Are climate change concerns related to fertility intentions and for whom? Evidence from five European countries

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1. Introduction and Research Questions

While humanity is facing one of the greatest challenges in its history, i.e. the rapid anthropogenic-caused change in climate, the past decades have simultaneously been characterized by a decline in total fertility rates (TFR) in most European countries (Sobotka 2018). Demographers have started questioning if and to what extent increasing environmental concerns constitute a possible driver for fertility decline. The literature has pointed out that the feeling of perceived uncertainty can influence fertility levels (Matera et al. 2022; Guetto et al. 2023). An example is provided by Sobotka and colleagues (2011), that demonstrated how a rise in unemployment rates can dissuade people from having children (Sobotka, Skirbekk, and Philipov 2011).

As more people become aware of the detrimental effects of climate change and environmental degradation, they may question the desirability of having children in such a world, the future and the responsibilities that a newborn would inherit. Over the past few years, there has been quite extensive coverage in the press regarding the matter (Osaka 2022; Britton-Purdy 2020), and social movements, like the "BirthStrikers" have risen, giving voice to people who have made the decision to refrain from having children due to the alarming consequences of climate change (Hunt 2019). There are at least two ways in which climate change concern may influence fertility intentions: 1) the worry about the impact of a (extra) child on greenhouse gas emissions; and 2) the worry about the future life a child will experience in a climate changing world.

There is however limited scientific evidence on the association between climate change concern and fertility intentions and the existing results are not consistent and nor homogeneous. Lockwood and colleagues (2022), for example, reveal a negative association between environmental concern and fertility intentions: a person entirely unconcerned about environmental behavior is found to be approximately 60% more likely to go on to have a child when compared to a deeply committed environmentalist (Lockwood, Powdthavee, and Oswald 2022). Rackin and colleagues (2023) examine the level of agreement regarding the government's responsibility to address environmental problems even if it entails paying more taxes. The authors find this preference to be associated to lower fertility intentions (Rackin, Gemmill, and Hartnett 2023). This result is in line with two studies on Canadian college students, that found a negative association between environmental concern and fertility desires (Arnocky, Dupuis, and Stroink 2012; Davis, Arnocky, and Stroink 2019).
In contrast, a study on EU countries found positive association between environmental concern and pro-natalism (De Rose and Testa 2015). The work of Szczuka (2022), which focuses on Hungary, Czech Republic, Poland, and Slovakia, explores the connection between the respondents' perception of climate change as the most critical global issue and their intended number of children, leading to contradictory results in the different countries (Szczuka 2022).

The scarcity of data that couple both environmental concerns and fertility intentions contributes to the relatively low number of studies on this topic. To the best of our knowledge, the study of Schneider-Mayerson and Leong (2020) is the first and only one that explores both reasons of fertility-related climate change concerns: it uses both open-ended and multiple-choice questions, providing an extensive perspective of the narrative behind the two concerns (Schneider-Mayerson and Leong 2020).

In the present study we will explore fertility intentions of European young adults (aged 18-34) in relation to climate change concerns (in the twofold specification of: procreation's carbon footprint and child's future wellbeing) with survey data designed purposively to capture this potential relationship.
Our aim is to explore whether environmental-related concerns about childbearing are related with fertility intentions and desires. If this is the case, are there specific (socio-economical, demographic, geographical, environmental) characteristics of individuals connected to these concerns? Are these characteristics different for the two specification of climate change worry?

2. Data

Data come from the 'Rapporto Giovani' project, collected by the Osservatorio Giovani of Istituto Toniolo. This original survey has been carried out through computer administered web interviews (CAWI) in November 2022, on a quota sample of 5,999 respondents aged 18 to 34: 2,000 observations in Italy, 1,000 observations for the UK, France and Germany each, and 999 observations in Spain. Quota sampling was employed to ensure the representativeness of the sample with respect to an important set of key demographic variables (gender, age, geographical area of residence, education, marital status).

3. Variables

Respondents were initially asked if they were planning to have a child in the next three years. Approximately 59% (n = 3,495) of the sample replied with a negative answer (certainly or probably not). These individuals were consequentially provided with a battery of response items and asked to what extent each of those play a role in their answer (on a 4 points Likert scale from 'not at all', to 'a great deal').

a) Having kids is not part of my life project *(not in life project)*
b) I'm single (*single)*
c) Health reasons (personal or of the partner) (*health*)
d) It is not compatible with either my or my partner's employment *(work-family conflict)*
e) I should change my lifestyle/give up my interests *(change of lifestyle)*
f) I cannot financially afford a(nother) child *(financial hardship)*
g) I don't have any childcare support (grandparents, kindergartens, babysitters, etc.) *(no care support)*
h) I would be too worried about the future that awaits the child because of climate change *(climate-change future)*
i) I would be too worried about the future that awaits the child because of the economic situation of the country *(economic future)*
j) Each new human being has an environmental impact on the planet *(climate change impact)*

Among those, the climate change concern was mentioned in its two specifications: the fear for the life a child would possibly experience in a climate changed world (item h) and the concern for the impact of one extra life on the environment (item j).

Our first dependent variable relates to the fear for the child's future, and has three categories: (i) respondents that want kids in the next three years (*Wants kids*); (ii) respondents that do not plan on having kids in the next three years and positively answer (srongly agree and agree) to be worried for the future of a child in the climate changed world (*CC concern: child's future*) (iii) respondents that do not plan on having kids in the next three years and do not mention the climate change concern among the reasons for not wanting children.

Our second dependent variable relates to the worry for the impact of a new-born on the environment. It is coded like the first dependent variable, but in category (ii) we include individuals who do not plan to have a child in the next three years and positively answer to the item related to the impact of the child (*CC- concern: child's impact*).

To capture demographic, socioeconomic and spatial heterogeneities, we consider as covariates: age; gender; educational level; the respondents' employment condition (student, neet, employed with permanent contract, employed with non-permanent contract, autonomous worker); area in which the respondent lives (rural, urban or peripheral); whether the respondent is in a stable relationship; whether he/she has kids; whether the respondent reports to have been hit by a climate change caused natural disaster in the past 5 years; and the country of residence (Italy, France, United Kingdom, Spain, and Germany).

4. Research methods

We first compute a Pearson correlation matrix among the fertility-items listed in the section above to investigate potential response clusters. Then, we use multinomial logistic regression models to assess characteristics associated with fertility intentions and the two climate change concerns, with two separate models, one for each dependent variable (*CC concern: child's future* and *CC concern: child's impact*). Sampling weights are applied. Results are presented in terms of marginal effects and predicted probabilities with 83.55% confidence intervals (MacGregor-Fors e Payton 2013).

5. Preliminary results

Figure 1 shows the proportions of individuals who (strongly) agree with the different reasons for not planning a (new) childbirth in the next three years period. More than half of the respondents (55%) express to be worried for *climate change future*, and 39% for *climate change impact*.

The heat-plot (Figure 2) shows that most correlation coefficients are below the value of 0.4, and the correlations among items *climate change future*, *climate change impact*, and worry for *economic future* are the highest (*cc future* and *cc impact*: 0.516; *cc future* and *economic future*: 0.617; *cc impact* and *economic future*: 0.421). This suggests a possible link between concerns for climate change and a general feeling of uncertainty towards the future.

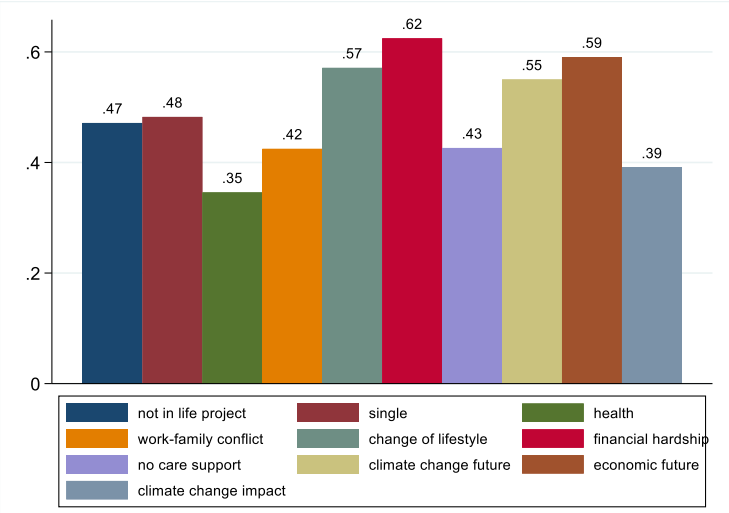

Figure 2 – Proportion of respondents that (strongly) agree to fertility intention related items. Sample of individuals who do not want children in the next three years (N=3,495). Source: Osservatorio Giovani, Istituto Toniolo, November 2022

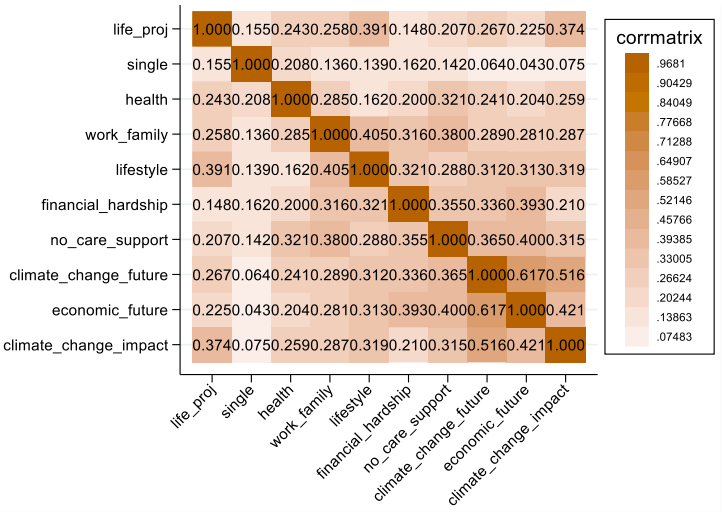

Figure 1 – Heat-plot of Pearson correlation coefficients among fertility intention-related variables. Sample of individuals who do not want children in the next three years (N=3,495). Source: Osservatorio Giovani, Istituto Toniolo, November 2022

The results from the multinomial logistic regression models (see Appendix) display some interesting patterns worth discussing. Those were previously strongly affected by natural disasters in the past 5 years are significantly more likely to report not wanting a child in the next 3 years due to both climate change concern reasons (Figure 3). Indeed, probabilities to fall into the climate change concern categories are higher for 'strongly hit' individuals when compared to 'not hit' respondents: +4

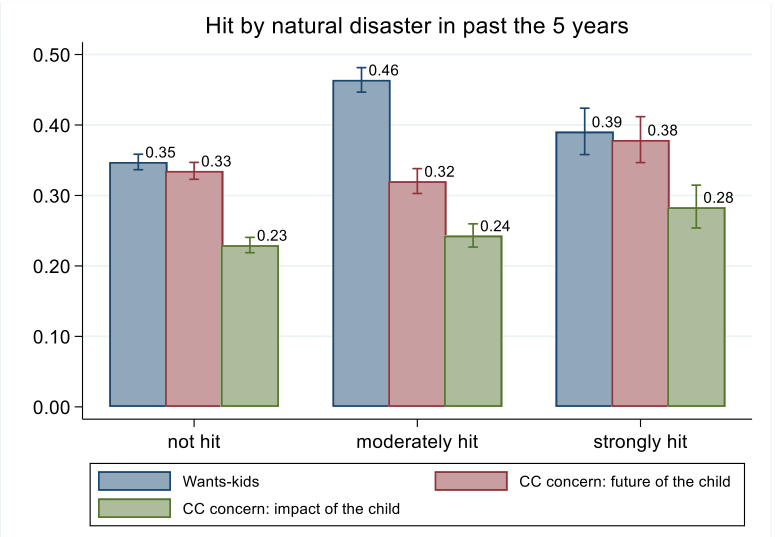

Figure 3 – Predicted probabilities *of wanting children in the next three years (blue bars); not wanting children for *CC concerns: future of the child* (red bars); not wanting children for *CC concern: child's impact* (green bars); by experience of natural disaster. Note: 83.55% CI. Results from multinomial logistic regression models with control variables included (see Appendix). N=5,948. Source: Osservatorio Giovani, Istituto Toniolo, 2022

percentage points for *CC concern: future of the child* (p.value: 0.081) and +5 percentage points for *CC concern: impact of the child* (p.value: 0.021). This finding is consistent with results from previous qualitative and exploratory studies (Schneider-Mayerson e Leong 2020; Smith et al. 2023). Also the employment condition is relevant for *CC concern: future of the child*; namely, students are more likely to report this concern with respect to people who work with a permanent contract (+4 percentage points, p.value: 0.053) or as autonomous (+6 percentage points, p.value: 0.036). This concern is also significantly associated with younger ages. On the other hand, no association emerges with the variables education and area of living.

Evidence so far obtained might lead to some considerations: among the two climate change concerns, worry for *climate change future* is the most widespread among young adults in Europe. Both climate change concerns are linked to reported experiences of natural disasters, which corroborates findings from qualitative and exploratory studies (Schneider-Mayerson and Leong 2020; Smith et al. 2023). Fear for the future of the child is also associated with younger ages and to being a student, two characteristics linked to precarious conditions; at the same time, they mirror a life period in which making fertility plans is not common, as they are usually projected in a distant future. Therefore, we hypothesise that this concern may belong to a broader feeling of uncertainty towards the future in general, as also the correlation with the item regarding concern for the *economic future* suggests.

6. Next steps

In the next steps of the analysis, we will dig further into the idea that climate-change concerns belong to a general sense of uncertainty for the future, for young people. Therefore, we will further investigate the characteristics associated with the items of concern for the economic future of the child (variable *economic future*) and the *financial hardship*. We expect similar patterns of association with those obtained for climate change concerns.

Latent-class analysis will also be employed to gain a better understanding of clusters in respondent's choices of items.

Moreover, we also plan to match our original survey data (at the municipality level), with climate data regarding extreme temperature (e.g. ERA5) and natural disasters (e.g. EM-DAT database), to compare reported experience with natural disasters with objective climate data.

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Appendix

Tables with average marginal effects for the two multinomial logistic regression models: Model 1 dependent variable comprehends *CC concern: future of the child* outcome (level 2). Model 2 refers to the *CC concern: impact of the child*.

Model 1 (N= 5948)	**Wants kids**			(No kids) **CC concern: future of the child**			(No kids) **Other reasons**		
	Average Marginal Effect (dy/dx)		p-value	Aver, Marginal Effect (dy/dx)		p-value	Average Marginal Effect (dy/dx)		p-value
Hit by natural disaster									
Ref: Not hit									
Moderately hit	0,117	***	0,000	-0,015		0,342	-0,102	***	0,000
Strongly hit	0,043	ŧ	0,087	0,044	ŧ	0,081	-0,087	***	0,000
Sex									
Ref: Female									
Male	0,002		0,851	-0,025	ŧ	0,077	0,022	ŧ	0,099
Age									
Ref: 18-24									
25-29	0,142	***	0,000	-0,069	***	0,000	-0,073	***	0,000
30-34	0,110	***	0,000	-0,042	*	0,029	-0,069	***	0,000
Country									
Ref: Italy									
Germany	-0,048	*	0,010	-0,075	***	0,000	0,123	***	0,000
Spain	-0,051	*	0,010	0,002		0,928	0,049	*	0,014
France	-0,005		0,797	-0,023		0,283	0,028		0,138
United Kingdom	0,021		0,341	-0,062	**	0,005	0,041	ŧ	0,053
Area of living									
Ref: Urban									
Peripheral	-0,048	**	0,001	0,023		0,126	0,025	ŧ	0,082
Rural	-0,064	**	0,007	0,000		0,995	0,064	**	0,006
Educational level									
Ref: Primary									
Secondary	-0,028		0,145	0,009		0,648	0,019		0,312
Tertiary	-0,027		0,185	-0,003		0,876	0,030		0,132
Occupation									
Ref: Student									
Neet	0,054	*	0,024	-0,028		0,261	-0,026		0,287
Permanent contract	0,133	***	0,000	-0,042	ŧ	0,053	-0,091	***	0,000
Non-permanent contract	0,107	***	0,000	-0,039		0,100	-0,068	**	0,002
Autonomous	0,149	***	0,000	-0,058	*	0,036	-0,091	**	0,001
Kids									
Ref: No, does not live with kids									
Yes, lives with kids	0,036	*	0,024	-0,057	**	0,001	0,021		0,227
Stable relationship									
Ref: Not in a stable rel,									
Yes, in a stable rel,	0,235	***	0,000	-0,116	***	0,000	-0,119	***	0,000

Notes: ŧ p<0,10; * p<0,05; ** p<0,01 *** p<0,001

Model 2 (N= 5948)	**Wants kids**			(No kids) **CC concern: child's impact**			(No kids) **Other reasons**		
	Average Marginal Effect (dy/dx)		p-value	Aver, Marginal Effect (dy/dx)		p-value	Average Marginal Effect (dy/dx)		p-value
Hit by natural disaster									
Ref: Not hit									
Moderately hit	0,117	***	0,000	0,013		0,349	-0,130	***	0,000
Strongly hit	0,043	ŧ	0,086	0,054	*	0,021	-0,097	***	0,000
Sex									
Ref: Female									
Male	0,002		0,852	-0,006		0,652	0,003		0,818
Age									
Ref: 18-24									
25-29	0,142	***	0,000	-0,041	*	0,012	-0,101	***	0,000
30-34	0,110	***	0,000	-0,001		0,945	-0,109	***	0,000
Country									
Ref: Italy									
Germany	-0,047	*	0,011	-0,004		0,838	0,051	*	0,013
Spain	-0,051	*	0,010	0,029		0,125	0,021		0,325
France	-0,005		0,806	0,010		0,600	-0,005		0,806
United Kingdom	0,021		0,342	0,014		0,495	-0,035		0,110
Area of living									
Ref: Urban									
Peripheral	-0,048	**	0,001	0,008		0,548	0,040	**	0,009
Rural	-0,064	**	0,007	-0,015		0,478	0,079	**	0,001
Educational level									
Ref: Primary									
Secondary	-0,028		0,144	0,012		0,512	0,016		0,415
Tertiary	-0,027		0,185	0,020		0,310	0,007		0,744
Occupation									
Ref: Student									
Neet	0,054	*	0,024	-0,005		0,817	-0,048	ŧ	0,059
Permanent contract	0,133	***	0,000	-0,014		0,485	-0,119	***	0,000
Non-permanent contract	0,107	***	0,000	-0,015		0,480	-0,091	***	0,000
Autonomous	0,148	***	0,000	-0,023		0,350	-0,125	***	0,000
Kids									
Ref: No, does not live with kids									
Yes, lives with kids	0,036	*	0,025	-0,046	**	0,004	0,009		0,603
Stable relationship									
Ref: Not in a stable rel,									
Yes, in a stable rel,	0,235	***	0,000	-0,107	***	0,000	-0,128	***	0,000

Notes: ŧ p<0,10; * p<0,05; ** p<0,01 *** p<0,001