Attitudes Towards Having Children in View of Climate Change

Final Year Project

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Abstract

A small yet growing body of literature links environmental concern with lower fertility intentions. A better understanding of how pro-environmental attitudes impact fertility rates might be a crucial contribution to research on the impacts and mitigation of climate change. However, the impact of factual knowledge as a cognitive pre-requisite to affective pro-environmental attitude and its impact on intentions towards childbearing remains understudied. Here, the factual knowledge of what impacts climate change and environmental concern (NEP; Dunlap, Van Liere, Mertig & Jones, 2000) are used as predictors for reproductive attitudes (RAS; Arnocky, Dupuis & Stroink, 2012). The study used a cross-sectional design and delivered an internet-based survey to 135 Irish adults. Results of hierarchical multiple regression show that when controlling for effects of age and gender, knowledge of climate change was a weak predictor (β = -.23, $p < .05$) that lost its significance in the final step. The final model explained 24% of variance and was significant ($p < .001$) with environmental concern being the sole significant predictor (β = -.38, $p < .01$). These results suggest that the affective component of attitude towards climate change might have a bigger impact of fertility decisions than the cognitive.

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INTRODUCTION

Literature review

The more feet, the bigger the footprint

Global warming is an increasingly popular subject in public debate, as alarming new data is regularly published. The Intergovernmental Panel on Climate Change report based on 6000 studies from all over the world states with 95% of certainty, that humans are responsible for climate change, mostly due to increased carbon emissions (Intergovernmental Panel on Climate Change, 2019). More specifically, the International Energy Agency reported that global emissions rose by 61.46% in the last 30 years, from 20.5 to 33.1 gigaton (GT) in 2018, driven by the increase in energy consumption (International Energy Agency, 2019). In the same time, global population grew 43.15%, from 5.33 to 7.63 billion. A part of the increase in energy consumption is cited to be due to growing individual energy needs, urbanisation and populations ageing (Roser, Ritchie, & Ortiz-Ospina, 2013). However, this increase is primarily due to population growth: a review prepared by O'Neill and colleagues (2012) analysed historical data on demographic change, energy consumption and carbon dioxide (CO_2) emissions and illustrated that increases in population size are almost proportional to the rise in CO_2 due to energy use. Same was previously found for developed countries by Jorgenson and Clark (2010) who reported a correlation between population growth and CO_2 as high as .91 between 1960 and 2005. At present, an astonishing 75% of world's energy expenditure, and the carbon footprint caused by it, are due to the 2.3 billion of the population under 30 years (Gerlagh, Lupi, & Galeotti, 2018; Guillebaud, 2016). Murtaugh and Schlax (2009) took similar data into account and analysed average CO_2 production per capita, as well as projections for new generations to calculate carbon

legacy value: carbon emissions of descendants weighted by the level of relatedness. Their findings suggest that in an example of an American household every adult, producing average of 20t of CO_2 a year, for over projected 80 years of life, will contribute a base of over 1600t of CO_2 throughout their lifetime. The authors note that certain behaviours can reduce this figure: for example, switching to low-wattage lightbulbs can save 36t, while recycling, 17t over an individual's lifetime. However, other behaviours could potentially increase carbon emissions, with the carbon legacy per child, estimated at added 9441t of CO_2, being the most significant contributor listed by the authors (Murtaugh & Schlax, 2009). Therefore, one conclusion of research into climate change and population growth is that individuals' choice to reproduce could be an environmentally costly decision: more feet means more carbon footprint.

Climate change and psychology

In 2009, the American Psychological Association's (APA) Task Force presented the first report on psychology and climate change which identified fertility choices in relation to climate change as understudied and called for psychologists to further investigate the subject, stating that global effort from all science disciplines, as well as public change, is required (Swim, Clayton, Doherty, Gifford, Howard, Reser, ... & Weber, 2009).

Arguably, the subject of reproduction and climate change is very complex, both concerning methodologies employed in studying it and because it is deeply rooted in moral, ethical and cultural values. Human fertility decisions depend on many factors including socioeconomic status (SES; Lampic, Svanberg, Karlström & Tydén, 2005); the economy of the country of residence (Goldstein, Kreyenfeld, Jasilioniene & Örsal, 2013) and public attitudes towards childbearing (Chan, Chan, Peterson, Lampic & Tam, 2014), to name a few. Despite widespread public fear of overpopulation, current research

suggests that today, people decide on having children later than did their parents and because of this, are likely to produce less offspring (Central Statistics Office, 2018a). Moreover, behaviours such as pursuing education, career development and consumerism were identified as competing with childbearing in individuals of reproductive age (Barber, 2001). Empirical data shows that globally, the population growth rate is steadily declining since its peak in 1968, when it reached 2.1% and is estimated to have dropped to 1.08% in 2019. However, even if the trend of lower fertility rates continues and reaches as little as 0.1% by 2100, another 3.27 billion people can be expected to be born, totalling 10.9 billion of humans on Earth (Roser, Ritchie, & Ortiz-Ospina, 2013). Because of this, as well as the direct call by APA, many researchers in the field of psychology and adjacent disciplines, have begun to focus on human fertility decisions. Interestingly, a small but growing body of literature from past decade links environmental concerns with fertility decisions (e.g. Ghimire & Mohai, 2005; De Rose & Testa, 2015).

Contemporary studies approach the investigation of participants' environmentally directed behaviour under two main models. Norm Activation Theory (Schwartz, 1977) depends on the assumptions of environmental behaviour being primarily treated as pro-social. While, Theory of Planned Behaviour (TPB; Ajzen, 1991) is used with primarily hedonic behaviours caused by self-interest (Bamberg & Möser, 2007). Additionally, Norm Activation Theory is generally used with less complex or habitual behaviours such as recycling, using ecological modes of transportation or environmental buying (Bamberg & Möser, 2007). TPB is employed to explain other such as building an environmentally friendly house or making reproductive choices (e.g. Sundblad, Biel & Gärling, 2007). Due to interest in attitudes and fertility decisions, the primary focus of this study will be put on TPB.

Attitudes towards the environment

The study of attitudes in psychology has a long history and generated a significant body of literature. Thus, there are several theories relating to how attitudes impact behaviour with the theory of planned behaviour (Ajzen, 1991) being the most well-researched throughout the years (Armitage & Conner, 2001). The theory states that individuals assess their intentions and the possible implications of their behaviour before deciding on how to act. According to the theory, the best predictor of behaviour is the strength of one's intention. Intentions, in turn, are believed to be based on three components: attitudes towards behaviour to elicit, subjective norms (a set of beliefs on how others would perceive behaviour), and the recognised degree of control over behaviour (Ajzen, 1991; Armitage & Christian, 2003; Armitage & Conner, 2001). Thus, in context of the theory, attitudes may impact on behaviour, but their effect is mediated by societal rules and expectations, as well as the subjective view on control over the circumstances and the action itself. Theory of planned behaviour displays high efficacy: a meta-analytical review of 185 studies prepared by Armitage and Conner (2001) found that the model proposed by the theory accounts for an average of 27% of the variance in behaviour and yields moderate to large effect sizes. Additionally, the authors report that attitudes are found to account for close to 40% of the variance of intention towards the behaviour, which is of particular interest for research on the relationship of environmental attitudes and reproductive intentions.

Cognitive and affective components of the attitude

It is widely accepted that individuals act on the cognitive and affective components of attitudes when forming evaluations (e.g. Mayer & Tormala, 2010; Van den Berg, Manstead, van der Pligt & Wigboldus, 2006). However, the cognitive part has so far

been commonly omitted from the literature assessing fertility decisions in view of climate change. One exception is research conducted by Sundblad, Biel and Gärling (2007) on a Swedish sample that investigated cognitive and affective risk judgements in the form of measurement of factual knowledge and worry respectively, under the assumptions of the theoretical model presented by Loewenstein, Weber, Hsee and Welch (2001). Interestingly, the study found that there was no difference in worry about climate crisis between parents and non-parents, suggesting that care for the future generation is not stronger in those who already have children on their own (Sundblad, Biel & Gärling, 2007). Further studies have suggested that concern for the environment, together with care for possible offspring negatively predicts fertility decisions (Arnocky, Dupuis & Stroink, 2012; Davis, Arnocky & Stroink, 2019).

In terms of measuring attitudes towards the environment, the majority of research to date employed the New Ecological Paradigm (NEP; Dunlap, Van Liere, Mertig & Jones, 2000) scale, measuring environmental concern. The scale is a widely used tool, valued for its high efficacy of measuring the impact of pro-environmental for instance, positive attitude towards the natural environment (see Anderson, 2012 for review). NEP scores were found to be significantly and negatively correlated to measured intentions towards having a child in Austrian university students (Andrijevic & Striessnig, 2017), reproducing findings from a similar sample in Canada (Arnocky, Dupuis & Stroink, 2012). Most recently, Davis, Arnocky and Stroink (2019) provided further support that higher NEP scores negatively predict fertility intentions.

It is essential to highlight that, to date, researchers proposed many different definitions of environmental or pro-environmental behaviour. Kurisu (2015) lists nine terms that are used interchangeably in literature such as 'responsible environmental

behaviour' (as in Hines, Hungerford and Tomera, 1987), 'environment-friendly behaviour' and 'environmentally significant behaviour' (as used by Stern, 2000). Furthermore, although defining what constitutes pro-environmental behaviour on conceptual level merits its own research (for examples see Jensen, 2002 and Kurisu, 2015) and is outside of the scope of the current study, the popular working definition from Kollmuss and Agyeman (2002) defines ‘pro-environmental behaviour’ as the sort of behaviour ‘that consciously seeks to minimise the negative impact of one’s actions on the natural and built world …’ (p. 240). Current research uses 'environmental behaviour' and 'pro-environmental behaviour' as synonyms.

Awareness of the issue

Another construct discussed in the current study in relation to both environmental action and intentions is factual knowledge or awareness of issues relating to climate change. Robert Glifford (2011) lists seven 'Dragons of inaction' concerning psychological barriers that stop individuals from making choices that could mitigate the effects of climate change. First and foremost, Glifford lists limited cognition about issues relating to the environment and climate change. Moreover, the he calls upon research from Bord, O'Connor and Fisher (2000) in which over 1200 Americans surveyed showed higher intentions to act with interest of environment if they had sufficient knowledge about climate change. Additionally, the study employed NEP and found that the knowledge about climate change was a better predictor of intentions to act in pro-environmental way than concern about the environment, accounting for 14% and 9%, respectively when accounting for variables of air pollution and global warming as personal and societal risk factors. Commenting on these findings, Glifford suggested that lack of the sufficient knowledge about causes and effects of global climate change, as well as behaviours that

can help mitigate the problem and the low-self-efficacy stemming from it, are essential predictors to the likelihood of an individual performing mitigating actions. Additionally, higher levels of knowledge and the positive impact on intentions to behave in a pro-environmental way were found in previously discussed meta-analyses from Hines, Hungerford and Tomera (1987) as well as Bamberg and Möser (2007). For this reason, research should employ a measure of knowledge of climate change as one of the predictors of fertility decisions.

Taken together, despite the wealth of research into environmental concern and pro-environmental behaviours, empirical investigations into fertility decisions and its relationship to attitudes towards climate change brings inconclusive findings and is rather scarce, thus two gaps in the research that need to be addressed; firstly, in reviewed research, student populations have been studied almost exclusively, with the participants' mean age reported in most being around 20 years. Sunblad, Biel and Gärling (2007) examined a random sample however the mean age of participants was 45.8 (range 18-75), which is at the end of average maximal human reproductive age (Wallace & Kelsey, 2010), and much older than average age of first child (32.5 year; Irish data; Central Statistics Office, 2018a). Secondly, previous research largely omitted factual awareness of climate change both in terms of its effects on attitude towards the environment and as a predictor of reproductive attitudes.

Taking the above into account, earlier findings might present limited generalizability to the Western population.

Rationale

As discussed above, the relationship between environmental concern and fertility intentions remains understudied, despite its importance and the direct recommendation of the American Psychological Association report (Swim, Clayton, Doherty, Gifford, Howard, Reser, ... & Weber, 2009). Moreover, except for one study which looked at 27 countries in Europe (De Rose & Testa, 2015), there have been no studies that have examined this topic on a unique Irish sample. Ireland represents a distinctive population in relation to significant differences in total fertility rates and carbon emissions when compared to other European countries. Firstly, Ireland is producing 150% the average of CO_2 comparing to other similar economies (Central Statistics Office, 2018b). Secondly, the country has 3rd highest total fertility rate in EU, a figure that was not affected by the 2010 economic recession (Goldstein, Kreyenfeld, Jasilioniene & Örsal, 2013). Additionally, a study by De Rose and Testa (2015) showed low levels of concern regarding climate change in Irish citizens. Specifically, Ireland ranked 2nd last with 53% of respondents reporting that they are not concerned the effects of climate change.

Furthermore, most of the existing studies, with the exception of relatively early work from Sunblad, Biel and Gärling (2007), have not considered factual knowledge or awareness of climate change as a factor contributing to intentions towards having children and used samples, not representative of the population making fertility decisions.

Aims and hypotheses of the study

The current research explores the following question: do environmental concerns and awareness predict intentions of having children? Specifically, the aim was to investigate

the relationship between knowledge of climate change, attitudes towards the environment and having children. Therefore, there are two primary hypotheses of the study:

H1: Scores on the New Ecological Paradigm predict negative attitudes towards having children measured by Reproductive Attitudes Scale.

H2: Scores of Knowledge of Climate Change questionnaire predict attitudes towards having children measured by Reproductive Attitudes Scale.

Additionally, a supporting hypothesis testing the relationship between knowledge and attitude towards the environment is included to assess the validity of the hypothetical model:

H3: There is a relationship between scores on the Knowledge of Climate Change questionnaire and scores on the New Ecological Paradigm Scale.

METHODS

Participants and procedure

The research used a cross-sectional design with quantitative methods used for an online questionnaire created in Google Forms and promoted on Reddit pages directed to Irish population (r/Ireland, r/CasualIreland, r/ROI). A self-selected sample of one hundred and forty-three participants completed a 15-minute unpaid survey consisting of an information sheet (see Appendix A), electronic consent (see Appendix B), demographic questions (age, country of residence, gender) and questions relating to the current and desired number of children (see Appendix C1). Next section included questionnaire measuring attitudes towards having children (Reproductive Attitudes Scale; Arnocky, Dupuis & Stroink, 2012; see Appendix C2), attitudes towards environment (revised NEP; Dunlap, Van Liere, Mertig & Jones, 2000; see appendix C3) and measure knowledge of climate change adapted from Sundblad, Biel and Gärling (2007; see Appendix C4). The final section included a debriefing sheet (see Appendix D).

A total of 6 cases were removed from the dataset because they were not fulfilling the inclusion criteria (being an Irish resident/citizen or, being aged 18-45) Additional 2 cases were removed due to improbable results. The final set included 135 cases (females = 69) of ages ranging 18-45 (M = 30.33, SD = 6.50).

Predictor variables

Attitudes towards the environment

The research employed the Revised New Ecological Paradigm (NEP-R; Dunlap, Van Liere, Mertig & Jones, 2000) scale as a measure of attitudes towards the environment.

This unidimensional measurement is popular and widely used to assess attitudes towards the environment (Anderson, 2012). It presents a high internal consistency previously reported by the author (alpha coefficient = .83; Dunlap, Van Liere, Mertig & Jones, 2000) and in recent re-tests (alpha = .81; Ntanos, Kyriakopoulos, Skordoulis, Chalikias, & Arabatzis, 2019). The revised scale is considered robust and consists of 15 statement items, 3 for each of the theoretical aspects of ecological paradigm: limits of growth, anti-anthropocentrism, nature's balance, and believe that people humans can control nature. The questionnaire contains eight statements worded positively and seven negatively, all of them rated on a 5-level Likert-type scale (from 1 = 'strongly disagree' to 5 = 'strongly disagree'). The possible score from the scale ranges from 1-5, where 3 is the lowest cut-off of 'pro-environmental concern', or positive attitude towards environment, as proposed by the authors (Dunlap, Van Liere, Mertig & Jones, 2000).

Knowledge of climate change

A questionnaire assessing knowledge about climate change knowledge was adapted from Sundblad, Biel and Gärling (2007; see Appendix C4). Forty-four items from the original questionnaire were reviewed and updated in accordance with the newest report of The Intergovernmental Panel on Climate Changes (2019), the UN body reviewing the scientific findings on the issue as per authors' suggestion. Moreover, as the population of Ireland is of primary interest to the study wording of questionnaire statement will be changed to include references to 'Ireland' instead of 'Sweden'. Participants were asked to judge statements as either true or false. As per the original study, only the 21 true statements were scored (0 for incorrect and 1 for a correct answer) and taken into analysis with intentionally false questions serving as a distraction, similarly to practice employed

by original authors and in other studies (e.g. Bord, O'Connor and Fisher, 2000). The possible range is thus 0-21.

Criterion variable

Attitudes towards having children

Reproductive Attitudes Scale, a 10-item measurement including pro-reproductive and anti-reproductive statements developed by Arnocky and colleagues, will be used to assess participants' attitudes towards having children. The questionnaire uses a 7-point Likert-type scale with possible scores ranging from 10-70.

Permissions to use (and in case of knowledge of climate change (Sundblad, Biel & Gärling 2007), to alter) the questionnaires were secured.

Data analyses

A priori sample size analysis suggests that given medium and large effect sizes found in the previous study (Davis, Arnocky & Stroink, 2019), the sample for multiple regression analysis with 5 predictor variables should not be smaller than 140 participants (calculated with G*Power 3.1.9.4.; Faul, Erdfelder, Buchner, & Lang, 2009). This exceeds recommended number of participants as calculated with formulas recommended by Tabachnick and Fidell (2007; $140 > 50 + (8 \times 5)$). Furthermore, to ensure no outliers, data will be screened for residuals of values higher than 3.3 and lower than -3.3 (Tabachnick & Fidell, 2007).

RESULTS

Descriptive statistics

Statistical analyses were conducted in IBM's SPSS 26. First the data was recoded, and the new variables created for scales' total scores. Participants had an average of 0.30 child (scores ranging 0-4) and intended to have 1.50 children (range: 0-6), lower than Irish Total Fertility Rate (1.77).

Table 1.

Summary of descriptive statistics.

	Mean	SD	Min	Max
Age	30.33	6.50	18	45
Current Children	0.30	0.66	0	4
Planned children	1.50	1.33	0	6

The average score of NEP was 3.71, above the cut off for 'positive attitude' (*M* = 3) consistently with literature cited females (*M* = 3.84, *SD* = .39) scored on average higher than males (*M* = 3.58, *SD* = .45; Dunlap, Van Liere, Mertig & Jones, 2000). Anti-reproductive subscale scores (*M* = 2.92, *SD* = 1.05) of RAS were on average higher than the pro-reproductive (*M* = 2.07, *SD* = 1.97), rendering total RAS score to be negative (*M* = -.85, *SD* = 2.34). Finally, knowledge of climate change averaged on 14.40 (*SD* = 3.06) out of 21, slightly higher than in the Original Swedish sample (Sunblad, Biel & Gärling, 2007). Summary of descriptive statistics can be found in Table 1. and Table 2.

Table 2.

Scales summary and diagnostics.

		CI 95%						
	Mean	Lower	Upper	SD	Min	Max	α	N
RAS	-.85	-1.25	-0.45	2.34	-4.00	6.00		10
Pro	2.07	1.73	2.40	1.97	0	6.00	.79	6
Anti	2.92	2.74	3.10	1.05	0	4.00	.42	4
NEP	3.71	3.64	3.79	.44	2.67	4.47	.65	15
Knowledge of climate change	14.40	13.88	14.92	3.06	2.00	20.00	.64	21

Note. NEP = Pro-environmental attitude; RAS = Attitude toward having children; CI 95% (B) = 95% confidence interval for Mean; SD = Standard Deviation; N = Number of items in a scale/subscale.

Inferential statistics

Hierarchical multiple regression was performed to investigate attitude towards the environment and awareness of climate change as a predictor of reproductive attitudes when controlling for demographic factors of age and gender. The EXPLORE program and preliminary analyses were run to screen data for outliers and to ensure normality, linearity and homoscedasticity.

Moreover, the correlations between the predictor variables (age, gender, knowledge of climate change, attitude towards the environment (as measured by NEP), current number of children and intended number of children) were examined and are presented in Table 3. All relevant correlations were weak and ranged between -0.01 and

.37, indicating that the assumption of lack of multicollinearity was not violated (Tabachnick & Fidell, 2007). Predictor variables, apart from age, were correlated with reproductive attitudes showing that the data was suitable for multiple linear regression analysis.

Table 3.

Intercorrelations between predictor variables and their correlations with attitude toward having children.

	Gender	Age	Current Children	Planned Children	NEP	RAS
Age	0.07					
Current Children	-0.01	.35**				
Planned Children	-.21*	-0.16	.32**			
NEP	.31**	-0.08	-.29**	-.49**		
RAS	-.27**	0.04	.27**	.56**	-.46**	
Knowledge of climate change	0.01	-0.02	0.007	-.25**	.37**	-.24**

Note. Correlation significant on: ** p < .001; * p < .05 level. NEP = attitude towards the environment; RAS = attitude toward having children. Gender coded as 1 = female and 0 = male.

A 3-step hierarchical multiple regression model was analysed. In the first step, two predictors: age and gender, were entered. The model displayed statistical significance $F(2, 132) = 5.40$; $p = .006$ and explained 8% of variance in reproductive attitudes (see Table 2 for full details). At Step 2 knowledge of climate change predictor was added, increasing the total variance explained by the model by 5.3%. This change

was significant $F(1, 131) = 7.95$; $p = .006$. Finally, attitude towards the environment predictor (as measured by NEP) was entered at Step 3 and the final model explained 24% of variance and was statistically significant $F(4, 130) = 10.15$; $p < .001$. The introduction of environmental attitude explained an additional 11% variance in reproductive attitudes scores after controlling for age, gender and awareness of climate change; and was small and statistically significant (r^2 change = .11; $F(1, 130) = 18.70$; $p < .001$).

In the final model, only the attitude towards the environment predicted reproductive attitudes to a statistically significant degree with the higher environmental attitude predicting lower reproductive attitudes (β = -.38, $p < .001$; see Table 4 for full results).

Table 4.

Hierarchical regression model of attitudes toward having children.

	R	R^2	*Adj.* R^2	ΔR^2	*B*	*SE*	β	*t*	*CI 95% (B)*
Step 1	.27**	.08	.06	.08**					
Gender					-1.27	0.39	-.27*	-3.25	-2.04/-.50
Age					.02	.03	.06	.67	-.04/.08
Step 2	.36***	.13	.11	.05**					
Gender					-.70	0.38	-.27**	-3.29	-2.00/-.50
Age					.02	.03	.05	.62	-.04/.08

Knowledge of climate change					-.07	0.06	-.23*	-2.82	-.30/-0.5
Step 3	.49***	.24	.21	.11***					
Gender					-.70	.38	-.15	-1.86	-1.45/.05
Age					.00	.03	.01	.17	-.05/.06
NEP					-2.03	.47	-.38**	-4.32	-2.96/-1.10
Knowledge of climate change					-.07	.06	-.09	-1.10	-.19/.06

Note. R^2 = R-squared; Adj R^2 = Adjusted R-squared; ΔR^2 = R^2 change; B = unstandardized beta value; SE = Standard errors of B; β = standardized beta value; CI 95% (B) = 95% confidence interval for B; N = 135; Statistical significance: *p < .05; **p < .01; ***p < .001. NEP = attitude towards the environment; RAS = attitude toward having children. Gender coded as 1 = female and 0 = male.

DISCUSSION

Current study worked under assumptions of Theory of Planned Behaviour (TPB; Ajzen, 1991) and investigated the relationship between attitudes towards the environment, knowledge or awareness of the issues relating to climate change and attitudes towards having children in a self-selected sample the Irish population (N =135). This cross-sectional research targeted at testing TPB, focusing on the affective/cognitive attitudes components in particular, as a model describing impact of one's environmental views on reproductive intentions.

The main objective was to provide additional data regarding environmental concerns and awareness as predictors of intentions of having children. The three hypotheses of the study tested whether or not 1) the positive environmental attitude (NEP) predicted negative attitudes towards having children (RAS); 2) higher awareness of issues relating to climate change (knowledge questionnaire) predicted attitudes towards having children (RAS); and finally 3) what was the relationship of awareness (knowledge) of climate change and attitudes towards the environment. One of the strengths of this study lies in the mean age of participants (M = 30.33) as it is more representative of individuals making fertility decisions and thus allows for more generalization to Western population, as opposed to the previous studies in the field that predominantly used undergraduate students.

Before the results corresponding to the two main hypotheses can be discussed it is important to provide context on relationship of variables used, namely awareness of climate change and environmental concern that were tested for in third hypothesis. Results suggest that higher knowledge of the issues relating to climate change was significantly, yet weakly, correlated to a higher, positive, attitude towards environment

measured by Revised New Ecological Paradigm scale (Dunlap, Van Liere, Mertig & Jones, 2000; $r = .37$, $p < .001$). This result was in line with previous research on a Swedish sample that used the same measure of factual awareness of issues related to the climate change (Sundblad, Biel & Gärling, 2007) and supported 3rd hypothesis of the current study. The strength of the relationship was slightly higher than reported in previous meta-analyses performed by Hines, Hungerford and Tomera (1987) where correlation between knowledge and intentions toward pro-environmental behaviour was found to be $r = .30$ and, more recently in that conducted by Bamberg and Möser (2007) where, based on 57 samples, 30% of variance in intention towards environmental behaviour was explained by knowledge of climate change. One explanation for this difference might be the demographics of the self-selected sample and the study's promotion of the research on social media platform Reddit. This may have led to the sample being not representative of the population, with a disproportionate number of people more interested in the issues relating to climate change taking part in the study. However, another explanation might be that there is an increase in awareness and, subsequently, factual knowledge of climate change due to increasingly higher media coverage. This, in turn might be a mediating factor to the relationship of knowledge and attitudes.

Scores on the New Ecological Paradigm were found to predict negative attitudes towards having children measured by Reproductive Attitudes Scale ($\beta = -38$, $p < .01$) which allowed the null of the first hypothesis to be rejected. This finding is in line with all of the previously discussed studies (e.g. Andrijevic & Striessnig, 2017; Davis, Arnocky & Stroink, 2019; Arnocky, Dupuis & Stroink, 2012) with an exception of De Rose and Testa (2015). It is worth noting this exception might be due to methodological differences as De Rose and Testa used a single item measure of environmental concern

rather than NEP. Moreover, the knowledge measure was used as a predictor of intentions towards having children and accounted for 23% of variance with higher scores predicting lower reproductive intentions. This effect, although significant, accounted for a lower part of the model than being male ($\beta = 27$, $p < .01$). Moreover, the significance of the effect was lost when affective component of the attitude towards environment was added to the model predicting fertility attitudes. Therefore, contrary to the expected, the scores of knowledge of climate change questionnaire were not a significant predictor of attitudes towards having children as measured by Reproductive Attitudes Scale and null hypothesis on H2 cannot be rejected.

Despite these results, this study is an important contribution to a limited research on environmental views and their impact on fertility intentions in the Irish context for a number of reasons. First and foremost, the affective component was found to be stronger than the cognitive, therefore, it can be argued that future research should address the usefulness of information promoting pro-environmental behaviour, in areas including, but not limited to, influencing fertility decisions in population. In line of the current study, information on the affective component can be expected to be more useful than that of cognitive. However, in designing future research, it is important to address limitations of existing body of literature as well as this current contribution.

Limitations of the current research can be generally extended to majority of similar research to date. One major limitation concerns the variables chosen as predictors of fertility decisions. The scope of both the current research and the majority of the literature to date, did not include factors that people consider important when making fertility decisions, for example the socioeconomic status. Additionally, Ajzen highlights the need to create a measurement of perceived behavioural control. In their meta-

analysis, Ajzen and Klobas (2013) reported studies were asking questions solely about housing, e.g.: ‘I will be able to house another child’.

Another limitation is that of not considering traditional gender roles and their impact on both perceived and actual behavioural control. For instance, although Arnocky, Dupuis and Stroink (2012) measured effects of religious affiliation these factors, none of the research reviewed as a part of this study took into account differences between males and females nor the effects of availability and attitudes towards contraceptives and abortion.

Finally, as current research utilised a sample of Irish population it cannot be generalised to non-Western populations where fertility decisions are influenced by different set of factors (e.g. in developing countries children are perceived as helping hands; for review see Haq, Vanwing and Hens, 2010). Moreover, the population of Ireland specifically cannot be directly compared to other European countries in terms of fertility rates and issues relating to climate change.

Conclusion

Wider implications of this and existing research may inform policy makers and organisations aiming on influencing human behaviour to help mitigate the effect of climate change (e.g. promotion of lowering the reproductive rates) by providing information on the best strategies. In these terms the current research suggests that using emotional messages might yield better results than information-rich ones particularly, in groups that have limited knowledge about facts on the issue. Furthermore, this study indicates that those with higher positive attitude towards climate change tend to have more knowledge about the issue. Because of the nature of the cross-sectional design used

in this research is that no causational statement can be made it might be possible that by gaining stronger emotional response towards environmental issues individuals will seek more information on the subject. Thus, a recommendation for future research would be to employ experimental or longitunal designs to measure the impact as well as the direction of the relationship.

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Appendices

APPENDIX A

Participant information sheet.

SURVEY PARTICIPANT INFORMATION SHEET

Intentions Towards Having Children in View of Climate Change

As part of my Bachelor of Psychology Final Year Project at the National College of Ireland, I am carrying out a study on people's view of climate change and intentions of having children. Before deciding to take part please see the below for all the information. In case of questions or suggestions please do not hesitate to contact me via email: climateresearchsurvey2019@gmail.com.

What is the study about?

The study aims to investigate the relationship between people's view on climate change and their intentions to have children.

What will I have to do?

You are invited to take part in the survey that is designed to measure the following:

- Your knowledge about facts related to climate change
- Your attitude towards the environment
- Your attitude towards having children.

Additionally, some demographic questions regarding your age, country of residence, gender as well as current and intended number of children will be asked.

Completion of the survey should take around 10 minutes.

What are the benefits?

The findings of the study might help in informing policymakers on population growth prognosis by supplying information on how people's view of climate change relates to their intentions of having children or not. You will not directly benefit from participation.

What are the risks?

There are no significant risks connected to this survey. If climate change or questions about parenthood make you worry, and you find yourself not comfortable during filling out the survey please consider taking a break from it. If you do not want to answer a particular question, please remember that you can withdraw at any time.

What if I do not want to take part?

Please remember that your participation is voluntary, and you have the right to withdraw/end your participation at any moment with no consequences.

What happens to the information?

All the information collected in the study will be protected by a password and stored on the researcher's computer for the duration of the project. Since no identifiable data is gathered you will not have a possibility to withdraw or request copy of your information after the completion of the survey. After the project end, all data will be stored securely for 5 years for the purpose of possible re-visiting the study in the future.

Who else is taking part?

The survey is posted on Reddit Ireland directed to the Irish population as well as promoted by posters placed in Dublin offices. Irish residents aged 18-45 years old are asked to take part in the study.

What happens at the end of the study?

At the end of the study, the information will be used to present results. No identifiable data will be made public. The research will be submitted to the National College of Ireland. The researcher hopes to have the final paper published and will present it at a student conference.

Thank you for taking the time to read this. I would be grateful if you would consider participating in this study.

Yours sincerely,

Ewa Musialczyk

APPENDIX B

Consent form.

Intentions Towards Having Children in View of Climate Change

CONSENT TO TAKE PART IN RESEARCH SURVEY

I voluntarily agree to participate in this research study.

I understand that even if I agree to participate now, I can withdraw at any time without any consequences of any kind.

I have had the purpose and nature of the study explained to me in writing and I have had the opportunity to ask questions about the study.

I understand that participation involves giving answers to questions relating to climate change, having children and demographics.

I understand that I will not benefit directly from participating in this research.

I understand that all information I provide for this study will be treated confidentially.

I understand that in any report on the results of this research my identity will remain anonymous.

I understand that survey data provided by me will be retained by the researcher for a period of 5 years and then destroyed.

I understand that I am free to contact any of the people involved in the research to seek further clarification and information.

Investigator and Supervisor

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Undergraduate Studies
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I read and understand the above consent form and I consent.

- Consent and progress in the survey.
- Do not consent and stop the survey.

APPENDIX C

Measures used in the study.

1. Demographic questionnaire

Dimension	Possible Answers
Gender	Male / Female / Other
Age	Numeric value
Current number of children	Numeric value
Intended number of children	Numeric value

2. The Reproductive Attitudes Scale (RAS). Adapted from Arnocky, Dupuis and Stroink (2012).

Statement	Answer yes / no
1. Carrying on my genes is important to me	
2. My having children is important for my entire family	
3. I'd be doing my duty to my family by reproducing	
4. It is important that my children carry on my family name	
5. Part of why I want children is because my parents would enjoy having grandchildren	

6. Having children is the greatest personal accomplishment one can hope for	
7. I would consider having fewer children if it meant less stress for family members	
8. If I had fewer children, it would save me a great deal of time and money	
9. I would feel the same way toward an adopted child as to my own biological child	
10. What I am made up of carries on regardless of whether I personally reproduce	

3. Revised New Ecological Paradigm Statements. Adapted from Dunlap, Van Liere, Mertig and Jones (2000).

Listed below are statements about the relationship between humans and the environment. For each one, please indicate whether you STRONGLY AGREE, MILDLY AGREE, are UNSURE, MILDLY DISAGREE or STRONGLY DISAGREE with it.

Statement	Strongly Disagree	Mildly Disagree	Unsure	Mildly Agree	Strongly Agree
1. We are approaching the limit of the number of people the Earth can support.					
2. Humans have the right to modify the natural environment to suit their needs.					
3. When humans interfere with nature it often produces disastrous consequences.					

4. Human ingenuity will insure that we do not make the Earth unlivable.					
5. Humans are seriously abusing the environment.					
6. The Earth has plenty of natural resources if we just learn how to develop them.					
7. Plants and animals have as much right as humans to exist.					
8. The balance of nature is strong enough to cope with the impacts of modern industrial nations.					
9. Despite our special abilities, humans are still subject to the laws of nature.					
10. The so-called “ecological crisis” facing humankind has been greatly exaggerated.					
11. The Earth is like a spaceship with very limited room and resources.					
12. Humans were meant to rule over the rest of nature.					
13. Th e balance of nature is very delicate and easily upset.					

14. Humans will eventually learn enough about how nature works to be able to control it.					
15. If things continue on their present course, we will soon experience a major ecological catastrophe.					

4. Questionnaire statements about climate change. Adapted from Sundblad, Biel and Gärling (2007).

Statement	True	False
1. The global average temperature in the air has increased approximately 3.11 C during the last 100 years		
2. The global average temperature in the air has increased approximately 0.61 C during the last 100 years		
3. The global average temperature in the air has been approximately stable during the last 100 years		
4. The 1990 decade was the warmest during the last 100 years		
5. The 1990 decade had a normal average temperature compared to other decades during the last 100 years		
6. The global change in temperature the latest 100years is the largest during the last 1000 years		

7. It is not possible globally to establish if the latest 100 years had a divergent temperature compared to the earlier 1000 years		
8. The precipitation has increased in the last 100 years in most areas in the middle and northern part of the northern hemisphere		
9. Climate change is mainly caused by increased concentration of green house gases		
10. Climate change is mainly caused by the ozone hole		
11. Climate change is mainly caused by a natural variation in sunbeam and volcanic eruption		
12. The carbon dioxide concentration has increased more than 30% in the atmosphere during the latest 250 years		
13. The carbon dioxide concentration has increased between 20% and 30% in the atmosphere during the latest 250 years		
14. Methane has increased more than 20% in the atmosphere during the latest 250 years		
15. Carbon dioxide is responsible for approximately 80% of the emissions of green house gases		
16. Carbon dioxide is emitted in the use of fossil fuels		
17. Methane is emitted mainly from the use of fossil fuels		
18. The increase of green house gases is mainly caused by human activities		

19. The increase of green house gases is mainly caused by a surplus of heat from tempered buildings		
20. The increase of green house gases is mainly caused by air pollutions from the industry		
21. The blanket of snow in the Northern hemisphere has decreased approximately 10% since the 1960 decade		
22. The blanket of snow in the Northern hemisphere is currently approximately the same as in the 1960 decade		
23. The number of storms and flooding hasincreased prominently in the latest 100 years		
24. It is not possible to establish globally if the number of storms and flooding currently are more or fewer than during the latest 100 years		
25. The global precipitation will increase the next100 years		
26. The global precipitation will decrease the next100 years		
27. The global sea level has risen approximately0.2 m the latest 100 years		
28. The global sea level has risen approximately1.1 m the latest 100 years		
29. The global sea level has been stable the latest100 years		

30. A cause to the rising sea level is the melting of glaciers and snow		
31. A cause to the rising sea level is the increasing temperature of the seawater		
32. In 100 years from now the sea level rise will be less than what is possible to measure		
33. In 100 years from now the sea level rise will be approximately 1 m		
34. In 100 years from now the sea level is expected to rise approximately 3–5 m		
35. The ice mass of Arctic is expected to increase in the next 100 years		
36. If the Greenland ice will melt down completely in the future the sea level will rise approximately 6 m		
37. If the Greenland ice will melt down completely in the future the sea level will rise approximately 12 m		
38. If the sea ice in the North pole will melt down completely in the future the sea level will rise approximately 3 m		
39. It is probable that an increasing number of mosquitoes and ticks within 50 years will cause more cases of human diseases in Sweden, due to climate change		

40. Climate change will increase the risk in Sweden for diseases transferred by water (i.e. diarrhoea) the next 100 years		
41. It is probable that the mortality by lung oedema and heart problems during heat waves in Sweden will increase the next 50 years		
42. Negative health impacts caused by climate change will globally affect humans on the countryside more than humans living in cities		
43. An increasing amount of green house gases risks to cause more UV radiation and therefore a larger risk for skin cancer		
44. The health effect that might come up due to climate change the next 50 years only concerns humans who stay in tropical areas		

APPENDIX D

Debriefing information.

SURVEY PARTICIPANTS DEBRIEFING INFORMATION

Intentions Towards Having Children in View of Climate Change

Dear Participant,

This message is to thank you for taking part in Intentions Towards Having Children in View of Climate Change study. Answers you have given in the survey will contribute to the data set currently being collected. This will be analysed and reported as part of my Final Year Project paper submitted to National College of Ireland. There is a possibility that this, in turn, will be published in students' academic journal and presented on students' conference.

Research that was done before mine suggests that people who have more pro-environmental attitudes have fewer intentions to have children on their own. So far, to my knowledge, there was no study that tested this in Irish population so my research will supply first data in the context of Ireland.

What should you do next?

I hope that taking part in the survey did not cause you any distress. If you feel worried about environmental changes please consider visiting the United Nations website for

information on how you can make the impact: https://www.un.org/sustainabledevelopment/takeaction/.

If you feel any level of discomfort as a result of partaking in this research, please contact the Samaritan on 116 123.

If you have any further questions about the nature of the current research, please feel free to contact my Supervisor, Dr Conor Nolan: conor.nolan@ncirl.ie.

What happens to my data?

As no identifiable information is being collected as part of this research, it will not be possible to withdraw your data once you have submitted it. Please note that all data will be stored securely on a password-protected computer after the data collection ends.

How can I contact the researcher?

Should you feel the need to contact me please send me an email: climateresearchsurvey2019@gmail.com.

Kind regards,

Ewa Musialczyk.