized that GHG emissions are the negative externalities of economic activity, suggesting culpability and responsibility of “the economic system” for exacerbating environmental decline (Stern, 2008); most of them saw overconsumption as the main contributor to climate change. Thus, many called for systemic change which could result in increased efforts at enabling sustainable lifestyles, including more sustainable ways to raise children. Their attitudes towards the economic system could also increase behaviors such as activism (i.e., Extinction Rebellion), anti-consumption, and boycotting behaviors which challenge the economic system.

Movements such as #NoFutureNoChildren or Birthstrike are motivated by the perceived need to force government action toward decreasing carbon emissions (#No Future, No Children, 2020). In particular, among the US interviewees and commentators on articles, blaming government inaction for impending negative future prospects was prevalent. The more that climate change threat as a reason for being childfree becomes an argument in public discourse (Miller, 2018; Relman & Hickey, 2019), the more pressure exists for political response. If climate change mitigation were a priority topic on governments’ agendas, this could alleviate public discontent about worsening prospects for future generations - which was a pressing concern for many participants.

The research also highlights the potential impact for public health policy, particularly in terms of mental health. As primarily evident in our interviews, young people experience considerable emotional strain in response to climate change threats, and when considering being childfree as their individual response. The majority of interviewees expressed regret and sadness over having to consider this choice, with some showing advanced symptoms of climate anxiety (Clayton & Karazsia, 2020), including suicidal ideation. As climate change advances, climate anxiety is expected to compound the existing mental health crisis (Helm et al., 2018), leading to a need for vastly increased resources invested in mental healthcare and therapy (Berry et al., 2010; Hayes & Poland, 2018), particularly among Gen Y and Gen Z. Conceivably, when these generations decide to have children, they will be even more

vulnerable to negative mental health consequences due to the dual guilt of having added to climate change and exposing children to a worse environmental future.

Limitations and future research opportunities

There are limitations to the present study which could inform future research. First, there are clear limitations due to sampling procedures in both studies. In study 1, using the number of comments as the inclusion criteria for news articles presents limitations as it may be the case that readers are more likely to post comments if they disagree with a news story or feel some discontent about an issue. Therefore, selecting articles on this basis has the potential to distort our understanding of public opinions (Henrich & Holmes, 2013). Study 2 was subject to self-selection bias (i.e., including only those who had considered going childfree due to climate change); thus, future studies should aim to involve larger study samples and random sampling techniques. Further, participants identifying as women dominated the sample in study 2 and while appropriate as childbearing intentions and its research are dominated by women, there is limited research on men's decision to have children (Lindberg & Kost, 2014) or on individuals identifying as non-binary/gender non-conforming which should be explored in future research.

Face-to-face interviews regarding emotionally, politically, and religiously charged issues, as relevant for study 2, can contribute to demand characteristics and socially desirable responding (Bergen & Labonté, 2020). Future researchers could seek to employ open-ended questions while participants remain anonymous, as for example within an online survey. However, content analysis of article comments (study 1) helped to provide an overview of opinions and motivations without social desirability (Taylor et al., 2016).

As with all qualitative research, our findings cannot be generalized (Malhotra, 2010) though they do offer a starting point to understanding the motivations to go childfree in response to climate change. A more detailed analysis of individuals opting to be child-free might reveal additional demographic, psychographic, geographic, and other differences. For example, those study participants in favor of being childfree due to climate change concern seemed to be liberal rather than conservative. Additional research could also focus only on parents who already have children, but refrain from having more children due to climate change. Such decision can for example have effects on the relationship between the parents and their parenting style, particularly when parents feel guilty about having (too many) children.

Another limitation is that we only included English-language news articles from newspapers headquartered in high-income countries, and our qualitative interviews were conducted in two Western countries—the USA and New Zealand. While these countries have similar birthing rates (The World Bank Group, 2018), there are differences in climate change beliefs; 57% of Americans (Marlon et al., 2020) and 79.5% of New Zealanders believe climate change is caused by humans (Woolf, 2019). Thus, while they make interesting countries for comparison, differences exist between the two countries. Future research may wish to explore the role of climate

change in childfree choices in other countries, in particular by expanding studies to low-income countries or, collectivist cultures.

A particularly important focus of research would be to investigate through quantitative research how widespread the uncovered motivations for going childfree are, and how strongly they influence reproductive attitudes and the decision to go childfree. This would provide a sense of the extent of climate change-induced childfree lifestyles, and to encourage further discourse on this particular aspect of the climate crisis and its effects on the future of humanity.

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Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

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