# DO PEOPLE LISTEN TO THE MEDIA AND GRETA?

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# ABSTRACT

This thesis empirically investigates the drivers of public opinion on climate change. Specifically, the thesis tests the effect of media coverage of climate change and the effect of the global climate strikes. Employing empirical analysis, the evidence from the sample country of the United Kingdom indicates that the amount of media reports related to climate change negatively affects people's worries about climate change. The number of articles published within the previous week has a stronger effect on people's attitudes, compared to the number of media reports on the day when their attitude was surveyed. Additionally, this thesis explores the heterogeneous effect between the age categories of respondents, which shows that while the younger generation (18-30) is affected by the number of reports on the given day of attitude sampling, the older generation (above 55) is influenced more by intense media coverage one week prior. This thesis found no evidence of the effect of the global climate strikes on people's attitudes, although this finding may be due to the small sample size in this test. In testing whether people who are more worried about climate change behave more ecologically, there appears to be no causal link between these two. The findings confirm the strong influence of media, but also indicate that fear is not enough of a driver to produce a change in behaviour, thus more needs to be done in order to limit the impact of climate change.

#### Keywords: Climate Change, Media Effect, Public Opinion, Global Climate Strikes

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# INTRODUCTION

In 2020 the world experienced 389 natural disasters. The average in the previous decade was 368 (UNDRR, 2020). The occurrence of natural disasters caused by climate change is more frequent than in the past, but the casualties are lower. On the other hand, the economic losses caused by natural disasters increased in 2020 by almost 20 billion US dollars (UNDRR, 2020). Undoubtedly, climate change is already happening, and no one can stop it. The only thing which can be done is to retrench its impact on planet Earth and its population.

There is a clear consensus among scientists that climate change is a pressing issue that needs to be addressed immediately, stressing the fact that it should have been addressed many years ago. Such a consensus is observed among the political elites too, at least in the European setting. The EU has adopted an ambitious policy aimed at cutting emissions by at least 55% by 2030 (Pronczuk, 2020) and running an economic stimulus program called Next Generation EU which to a large extent targets supporting green, climate-friendly investments (European Commission, 2020). But do we observe such a consensus among people? Clearly, the vast majority of people would agree that climate change is an issue that embodies a potential problem in the future, but the extent to which individuals are willing to prioritize climate change varies. While one group of people sees climate change as a serious problem and are willing to change their habits, another group does not care so much and would prefer less attention and financial support to be given to green policies. This brings us to the main goal of this thesis – to investigate what drives attitudes towards climate change at the individual level.

Climate change is a global threat that will impact everyone living on Earth. This is a fact that cannot be queried. Although some people may be impacted more than others, the question arises around why some people do not consider climate change to be a threat. In the European Parliament elections in 2019, the green political parties experienced a rise in support, which indicates that increasing numbers of people care more deeply about environmental protection (European Parliament, 2019). The most dominant theory in the existing literature is built upon the economic hypothesis, which claims that recession tends to decrease the support for green policies as well as decrease the level of climate change fear (Brulle et al., 2012; Scruggs et al., 2012).

This thesis looks at the attitudes towards climate change from a different angle. The general research question concerns the effect of media and global climate strikes on people's attitudes towards climate change. Since the thesis is an observational study, I implemented an unconventional strategy in order to examine the media effect. Specifically, I aggregated the number of articles about climate change published on a given day of interview, and also one week prior to interview. Consequently, the number of articles is assigned to each individual based on the day of their interview.

Secondly, the thesis tests the hypothesis about new emerging climate change movements, such as the School Strike for Climate inspired by Greta Thunberg. I examine the media coverage at the time the strike was taking place and whether the general mood was different compared to the non-climate strike weeks.

To test the hypothesis, I employed quantitative analysis, in particular an ordinary least square estimate. Because the media coverage is the number of articles published on a day of interview, I clustered standard errors on a given day in the regression to ameliorate the estimates in the analysis. The availability of data directed the selection of the sample, as there is a very limited number of longitudinal survey databases in existence. I worked with data from the Understanding Society study, conducted in the United Kingdom; thus, the sample country is the United Kingdom. The last available wave 10, wherein the time period of data collection spanned the years 2018 to 2020, was adopted for the purpose of this thesis. My empirical analysis reveals that media does have an effect on public attitudes, but the magnitude of the effect varies based on the age of the participant. Moreover, I found that the number of articles

one week prior to the interview has a stronger effect than the amount published on a day of the interview. Regarding the second hypothesis, I found that public attitudes are not affected by the global climate strikes. Moreover, according to the empirical analysis, it seems that there is no link between climate change fear and ecological behaviour.

The structure of the thesis is as follows: the first third of the thesis reviews the extant papers, introduces the theoretical framework which is mostly built on the quantity of coverage theory, and explains the data collection and coding processes of the variables. In the second section of the thesis, public opinion, as well as media coverage, are discussed in detail, followed by empirical hypothesis testing. At the end of the thesis, a conclusion is provided which summarises the main findings and states the implications, as well as some ideas for future research.

# **1.LITERATURE REVIEW**

This chapter of the thesis provides a brief summary of the most crucial studies examining what determines people's attitudes towards climate change and identifies the gaps and the contribution to the literature.

## 1.1. Social Demographic Indicators and Partisanship

One of the most traditional factors affecting people's opinion are social demographic indicators and partisanship. Therefore, numerous previous papers conducted on attitudes towards climate change included these variables. For example, several papers conducted mostly in the US but some also in Europe claim that women are more likely to believe that climate change is actually happening (Egan et al., 2012; McCrightet al., 2011, Scruggs et al., 2012). For example, Scruggs's findings suggest that women believe that global warming is a real threat on average 5% more than men (2012). Besides the gender effect, a positive effect on support for environmental protection was found to correlate with educational attainment, whereas negative support correlated with increased age (Geliseen, 2006). The literature strongly suggests the importance of gender, education and age on public opinion towards climate change. For that reason, the analysis of this thesis also controls for these factors.

Partisanship may also play a role in shaping public opinion on green policies (McCright et al., 2011; Scruggs et al., 2012). Specifically, papers dealing with partisanship were conducted exclusively in the US setting and claim that Liberals and Democrats are more likely to believe in the occurrence of climate change than Republicans. Additionally, the interaction of education and partisanship is positive and stronger among Democrats and Liberals (McCright et al., 2011; Ehret et al., 2017). Fairbrother claims that the level of support for environmental protection depends on the level of trust held for people in public authority (2016). The main argument is that when people trust in the authorities, they also believe that policies addressing

environmental protection will be fair; meaning that the polluter will play by the rules (Fairbrother, 2016). Whether a green policy is an exclusive agenda and priority of left-wing parties was confirmed only in the Anglo-Saxon environment. In other countries, the topic of environmental protection is usually adopted by several parties and not only by left oriented parties (Fankhauser et al. 2015; Fairbrother, 2016).

A different group of researchers has tested the hypothesis of whether there is a difference in the support for green policies between people living in urban and rural areas. There seems to be a consensus that there is no significant difference in the support for environmental protection between rural and urban citizens (Lowe and Pinhey, 1982; Arcury & Christianson, 1993). On the other hand, Huddart-Kennedy et al. argue that there are a few differences, for example, people living in rural areas prioritize the environment more and also recycle more. As the previous papers focused principally on environmental protection and ecological behaviour, the opinion differences about climate change between rural and urban citizens remain unanswered, thus I include the type of settlement in the analysis.

## 1.2. Weather and Environmental Attitude

Some papers also tested the hypothesis of experiencing the actual impact of climate change and its effect on a person's position (Egan et al., 2012, Scruggs et al. 2012; Shum, 2012, Inglehart, 1995). These papers conclude that there might be some effect of experiencing temperatures above normal, but this effect is rather short-lived in nature, meaning that in the long-term, people tend to return to their previous position (Egan et al., 2012). However, Shmu's paper conducted in a European setting found no evidence of the effect of weather on attitudes towards the mitigation of greenhouse gas emission (2011).

## **1.3. Economic Condition and Support for Environmental Protection**

Perhaps the largest attention of researchers exploring public opinion on climate change was paid to the effect of economic conditions and the performance of national economies as a whole. The main argument of the economic explanation is related to "a prosaic public goods dilemma: people's immediate economic concerns – not just for themselves, but also for their friends, neighbours, countrymen, and even fellow man - lead many to adjust their expressed concern about long-term worries when they seem to compete directly" (Scruggs et al., 2012). In other words, an immediate change in the economic situation makes people prioritize economic-related issues over others.

In the U.S. setting, there is evidence that unemployment is negatively associated with people's perception of climate change as a threat (Brulle et al.,2012; Scruggs et al., 2012). Kahn et al. found evidence that a high unemployment rate makes people believe that climate change is not a serious problem, which leads to lower support for policies aiming to address climate change (2011). A conflicting conclusion provided by Krosnick and MacInnis claims that there is "no evidence to support the hypothesis that people living in states with struggling economies manifested larger declines in policy endorsement" (2012, p. 15). Similar reasoning might be found in Mildenberger and Leiserowitz's 2017 paper stating that there is very limited evidence supporting the economic hypothesis on both the individual level as well as the regional level (2017).

Scruggs et al. looked at the effect of the Great Recession in the European setting between 2007 and 2009 and found that this effect was similar to the effect in the U.S., claiming that all European countries observed a decrease in their environmental attitudes and those that were most affected by this recession also experienced the largest decline in this attitude (2012). Additional to the effect of employment, economic growth also shows a statistically significant

negative effect on people's position towards the mitigation of greenhouse gas emissions (Shmu, 2011). In other words, when the economy is performing worse, people tend to be less worried about climate change and its impact.

One of the most recent papers that focuses on the relationship between economic conditions and the prioritization of environmental protection comes from Kenny (2019). Specifically, his research looks at the effect of the recession on people's prioritization of environmental protection. The analysis of the paper includes countries from different continents. The main finding of this paper concludes that it is the unemployment rate that determines the level of support for environmental protection. At the same time, he found that GDP did not have a measurable effect on people's prioritization of environmental protection.

At the country level, the evidence suggests that when the economy performs well in highincome countries, (meaning that the GDP per capita increases), support for higher taxes for environmental protection increases too while in low-income countries the trend is the opposite, and the support decreases (Israel, 2004; Geliseen, 2006). The logic behind why this pattern is observed is either because the environmental taxes are already high in developed countries or that "higher taxes" represent a much larger amount in higher-income countries than in lowincome countries, and therefore they are met with indignation (Israel, 2004). Moreover, the paper found a "quite high level of support for environmental protection in lower-income African countries" as well as finding that environmental protection is important to the public in these countries during economic growth. (Israel, 2014, p. 775).

According to Geliseen, in countries with a higher level of national wealth, people tend to be less supportive of environmental protection. (Geliseen, 2006; Dunlap and Mertig, 1997). One possible explanation may be the fact that people in these countries already have to pay a large amount of money on environmental protection and therefore they do not support increased environmental protection. Another of Geliseen's findings supports the argument developed by Inglehart claiming that in States in which postmodernist values are broadly spread, people are more willing on average to make "financial sacrifices for environmental protection" (Geliseen, 2006, p. 411; Inglehrat, 1995). This may mean that postmodernist values are not exclusively spread only in countries with high levels of national wealth.

The economic hypothesis, using GDP per capita and unemployment status was mostly employed in the years of recession, and it can be questioned whether its actual effect is not just overestimated by the worsening economic situation on individuals as well as at country level. The analysis of this thesis therefore adopts some variables measuring the economic conditions of individuals, to investigate whether the economic hypothesis holds even in non recession years.

## 1.4. Media and Climate Change Opinion

A large number of papers examining public opinion tested the media hypothesis and they showed clear evidence of the media's power to influence people's opinions. The most prominent theories from political communication used in this thesis will be discussed in the theory chapter. Regarding environmental attitudes, such a hypothesis was tested by Brulle et al. Their findings are in line with other papers on public opinion, in that "media coverage of climate change directly affects the level of public concerns" (2012).

The effect of media consumption on the behaviour of adolescents towards environmental protection was tested by Östman (2014). According to his analysis, larger news media consumption promotes pro-environmental behaviour (such as recycling) and also makes people talk more about environmental issues (Östman, 2014). Since the paper is built on the survey conducted among young people only in one specific region in central Sweden, the results may be generalized only to young people in modern and tolerant societies.

The increased frequency of media coverage about climate change matters for public concern is a claim made by Sampei & Aoyagi-Usui (2009). They conclude that larger media

coverage of global warming is correlated with greater public concern for climate change (Sampei & Aoyagi-Usui, 2009). This paper was purely based on cross-corelation analysis between two variables and failed to control for other factors that could lead to biased results. Also, the time period of the paper is from 1998 to 2007, and nowadays there are new factors which affect people's position on climate change, such as new social movements as well as the prioritization of environmental policies by many political leaders. To ameliorate these factors, this thesis works with the most recent data and includes several control variables in the analysis.

Spence and Pidgeon tested the "gain" and "loss" frames of climate change and conclude that gain frame influences people's attitudes more (2010). In other words, a gain frame led to an increase in support for larger change mitigation and "also increased the perceived severity of climate change impact" (Spence & Pidgeon, 2010, page 656).

#### 1.5. Contribution

There are three major gaps in the studies that investigated public attitudes towards climate change. One is that the majority of studies are conducted in the US. The next gap is that the economic explanation is applied only in the years around the recession, and the last is that there is a lack of quantitative papers testing the media effect. This thesis fills these gaps in the following ways: first of all, the case selection for this thesis is a European country – the United Kingdom. Secondly, this thesis investigates the effect of media coverage on people's attitudes toward climate change in years of no recession. Moreover, the analysis tests a brand-new hypothesis about the effect of newly emerging social movements campaigning for greater climate protection.

## 2. THEORY

In the literature, four main drivers of public opinion on climate change are theorized – weather, partisanship, economic conditions, and media coverage. This section very briefly discusses them and introduces the theoretical framework of the thesis.

The theory of weather is built on the assumption that people associate short-term weather abnormalities with climate change which makes them believe in the actuality of climate change (Li et al., 2011, Krosnick et al., 2006; Egan and Mullin, 2010; Scruggs and Benegal, 2012). This pattern is observed because of "attribute substitution", which means that people form their opinion about climate change based on an easier calculated heuristic judgment (attribute) which in this case is recent weather (Kahneman and Shane, 2004; Li et al., 2011).

The partisanship theory states that as we are moving on a liberal-conservative scale getting closer to the conservative side, we will also observe a lower level of climate change fear (Zia and Todd, 2010, McCright and Dunlap, 2011). But as noted by Scruggs (2012), this theory does not provide any explanation for large declines in climate change fear among non-partisans, as well as those on the left. Also, the partisanship effect will not be significant in countries where there is no majoritarian system, as people tend to change their party preferences from election to election.

Several papers conducted on green policy preferences used economic explanations and applied them to the time right before and immediately after an economic crisis. They theorized that this sudden change in people's economic situation makes people prioritize economic policies over green policies (Brulle et al.,2012; Scruggs et al., 2012; Mildenberger and Leiserowitz; Kenny, 2019). The fact that people who find themselves in a worse economic situation such as being unemployed, prefer or are more supportive towards economic policies over environmental protection is straightforward. Because in the first place, every single person needs to secure essential goods such as food, and the only way to secure it in the modern world is by purchase. Thus, lacking money makes people prioritize their own well-being which in this case is securing an income either through social transfers (e.g. support in unemployment) or finding a new job.

This theory also holds on an empirical basis (Piselli, 2004; Brulle et al., 2012; Scruggs and Benegal, 2012). For example, Smith et al. in their analysis found a negative statistically significant correlation between survey questions measuring support for environmental protection and the unemployment rate between 1973 and 2008 (2011). Reprioritization of environmental protection is one thing, but the other is the attitudes towards climate change. Is an opinion shift on climate change observed concurrently with the reprioritization? According to Scruggs, there is evidence of a correlation between the survey variable "that media exaggerate the seriousness of global warming" and the unemployment rate (2012). We should be cautious with this argument since the evidence comes from 1989 when media coverage, as well as scientific knowledge, was not as strong and intense as in the last decade.

## 2.1. Media Coverage During the Recession

Until this point, I have been discussing an economic explanation which was largely employed in the years of the Great Recession in 2008 and 2009. I do not argue that this economic explanation is wrong, but I need to ask the question what kind of role media plays. What is the effect of media coverage during the recession?

One objection or shortcoming of previous papers is using an economic explanation measured by unemployment status during the economic recession. Because during an economic downturn, many people, not just a few individuals lose their jobs. Also, a reduction in wages that affects people's income might be generally observed. These changes in conditions affect a large proportion of people who will struggle to secure basic goods such as food, shelter, etc. Moreover, during a recession there is a spillover effect – although you are not affected directly,

you still know people close to you who were affected by the economic downturn and a person can feel their struggle, therefore they might re-prioritize too. Under given circumstances, there is evident re-prioritization during the economic recession, but we can speculate whether economic hardship such as unemployment would explain an individual position on climate change in non-recession years.

The second criticism is of excluding media coverage in previous papers. It has been demonstrated in several political communications studies that media does play a large role in shaping opinion, and the previous papers did not include any measurement of media coverage.

The initial question that arises is what media coverage during an economic downturn is mostly about? Perhaps about those topics which are the most urgent in public discourse, which is, in the case of economic crisis, economy-related topics. Without any doubt, there was a certain rise in the volume of economic news during the recession. In other words, it was not only a dramatic change in people's economic situation but also a change of public discourse as well as media coverage that led to an opinion shift towards climate change as well as a re-prioritization.

The discussion then turns to media coverage of climate change in the years of recession. Logically, there should be a decrease in climate change coverage as the vast majority of attention goes to economy-related topics. This was perhaps also true during the Great Recession in 2008. It does not imply that the media completely abandoned other topics. The question is just to what extent the second-order topics are covered. Speaking of the Great Recession of 2008, I assume that at that time, there was not as much scientific knowledge about the effect of climate change. No pro-environmental movements were popularized, such as today's "Fridays for future". No celebrities openly campaigned for a more ecological lifestyle as they do nowadays. Climate change was also not as important on the political agenda – no Paris Climate Agreement, no commitment to cut emissions. Also, the occurrence of the actual effects of climate change, such as natural disasters or temperature fluctuations were infrequent compared

to recent years. The absence of all the above-mentioned factors contributed to lower media coverage of climate change in the Great Recession, as these factors were not present or discussed in the public discourse.

On the contrary, all these factors occur today, and I believe that even when another topic may be dominant, such as an economic recession, a decrease in climate change coverage may occur, but the extent will be smaller compared to the year 2008. Today the topic of climate change is firmly embedded in the public discourse.

To sum up, I argue that the effect which was found in the previous papers from the recession years – prioritized economic policies over green policies and questioning the realness of climate change is not exclusively due to a worsening of the economic situation of individuals, but also due to a change in the public discourse mostly affected by media coverage.

#### 2.2. Media Effect In Non Recession Years

As I discussed in the previous paragraph, I assume an increase in coverage of economyrelated topics at the cost of lower coverage of climate change, since climate change was not embedded in social discourse back in 2008-2009. Additional to this assumption, coverage of climate change intensified in recent years. I expect that in the years of the analysis (2018-2020), the topic of climate change was covered more than in the relevant years in the previous papers (2008-2009). Once the issue of climate change became important in the public discourse, it might be assumed that media played a very important role, as confirmed by many empirical papers (e.g., Tesler, 2015; McCombs, 2004; Mazur & Lee, 1993; Entman, 1993; Mrogers & Wdearing, 1998).

One of the most dominant theories from the political communication field about the media effect is the agenda-setting hypothesis and the priming effect. The priming effect does have the power to change the way people assess a candidate's performance. For example, when the media calls more attention to economic issues, people begin to assess the candidates based on their performance using economic indicators (Lenz, 2009).

The definition of agenda-setting says that "public opinion is a reflection of the extent and prominence of media coverage" (McCombus, 2014; Mrogers & Wdearing, 1988). Tesler argues that not all attitudes might be influenced by media, or by priming (2015). To be more specific, he distinguishes two different kinds of attitudes - strongly crystallized - those which cannot be changed easily by media e.g. ethnocultural attitudes - and weakly crystalized preferences - which can be easily changed by the priming effect e.g. positionality on economic policies, etc. Support for environmental protection as well as attitudes toward climate change might be considered to be a weakly crystalized preference, because it has no religious roots, it is not as strongly pre-defined as, for example, opposition to LGBT+ rights. This means that the media as well as public figures might play a huge role in shaping people's position on this issue.

My theory assumes that once the issue of climate change and environment protection becomes salient as well as politically important, people have a larger amount of information at their disposal, which enables them to evaluate their opinion on this issue. Specifically, I assume that the frequency of discussion on climate change in media matters. Agenda-setting makes a topic salient. Usually, a topic becomes salient during an election campaign or due to the occurrence of a special event, such as a natural disaster. But what I want to know is how often the media discuss the topic of climate change regardless of special events.

Mazur, and later several other researchers, adopted the Quantity of Coverage theory (Mazur & Lee, 1993; Mazur, 1998; Mazur, 2009; Sampei & Aoyagi-Usui, 2009; Brulle et al., 2012). This theory implies that the content of a media report does not really matter since people usually skim through an article or watch the news on TV "with one eye closed". Comparing the Quantity of Coverage theory to the agenda-setting, it might be said that besides making a topic salient, the quantity of coverage is capable of turning public opinion in some direction (Mazur

& Lee, 1994). The main assumption of the Quantity of Coverage theory says that a rise in the volume of articles dealing with a particular topic, (in the case of Mazur it is an environmental and technological risk), leads to a negative direction in public opinion (Mazur, 1993). In other words, a larger frequency of articles about environmental and technological risk made people more concerned and vice versa.

In case of this thesis, I assume that providing more information about climate change by the media leads to people starting to consider the topic of climate change as more important and pressing, and subsequently, it makes them more concerned about climate change, which means that people will see climate change as a more serious problem. Based on the Quantity of Coverage theory, the hypothesis is posited as follows:

Hypothesis 1: Larger attention by the media on climate change negatively affects people's attitudes towards climate change.

The assumption here is that people who were exposed to larger media coverage on climate change in recent days, will also have more negative attitudes towards climate change, meaning perceiving of climate change as a more serious threat. On the other hand, people who were recently exposed to lesser coverage of climate change also experienced a lower level of climate change fear. What is more, this theory implies the time effect, meaning that the most recent articles have greater influential power.

#### 2.3. The Greta Effect

Environmental movements are nothing new in society and their existence can be dated back to the late 19<sup>th</sup> century when they emerged due to concerns around the pollution produced during the Industrial Revolution (Elliott, n.d.). The main intention of these movements is to seek greater protection of the natural environment and limiting the human activities that harm the environment the most. Environmental movements seek to reach their goal by legislating policies that assure environmental protection. Currently, there exist many environmental movements and non-governmental organizations that are widely known, for example, Greenpeace and the World Wide Fund for Nature.

In summer 2018, Europe was hit by heatwaves and as a response, a Swedish pupil Greta Thunberg started to protest in front of the Riksdag (the Swedish National Parliament). Instead of attending classes at school, she started to protest daily and demand the reduction of carbon emissions according to the Paris Agreement. Thunberg received massive attention from media not only domestically but also internationally. Consequently, she has become one of the most influential figures in the world and regularly attends globally important meetings and conferences. Nowadays, Thunberg is recognized as the key figure in the current international movement to fight climate change, as her early strikes inspired global ones called "the school strike for climate" which were held three times in 2019 in more than 125 countries and over 1.5 million people took part.

I theorize that these global strikes attracted large media attention as well as made the topic of climate change more discussed in public which influenced public attitudes towards climate change. When the strikes are taking place, the strikes, as well as climate change, becomes one of the main topics in the public discourse and hence people think about climate change as a more serious problem. Since the timeframe of the analysis includes 2019, I am able to empirically test this theory. Hypothesis number 2 is formulated as follows:

Hypothesis 2: The occurrence of strikes demanding better addressing of climate change makes people see climate change as a more serious problem.

The expectations are that on the day, and the week, when these strikes take place, people perceive climate change more negatively, as the discussion about climate change intensifies in negative directions – such as panicking about climate change.

# 3. RESEARCH DESIGN

Before the thesis proceeds to the analysis and hypothesis testing, I need to define the major concepts of the thesis, introduce the data used for testing the hypothesis, as well as discuss the research method employed in the thesis.

## 3.1. Conceptualization

This thesis deals with two main concepts, which were already mentioned in the theoretical section, but the definitions were not yet provided. Namely, I need to clarify what I mean by climate change fear, and media coverage.

CLIMATE FEAR is simply people's attitudes towards climate change. There is no need for a sophisticated definition since the term itself gives us the main idea of what I mean by it. Throughout the thesis, I will also use the term perception of climate change, attitudes toward climate change, and position or opinion on climate change. I assume that someone who perceives climate change as a serious threat also supports environmental protection.

MEDIA COVERAGE refers to the frequency of a topic being discussed in the media. In other words, it is about the number of articles written on the topic of climate change or environmental protection and not really about the content of these articles or the framing of this topic.

## 3.2. Data

Since this thesis is an observational study, the majority of the data comes from multiple secondary sources, e.g., Eurobarometer, Nexis Uni, Media and Climate Change Observatory (MeCCO), but the most important part of the data was retrieved from the Understanding Society: the UK Household Longitudinal Study (UKHL). For the purposes of this thesis, I created a brand-new dataset, as there is no dataset that includes the necessary variables for the analysis. Before I lay out the coding of the variables, I need to provide a brief description of two main data sources – Understanding Society and Nexis Uni.

#### UNDERSTANDING SOCIETY

Understanding Society, also known as the UK Household Longitudinal Study (UKHL) is a longitudinal study conducted in the UK by the Institute for Social and Economic Research at the University of Essex. As it is a longitudinal study, it means that its participants remain the same over time. The survey is conducted in waves where one wave lasts three years. This study covers a variety of questions such as information on background characteristics, but also people's political and social attitudes. I will use the last wave which has a time span ranging from 2018 to 2020 during which over 35,000 people took part. What should be pointed out is the sample, as the majority of surveys are trying to capture a representative sample of a country. In this case, we are not talking about a truly representative sample as it includes people from all age categories and 95% of people are continuing participants from the previous waves. But as the sample is very large, the researchers are able to focus on a subsample, in my case, the adult population.

#### NEXIS UNI

Nexis Uni (also known as Lexis Nexis) is a large online dataset including archives of newspapers, business and legal documents as well as transcripts of radio and TV broadcasts mostly for the United States. According to the official website, Nexis Uni covers more than 17,000 documents dating from 1970. In the literature, in papers conducting content analysis in particular, Lexis Nexis or Nexis Uni is heavily used as a main data source (e.g., Müller, 2020). Due to the availability of data in the Nexis Uni search engine, I employed it for creating the corpus. Because Nexis Uni does not provide any API access, the data were collected by downloading news reports where only 100 news articles are allowed to be downloaded at once.

This limitation made my data collection more difficult and time consuming. All articles were downloaded in word format and subsequently loaded in R by the package "LexisNexisTools" (Gruber J., 2021) which was precisely coded for the purpose of creating corpora from Nexis Uni documents.

### 3.3. Operationalization

#### PUBLIC OPINION ON CLIMATE CHANGE

The outcome variable – public opinion on climate change is taken from the already mentioned Understanding Society study. The following statement used in the Understanding Society study "the so-called 'environmental crisis' facing humanity has been greatly exaggerated" (2019), will be adopted as the outcome variable measuring public opinion on climate change. Participants put their answers on a Likert scale – From strongly agree (1) to strongly disagree (5). In the coding process, I kept the variable in the original format, which means a lower number (1) stands for a lower level of fear of climate change, and (5) represents a greater fear of climate change or seeing climate change as a serious threat. I picked this statement as the proxy of climate change fear because it seems to be the best option for operationalization out of the other questions asked in the Understanding Society Survey. I believe that people who see environmental crisis (a different term for climate change) as exaggerated, are also the people who are sceptical - not worried about climate change.

#### NEWLY EMERGING CLIMATE MOVEMENTS

The second hypothesis of the thesis deals with the newly emerging climate movements. By newly emerging climate movements, I am referring in particular to the activities and events associated with Greta Thunberg. Perhaps, the most famous events associated and motivated by Thunberg were protests called the "School Strikes for Climate" which were globally held three times in 2019, and millions of people, mostly teenagers, took part. To measure the effect of these strikes I created a variable indicating whether a person was interviewed in the week of the strike or not. The dates of the three major climate strikes are March 15, 2019; September 20, 2019; and September 27, 2019. All individuals who were interviewed on the exact day or five days after these strike dates is assigned the value 1 of the variable strike.

#### MEDIA COVERAGE

In the literature, there are several strategies for how to operationalize media coverage. For example, some papers took all articles which belonged to a particular category that was very close to the topic of their research (e.g., Benesch et al., 2018). The other approach might be called the "lexical approach", meaning that researchers collected all articles which included key words related to the topic in question (e.g., Mazur, 2009). Both of these strategies have their pros and cons, but because I do not have access to any dataset covering a large number of articles with proper assigned categories, I applied the second approach – keyword search approach. Although Nexis Uni offers the option to search by categories, the literature suggests that Lexis Nexis's categories (nowadays Nexis Uni) do not provide any guarantee that the subject category also provides information about the topic in question (Barberá et al., 2016). On the contrary, key word search seems to be a more reliable strategy for creating a corpus in terms of capturing a desired topic and including larger volumes of articles.

Additionally, I should note, that the operationalization of media coverage includes only printed newspapers and no other forms of media such as TV news programmes. It would be a very time-consuming process to collect TV news about climate change. Most likely, the coverage of newspapers copies the trend of TV news. In other words, the assumption is that when TV news airs some climate change-related topic/issue/event, the newspapers will also report this exact theme. What is more, the same logic of this argument pertains to radio as well as online media. Nowadays, all newspapers also have corresponding websites and perhaps the

coverage on the internet is richer, but the most important articles and most influential ones are always published in paper format.

Having stated the basic logic behind using newspapers articles, I might proceed to the case selection of newspapers as well as the coding process. The case selection is mostly motivated by the statistics provided by the Publishers Audience Measurement Company Ltd

(PAMCo). In Table 1 is listed the TOP 8 UK's Newspapers by monthly reach in September 2019. My primary goal was to have a diverse sample of newspapers, meaning I wanted to include both broadsheet newspapers as well as tabloids. Nexis Uni does not distinguish those articles which were published in The Mirror or in the Irish Mirror. This would lead us to have inaccurate media coverage, thus I did not include The Mirror. Also archives for The Metro and The Express are not available in Nexis Uni. As I aimed to collect mainly print media, I also dropped the Independent newspaper because it has not been published in printed format since 2016. Therefore, in the final corpora I included two tabloid newspapers – the Sun and the Mail and two broadsheets, The Guardian and the Telegraph.

Qualities	Entities Included	Total Brand Reach (000s)		
Sun	The Sun The Sun on Sunday	33 918		
Mirror	Daily Mirror Sunday Mirror Sunday People	27 760		
The Mail	Daily Mail The Mail On Sunday	26 530		
Metro	Metro	25 188		
The Guardian	The Guardian The Observer	24 042		
Independent		21 903		
Express	Daily Express Sunday Express	21 689		
The Telegraph	The Daily Telegraph The Sunday Telegraph	20 873		

TABLE 1: TOTAL NEWSBRAND REACH (000S) IN SEPTEMBER 2019

As mentioned earlier, I collected data for the corpus from Nexis Uni through key word search. In this case the keywords were "Climate change" and "Global warming", and all articles including one of these terms either in title or in the main body was collected. The time period of data collection is from January 1, 2018 to March 15, 2020. Once I collected all articles with one of these key words, I performed very brief data cleaning. Because Nexis Uni is not perfect and very often there is duplication of some articles, I delated all duplications (documents with the exact same body text). Unfortunately, some texts were not exact duplications, for example the title was slightly different, or there was different spacing – this problem was mostly noticeable among The Sun articles. To tackle this issue or to minimize it I delated all articles in which the first 15 words were the same. I am aware of the fact that in the case of the Sun I might still have some "not exact duplication", but I assume these duplicate articles occurred by chance

and should not bias my results, but I also aim to perform some robustness checks without The Sun in the analytical part.

As a result of the cleaning process, I ended up with 12,077 articles in my corpus. The largest proportion of articles goes to the Guardian (7,631) with a large gap between it and the remaining article sources- The Daily Telegraph (1,680), The Sun (1,631), and the fewest articles were published by the Daily Mail (1,135). Because I carried out the news collection exclusively by key word search, I am certain that many, if not the majority of articles in my corpora might not be really engaged in the topic of climate change. For example, there might be a long article which discuss a completely different topic to climate change, for example an EU summit meeting about Brexit, but at the end of the article the term climate change is briefly mentioned. I might assume that the large volume of such articles in the corpora are just like this- the main topic is something other than climate change, but there is a brief reference to climate change. The inclusion of such articles causes a measurement error of my variable media coverage. To tackle this issue and improve the operationalization of media coverage, I implemented a dictionary-based quantitative text analysis.

Dictionary analysis accounts for counting the number of words which appears in a document – in this case in news reports, and these words have been assigned to a specific category before analysis. This means that the researchers have to create different topic categories and decided which words are associated with each of these categories. Then the researcher runs a dictionary analysis, and the output is the number of words assigned to a particular category. Dictionary analysis is most frequently used in the form of sentiment analysis, which enables researchers to capture the tone (positive/negative/natural) of a document based on a previously coded dictionary.

As the main intent is to distinguish which articles are about climate change and to what extent they address climate change, I applied simple dictionary analysis. To come up with a powerful dictionary which correctly assigns categories to each document is a time consuming process and every choice of a word might mean a different result. To make sure that I have a valid dictionary, I adopted a previously coded one, namely *The Lexicoder Topic Dictionaries* developed by Quinn, Sevenans and Soroka (2013). These Dictionaries were coded for capturing "topics in news, content, legislative debates, and policy documents" (Quinn et al, 2013) – which correspond exactly to my analysis. The Lexicoder Topic Dictionaries are comprised of 28 topics, e.g. macroeconomics, immigration, education as well as environment, or religion (the full list of topics is presented in Table 1 in Appendix). The topic which is the most relevant for my analysis is the category "environment", which includes the words presented in the table below.

"acid rain", "cap and trade", "cap-and-trade", "carbon pricing", "carbon sink", "carbon tax", "climate change", "climate engineering", "climate intervention", "climate remediation", "conservation", "contaminant", "deforest", "ecolog", "emission", "endangered species", "environment", "extinct", "geoengineering", "glacier", "global warming", "greenhouse effect", "greenhouse gas", "ozone", "pollut", "sea ice", "sea levels", "species at risk"," sustainability", "threatened species", "drinking water", "water supply", "potable water", "hazardous waste", "smog", "air quality", "asbestos"

The Lexicoder Topic Dictionary's environment category provides quite an exhaustive list of words which are rightly attached to the topic of climate change or environment. As it is suggested in the text mining literature to adjust dictionary, I did the same thing by adding the following terms to the topic category of environment: **"renewable energy"**, **"sustainable"**, **"natural disaster\*"**, **"footprint"**, **"dioxide\*"**, **"heat wave\*"**, **"wildfire\*"**, **"flood\*"**, **"drought\*"**, **"co2**". Moreover, many terms in the Lexicoder Topic Dictionaries are in singular or in a root form, which might cause some words not to be detected by the dictionary. Hence, I also counted words in their inflected format. Performing text analysis usually requires pre-processing of a corpus before analysis. Since I am doing simple dictionary analysis with pre-defined categories and not more sophisticated analyses, e.g. topic modelling, I do not need to conduct a complicated cleaning process. The only step which was done was transforming all words in the corpus into lowercase and then I ran the dictionary analysis. As mentioned earlier, the output which dictionary analysis provides is just the number of words which match with the words in my dictionary across different categories. To get a better estimate under what categories an article falls, I transferred the total count of words within different categories into proportions. Computing proportion allows us to observe to what extent a particular text discussed a specific topic. The dictionary category of interest is environment/climate and therefore, I focus my attention to it.

After computing proportions, the environment dictionary category variable might take a value 1 – which means that an article deals exclusively only with the topic of climate change, or that only words in the environment category are mentioned in that particular article. On the other hand, when the value of the category is 0 it means that there is no word in the text which is covered in the climate dictionary category. One of the advantages of employing dictionary analysis followed by proportion computing is its continuous nature. To put it differently, the output is not just a list of categories (one article = one topic), but it is rather a continuous measure of a topic, meaning that one text might cover multiple topics.

I assume that continuous measurement of a topic is closer to the reality, because there is hardly ever a news article which would be exclusively about one topic. Additionally, there is a strong overlap of topics within one article. Imagine a news report on an EU Summit about environmental protection policy – one of the topic categories is politics/ international affairs, as it is on the EU level, and the second topic might be environment. I could speculate that this article might also be about economics, as usually the coverage of policies is linked to the economy. By using a continuous measurement of a topic, I am able to capture all these different

topics, whereas by using a categorical measurement I would fail to do so, and I would end up with imprecise measurements.

This bring us to the question of a cutoff point – what is the threshold when a media report can be classified as climate change-related and subsequently included in my final dataset. I decided to set a cutoff point at level 0.3, because all articles below this level perhaps just mentioned climate change as a marginal topic.

All articles in which the proportion of environment category dictionary is 0.3 or larger will be classified as a topic related to climate change. The distribution of the number of articles across the environmental topic proportion is summarized in Table 2.

Environment topic proportion	Number of Articles
0-0.1	2 437
0.1- 0.2	2 247
0.2-0.3	1 831
0.3-0.4	1 445
0.4-0.5	1 046
0.5-0.6	1 390
0.6-0.7	753
0.7-0.8	383
0.8-0.9	181
0.9-1	22
1	342

#### TABLE 2: DICTIONARY ANALYSIS RESULTS

In Table 2, we might notice that the largest proportion of articles is in the lowest decile, which means that the majority of the articles might include the term "climate change" or "global warming", but besides these words, perhaps they do not include other words associated with climate change or the environment. By applying the cut-off point at 0.3 proportion, I dropped 6 515 articles out of 12 077, which leaves us with 5 562 articles. Applying dictionary analysis to capture different topics caused us to drop a very large proportion of my original corpus, but I believe it was at the expenses of improving the measurement of the media coverage variable. Later, I also dropped articles which were shorter than 200 words, as the likelihood is that these

articles were either just a news brief or a column and they do not have the influence of main articles. The final number of articles which are counted for analysis is 4 565.

Following discussion of my data source, case selection and dictionary analyses of the media coverage variable, I finally proceed to the most important stage – the coding process of the media coverage variable. Since the main topic of this thesis is public opinion, it means the analysis ideally should be conducted on the individual level. The papers examining the effect of media usually use experimental research design, because the researchers are able to manipulate the treatment such as reading a media report or watching a particular video.

Until this point, the variable of media coverage was measured at a national aggregated level, because I was not able to identify which people received treatment and which did not. In other words, I am not able to identify these who read news about climate change and those who did not. To obtain a proxy of the media's influential power, I was inspired by the strategy used by Benesch et al., in their paper "Media Coverage and Immigration Worries: Econometric Evidence" (2018). In this paper, Benesch et al. conducted an observation study testing the effect of media coverage (in their case - Immigration) on public opinion. As they faced the same challenges of how to code media coverage on an individual level, I adopted a similar strategy. One wave of the Understanding Society study takes place over three years. It means each individual is surveyed on a different day which allows me to compute the media coverage variable variance by participants. The media coverage variable takes a different value for every observation and its value depends on the day when a participant was interviewed. On this basis I created two different measurements of the media coverage variable presented in table 3.

MediaCoverag1Media coverage on the same day as the surveyMediaCoverage8Media coverage one week before the survey (2-7 days)

TABLE 3: MEDIA COVERAGE VARIABLE CODING

For clarification, the coding of the media coverage variables can be demonstrated in the following example. Person A was interviewed on 17 March 2018. The first variable of media coverage will take the value of the count of all news reports on climate change on 17 March 2018, and the second form of media coverage variable will take the value of the count of all articles on climate change published from two days to 7 days prior to 17 March 2018 (the interview day). In this case, it would be all articles from 10 March to 16 March 2018.

Looking at the number of articles on the timeline, there are 43 days where no climate change related article was published. The larger volume of articles was published on 25 April 2019 which accounts for 20 articles on that day.

### 3.4. Control Variables

Besides the main variables of the interest, several control variables are included to limit the omitted variable bias and achieve more reliable results. Male, education, age, income, unemployment status, and partisanship are employed as control variables. The survey questions of the control variables are presented in the table 4 below.

Male	Respondent's sex (Male or Female)			
Age	Age at Date of Interview			
Level of Education	Highest qualification			
Monthly Income	Total net personal income - no deductions			
Unemployment	Which of this best describes your current employment situation?			
status				
Religion	Whether belong to a religion			
Urban Area	Urban or rural area			

TABLE 4: CONTROL VARIABLES

Variable	Obs.	Mean	St.Dev.	Min	Median	Max
ClimateFear	31,074	3.42	1.05	1.00	3.00	5.00
MediaCoverage1	32,592	5.42	3.51	0	5	20
MediaCoverage8	32,592	35.79	16.03	7	34	87
Gender	32,592	0.44	0.50	0	0	1
Age	32,592	50.89	18.19	18	51	103
Level of Education	29,259	3.36	1.38	1.00	3.00	5.00
Unemployment status	32,555	0.04	0.19	0.00	0.00	1.00
Monthly Income	32,578	1,636.32	1,492.16	0.00	1,400.00	59,580.02
Religion	31,331	0.54	0.50	0.00	1.00	1.00
Urban area	32,568	0.75	0.43	0.00	1.00	1.00
Strike	32,592	0.02	0.14	0	0	1

#### **Descriptive statistics**

#### TABLE 5: SUMMARY STATISTICS OF THE FINAL DATASET

Based on the Summary statistics displayed in Table 5, the ranges of the variables can be seen. For example, the *MediaCoverage1* variable standing for the number of articles published on a day of interview ranges from 0 (no article) to 20. The *MediaCoverage8* variable which measures the number of articles published one week prior to the interview takes values from 7 (7 articles) to 87. The variable *Male* is a binary variable, where 0 stands for women, while 1 for men. The values of Level of Education range from 1 (No Qualification) to 5 (University Degree). Unemployment status, religion, urban area, and strike are dummy variables that take values 0 or 1. *Unemployment status* is 1 if a person is currently unemployed, *Religion* takes value 1 when a person follows any religion, the *Urban area* takes value 1 when a person is interviewed during the Climate global strikes, otherwise, it is 0. Age and Monthly income are straightforward measurements, while *Age* is the age of the participant during the interview, the *Monthly Income* is the total monthly net income of an individual without deduction.
# 4. PERCEPTION OF CLIMATE CHANGE

## 4.1. Climate Change as the Number One Topic

In the theory chapter, I set the assumption that during the economic recession, the economic situation becomes the top priority for people. To examine this assumption, I collected data from the Eurobarometer which conducts a special edition about climate change roughly every two years, starting from 2008. One question of this special Eurobarometer askes participants what they perceive as the most serious problem facing the world as a whole (Eurobarometer, 2008). Participants pick from seven options (in some years, more options were available): Climate Change; Poverty, Hunger and Lack of Drinking Water; the Economic Situation; International Terrorism; Armed Conflict; the Increasing Global Population; the Spread of Infectious Diseases, and the Proliferation of nuclear weapons. But at first, participants are asked to pick just one option, and later they might choose additional ones. To determine the topic priorities, I focused on the question where participants had to pick just one option- the single most serious problem. The results on the timeline are presented in Figure 1.



### The most serious problems facing Europe



According to Figure 1, it seems that climate change was priority number one in 2008, when almost 30% of Britons saw it as the most serious problem, followed by International Terrorism (27.3%) and Poverty, Hunger, and a Lack of Drinking Water (20.6%). On the other hand, the economic situation was perceived as a serious problem by just roughly 4 percent of people (the second least serious problem). The Great Recession started in the second half of 2008, and since the fieldwork of Eurobarometer 2008 was conducted in the spring, it might be assumed that the public mood influenced by the recession was not yet capture.

Looking at the data from 2009, a dramatic increase in the Economic Situation fear (28.6%) might be observed, which also represents the most serious problem in that year according to Eurobarometer. This dramatic increase is certainly due to the tremendous hit of the recession. The second and third most serious problems in 2009 were Climate Change and Poverty and Hunger, with more or less the same scores -20.7 percent, and 19.6 percent, respectively.

In the following years (2011 and 2013) the Economic Situation, as well as Climate Change, had a decreasing trend and the difference between these two was tiny - specifically in 2013, it was more or less the same. In 2015 there is a change in the trend of the Climate Change topic which started to gain importance, and which remained at the same level in 2017, while in 2019 almost as many people as in 2008 perceived Climate Change as the most serious problem facing the world, and this problem was ranked as number one. Looking at the perception of the Economic Situation, we might notice that there is decreasing trend up to 2017 and a very tiny rise in 2019.

Figure 1 is in line with the previous papers as well as my theory because the Economic Situation was prioritized over other topics (over Climate Change, too) at the peak of the Great Recession. Additionally, the Economic Situation has a clearly decreasing trend, which means I do not expect the topic of economy to be prioritized over climate change in years when there is no recession on a large scale. Climate Change is regaining importance in recent years, according to Figure 1.

## 4.2. Trends in Attitudes towards Climate Change

To look at the trends in the public attitudes towards climate change I again use data from the Eurobarometer and from its special edition concerning the topic of climate change. Additionally, to the question about the most serious problem facing Europe as a whole, there is a specific question which asks citizens of the European Union "how serious a problem do you think global warming/climate change is at this moment?" (2019).

Based on the last edition of Eurobarometer measuring public opinion on climate change from 2019, over 79% of Europeans perceive climate change as a serious problem which was 5 points more than in 2018, while in 2008, 75% of people perceived climate change as a serious problem. Besides the slight shift in attitudes in recent years, also more people tend to take action on their own to mitigate the effect of climate change. While in 2017, only 49% claimed that they take some action towards environmental protection; in 2019 there was an increase of 11 points (Eurobarometer, 2019).



### FIGURE 2: PERCEPTION OF CLIMATE CHANGE ACROSS 5 EUROPEAN COUNTRIES

In Figure 2, we can see the trends in public opinion on climate change across 5 selected countries – the United Kingdom, Greece, Germany, Estonia, and France. As it can be seen, there is no clear trend over time. Seemingly, there was a slight decrease in public opinion in the years 2009 and 2011, but then there seems to be an upward trajectory from 2013 to the most recent data. This observed decline in attitudes in 2009 and 2011 are the years of the consequences of economic recession and confirms the findings of papers employing the economic hardship theory (Brulle et al., 2012; Scruggs et al., 2012; Mildenberger and Leiserowitz; Kenny, 2019).

The member states that experience the lowest level fear of climate change is Estonia and Latvia, while the countries experiencing the highest figures in 2019 are Cyprus and Greece, scoring 84 and 86 points respectively which is above the EU average of 79%.

To focus now on the sample country of this research, the United Kingdom; in 2019, over 75% of UK people expressed concerns about climate change as a serious problem, which is still below the average of the EU, and it places the UK into the less (but not the least) worrying countries within the EU. By looking at the trend over time, a rising trend may be observed, meaning that people are becoming more worried about climate change in the last three waves. The difference from the 2017 and 2019 surveys is an increase of 6 points. Importantly, I should note, that in 2008 the UK was the least worried country, scoring 59 points according to Eurobarometer, while in recent years, it moved ahead of several other countries.

To gain a better insight into the British context, I looked at the national figure from the Public Attitudes Tracker (PAT) conducted annually by the Department for Business, Energy and Industrial Strategy (BEIS). Figure 3 confirms the slow but clear rising trend in recent years observed in Eurobarometer data. Additionally, the proportion of people not very concerned or not at all concerned about climate change is certainly decreasing. Focusing on the period, which is also the time frame of the analysis, a rise of 9% from 2017 to 2019 is observed.



FIGURE 3: PERCEPTION OF CLIMATE CAHNE IN THE UK

# 5. MEDIA AND CLIMATE CHANGE

## 5.1. European Trend

One way to look at the media coverage of climate change is to conduct a search of keywords such as "climate change" and "global warming. This is exactly what the Media and Climate Change Observatory (MeCCO) is doing. It collects data on coverage from the most popular (by circulation) newspapers across different countries.



FIGURE 4: USAGE OF TERM CLIMATE CHANGE AND GLOBAL WARMING IN EUROPE

Figure 4 depicts the time trends of media coverage of climate change in the European countries. The overall trend is not stable over time, meaning that ups and downs are present. There are 5 major spikes – in 2007, the end of 2009, the end of 2015, and in 2019.

Since the main goal of the thesis is not to look at the content of the media coverage, it engenders speculation as to why these peaks are present in the timeline. For example, the peaks observed in 2019 might be due to the media coverage of "the school strikes for climate movement", which organized protests for greater environmental protection across the globe in 2019, started and popularized by Swedish teenager Greta Thunberg. Also, the peak at the beginning of 2020 may be explained by the conference in Davos where one of the guest speakers was Greta Thunberg.

The peak at the end of 2015 is explained by the signing of the Paris Treaty. At the end of 2015, the Conference of the Parties of the UNFCCC in Paris took place, where over 190 states agreed on joint actions in the fight against climate change.

At the end of 2009, the United Nations Climate Change Conference took place in Copenhagen, which was one of the largest interstate meetings of the UN outside New York at that time. Perhaps the media were intensively informing about the course and the unsuccessful outcome of the conference.

Lastly, the peak in 2007 might be also caused by UN Climate Change conference 2007 in Bali in combination with awarding the 2007 Nobel Peace Prize to Al Gore, former vice-president of the US who stress the importance of addressing climate change.

## 5.2. Media Coverage in the United Kingdom

The media coverage in the United Kingdom follows the peaks and trends observed in Europe. From Figure 5, it seems that the broadsheets cover the topic of climate change more, compared to the tabloid newspapers, but it is not really surprising. As the main goal of broadsheets is to inform people about news such as politics and the economy, the tabloids focus on celebrity stories and scandals. The Guardian is clearly the newspaper outlet which covers climate change the most. When we looked at the timeline for the years 2014-mid-2016, we observe there was a huge increase in coverage by The Guardian. This coverage was much greater than the coverage in other newspapers. Even The Times (a broadsheet) did not cover the topic of climate change as intensively. Because this gap is not observed in the time period of my analysis, I do not need to be concerned about the biases which could be caused by the over-coverage in The Guardian.

Another interesting point which can be drawn from Figure 5 is that the broadsheet newspaper The Telegraph's coverage is at more or less the same level in the last years as the tabloid newspapers The Daily Mirror or The Sun. The newspaper that focuses the least on climate change is The Sun, but the difference in coverage from other tabloid media is not significant. Overall, the trend across different newspaper publishers seems to be the same; the only difference is the volume of how many articles they publish.



FIGURE 5: USAGE OF TERM CLIMATE CHANGE AND GLOBAL WARMING IN UK

In Figure 6, I plotted the number of articles which were coded according to the process discussed in the Dictionary analysis section. On average, the number of articles about climate change had a negligible increasing trend by quarters until the year 2020. The seems to be a slight decrease in the first quarter of 2020, which possibly is caused by a new topic prominence - Pandemic Covid-19. At the same time, we might notice that this decrease is not significant and is on comparable level of coverage in 2019 Q3. Figure 6 indicates that even when there is a huge coverage of another topic (such as Covid-19), the climate change remained to be part of the public discourse. To fully support this theory, I would need more data in the following quarter what I unfortunately, do not have at disposal.



The number of climate change articles

FIGURE 6: NUMBER OF CLIMATE CHANGE ARTICLES BY QUARTERS

Before I conduct a statistical analysis, I will look at the mean value of the climate worries

variable across	different	variables	and	subgroups.	The results	are	presented in Table 6.	

Worried about cl	imate change a	across dif	ferent variables and sub	-groups	
	Number of	Climate		Number of	Climate
	observations	Fear		observations	Fear
Gender			Education		
Male	14 167	3.37	Degree	9 102	3.79
Female	15 916	3.45	Other higher degree	3 935	3.39
Age			A level etc.	6 549	3.35
Below 30	5 227	3.47	GCSE	5 761	3.23
30 to 55	13 055	3.44	Other qualification	2 566	3.13
55 to 70	7 873	3.45	No qualification	2 690	3.08
above 70	4 920	3.25	Unemployment Status		
Year			Unemployed	1 227	3.42
2018	17 634	3.39	Others	31 328	3.28
2019	13 390	3.44	Monthly Income		
2020	939	3.50	Below 1 500	17 849	3.33
State			1 500-3 000	11 524	3.48
England	25 182	3.42	Above 3 000	3 166	3.66
Scotland	2 753	3.47	Religion		
Wales	2 023	3.37	No Religion	14 325	3.51
Northern Ireland	1 983	3.32	Religion	17 006	3.34
			Urban Area		
			Rural	8 026	3.44
			Urban	24 542	3.41
Overall	31 953	3.42			

### TABLE 6: DIFFERENCES IN CLIMATE FEAR

In the interpretation of Table 6, I need to repeat and stress the coding of the variable climate fear, where a larger number stands for "being more worried about climate change". The average value of this variable in the whole data frame is 3.42. By looking at Gender, women are more worried about climate change than men on average. Proceeding to the age variable, it seems that the youngest generation (participants below 30 years) are the most worried about climate change, while the oldest generation worries the least. Figures for the variable year do not provide a very meaningful explanation, as the mean for the year 2020 is biased by a small number of observations since the survey took place only in the first two months of 2020.

Nevertheless, it might be said that the climate change fear was larger in 2019 than in 2018. On the state level, climate change fear is very similar across three states – England, Scotland, and Wales, whereas Northern Ireland seems to be the least worried.

The mean value of climate change fear across different groups of variables of education just confirms the finding of previous papers – a lower level of education also means a lower level of fear of climate change. Specifically, people holding University degrees are worried about climate change at the level of 3.79, while people with no education or with just GCSE (equivalent to 10-11 years of schooling) scored on average 3.08, and 3.23, respectively. The people who are currently unemployed are more climate skeptical compared to the rest of the people. Moreover, higher income is positively correlated with climate change fear. The people who classified themselves as religious believers are less worried about climate change. Surprisingly, people livening in rural areas are more worried about climate change than people living in urban areas.

# 6. EMPIRICAL STRATEGY AND ANALYSIS

To test the hypothesis stated in the Theory section, I employed quantitative statistical analysis. The Understanding Society data are in the form of panel data – the individuals are observed at multiple points in time. But because the thesis is working with only one wave of this survey, I do not observe individuals multiple times, but just once. Working with one wave of a survey makes the data cross-sectional – multiple observations, in my case individuals in one time. This limitation affects the model selection for the analysis. Because I do not have panel data, I am not able to do a fixed effects regression model which enables researchers to control variables that are difficult or impossible to measure and do not change over time. The main model implemented in the analysis is the Ordinary Least Squares (OLS) estimator. To ameliorate the quality of analysis, the linear regression will include multiple regressors. Using multivariate regression analysis eliminates the risk of omitted variable bias and helps to find a more precise estimate. The units of analysis in all models are individuals. This section introduces and discusses the employed models, and the second part reports and interprets the results, and the robustness and limitations are also discussed.

## 6.1. Empirical Models

In the first model I investigated the research question of the effect of media coverage on attitudes towards climate change. The outcome variable is *ClimateFear* which is measured on a 5-point scale, where 1 stands for not worried at all and 5 represents being worried to a large extant. The independent variable is *MediaCoverage* which is the number of articles published on a day of interview or the second format of this variable is the number of articles published two to eight days prior to interview. Besides the independent and dependent variables, a set of

control variables are also included in the empirical tests. The specification of the main model of this study is reported in equation (1).

$$ClimateFear_{i} = \beta_{0} + \beta_{1}MediaCoverage_{t} + \beta'\theta_{i} + \varepsilon_{i}$$

$$\tag{1}$$

*ClimateFear* is the outcome variable of individual *i*, *MediaCoverage* is an independent variable at time *t* (time is either the day of the interview or one week prior to interview) and  $\theta$  is a sign for all control variables of individuals *i* (gender, age, education, unemployment status, income, religion, urban area). The coefficient  $\beta$ 1 stands for the effect of Media coverage on climate change, while keeping all control variables constant, and the coefficient  $\beta$ ' represents the effect of control variables, individually, on *ClimateFear*. Inclusion of control variables enable us to improve the estimate by including characteristics that might also have an effect on *ClimateFear*. The last term included in equation 1 is the error term of an individual *i* denoted as  $\varepsilon$ . The interpretation of equation (1) in plain English is as follows - the regression of the ClimateFear variable on the MediaCoverage of climate change, while controlling for a set of other independent variables.

The second research question of this thesis relates to the effect of global climate strikes on people's attitudes towards climate change. This research question is tested through the second model which is very similar to model 1, with the only difference being the independent variable, which is *Strike*. The variable *Strike* takes value 1 when a person was interviewed on the day of a strike or five days afterwards, otherwise the value of this variable is 0. The outcome variable *ClimateFear* remains the same as in the previous model. The equation of the second model is as follows:

 $ClimateFear_{i} = \beta_{0} + \beta_{1}Strike_{i} + \beta'\theta_{i} + +e_{i}$ 

The interpretation of equation (2) remains the same, but I used the variable Strike

(2)

instead of *MediaCoverage*. The variable *Strike* is an independent variable of individual *i*. The sign  $\theta$  stands for control variables (the same as in the previous model) of individual *i* and  $\varepsilon$  stands for the error term of an individual *i*. In the model reported in equation (2) I regress *ClimateFear* on *Strike* and control all variables on an individual level.

Because the *MediaCoverage* variable is not measured on an individual level but is rather a level-2 variable aggregated by day, the OLS assumption that the unobserved factors are independently and identically distributed is violated. In other words, I expect that the individuals who were interviewed on the same day are related to each other as they share the same values of the MediaCoverage variable. To address this issue, I will cluster the standard errors on the "day of the interview" variable. Clustering standard errors on other variables does not produce a different coefficient, but it changes the size of the standard errors, which are important for the interpretation of statistical significance.

# 6.2. Results and Discussion

## EFFECT OF MEDIA ON PUBLIC OPINION

As discussed in the previous section, the first set of regressions tests the effect of media on public attitudes. The results are reported in Table 6, where the dependent variable is individual attitudes towards climate change.

	DV: Attitudes towards climate change					
	(Model 1)	(Model 2)	(Model 3)	(Model 4)	(Model 5)	
Media coverage on the day of the interview			0.00774 <sup>***</sup> (0.00195)		0.00358 (0.00223)	
Media coverage 2-8 days prior to the interview				0.00209*** (0.000449)	0.00166 <sup>**</sup> (0.000513)	
Male	-0.111*** (0.0128)	-0.111 <sup>***</sup> (0.0126)	-0.111*** (0.0126)	-0.111 <sup>***</sup> (0.0126)	-0.111*** (0.0126)	
Age	0.000897* (0.000373)	0.000897* (0.000379)	0.000872* (0.000379)	0.000925* (0.000380)	0.000908* (0.000379)	
Level of Education	0.169*** (0.00483)	0.169*** (0.00498)	0.170 <sup>***</sup> (0.00499)	0.169*** (0.00498)	0.169*** (0.00498)	
Unemployment status	-0.0218 (0.0344)	-0.0218 (0.0332)	-0.0241 (0.0332)	-0.0259 (0.0331)	-0.0261 (0.0332)	
Monthly Income	0.0000250 <sup>***</sup> (0.00000442)	0.0000250 <sup>***</sup> (0.00000459)	0.0000251*** (0.00000460)	0.0000249*** (0.00000459)	0.0000250*** (0.00000460)	
Religion	-0.168*** (0.0127)	-0.168*** (0.0135)	-0.168*** (0.0136)	-0.168*** (0.0136)	-0.168*** (0.0136)	
Urban area	-0.0381** (0.0144)	-0.0381* (0.0152)	-0.0391* (0.0152)	-0.0418** (0.0152)	-0.0415** (0.0152)	
Constant	2.952 <sup>***</sup>	$2.952^{***}$	2.912 <sup>***</sup> (0.0338)	$2.880^{***}$	$2.877^{***}$	
Clustered SE	NO	YES	YES	YES	YES	
N. clusters	-	828	828	828	828	
Observations	26 922	26 922	26 922	26 922	26 922	
Adjusted $R^2$	0.062	0.062	0.062	0.063	0.063	

p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

TABLE 7: OLS REGRESSION: MEDIA COVERAGE EFFECT

The results are interpreted step by step – model by model. Model 1 and Model 2 represent baseline models in which I did not include the main independent variable media coverage. While in Model 1, I did not cluster standard errors, in Model 2 and in all following Models, the standard errors are clustered on the day when a person was interviewed. The number of clusters in all Models except Model 1 is 828, which means that there are 828 days when at least one person was interviewed. In Model 1, the variables which seem to affect attitudes towards climate change is Male, level of education, monthly income, and religion with a p-value lower than 0.001. Besides these variables, statistically significant are the variables age with p-value smaller than 0.05 and urban area with p-value smaller than 0.01. Running the same Model but with clustered standard errors on days (Model 2) did not bring any considerable changes, only the level of significance of the variable Urban area was reduced, since in Model 2 its level of significance is at level 0.01.

Having addressed the interpretation of the baseline models, I may continue to the main statistical models of this thesis – models testing the effect of media coverage (Model 3-6). In Model 3, the media coverage on the interview day does have a statistically significant effect on people's fear level for climate change. The coefficient for the media coverage variable is statistically significant with the level of significance at level 0.001. On a substantial level, the coefficient of media coverage is 0.00774 which can be interpreted as one more article published per day leads to an increase of people's attitudes by 0.00774 on average. To put it into more realistic terms, an increase of the media coverage variable by 100 (articles) would lead to greater climate change worries by 0.774 points on average. This means that if there was a day when no article on climate change was published and it would be compared to a day when 100 articles were published on that topic, it is expected to see a lower level of climate change worry by 0.774 (this is a 5-point scale, so 0.774 is a significant increase). The variables showing a

statistically significant effect in Model 2 remain the same as in Model 3, namely Male, age, level of education, monthly income, religion, and urban area.

In Model 4, I included as the main explanatory variable media coverage, which counts the number of climate change-related articles published from two to eight days before a person was interviewed. By looking at the results, it might be noted that this variable, as in Model 3, produced statistically significant results with a p-value smaller than 0.001. The substantial interpretation is one more article in a week prior to the survey is responsible for a rise of climate fear by 0.00209 on average. In more interpretable terms, one hundred more articles in a week prior to the survey is linked to an increase of climate change fear by 0.209 points.

Finally, I proceed to the final Model of the first set of regressions, which included both the main explanatory variables of interest – media coverage on the day, and one week prior to the interview. As can be observed in Model 5, media coverage on the day of the interview lost its statistical significance (the p-value is 0.108), and the second media coverage variable (the count of articles one week before the interview) is still statistically significant but with a greater p-value at the level of 0.01. This might be interpreted that once I also control for the number of articles on the day and one week before the interview, the coverage on the day becomes less important, whereas the coverage during the last week still remains important. Model 5 indicates that coverage during the last week has more influence on public attitudes towards climate change. The statistical significance of the control variables remains unchanged.

Until this point, I did not clarify the effect of control variables. Two main drivers of public opinion were used in several previous papers testing the economic hypothesis – employment status and income. Surprisingly, there seems to be no difference between people who are currently unemployed and others. This is in direct conflict with some previous research findings (Brulle et al., 2012; Scruggs et al., 2012). My findings suggest that what I anticipated in the theory chapter - that economic hardships will work perfectly in recession years, but not in

economic expansion, might be correct, because the unemployment status variable is statistically significant in any model. The second economic variable is monthly income, this variable is statistically significant in all models. Does the significance of the monthly income mean that the economic explanation works even in non-recession years? It can, but not necessarily. Because in this thesis I used only income, while the economic explanation is rather about the change in income which I did not measure, as I do not have data for that. Additionally, I assume a strong collinearity between income and education, because I expect that people with better income are also those who have a higher level of education.

Gender plays a role in whether a person is more likely to be afraid of climate change. As the coefficient for Male is negative, it means that men are more sceptical about climate change. The variable age has the lowest level of statistical significance at level 0.05, but still, it satisfies the general criteria of social science standards. Surprisingly, it seems that older people tend to be more worried by climate change. This might be caused by the fact that the older generation of people in the sample is overrepresented compared to teenagers and the youngest generations. The level of education indicates that people with a higher degree such as a diploma or University degree are more worried about climate change. Interestingly, people who do not believe in any religion have larger climate fear. And finally, the variable Urban area has a negative coefficient signalling that people in rural areas have more negative attitudes towards climate change. I can speculate why we observe this, but it may be because of the fact that many people in rural areas are also farmers or people who have direct contact with the agricultural sector. They could be witnessing the direct consequences of climate change, such as droughts or heatwaves which affect their harvest.

To summarise the results from the first sets of regressions reported in Table 7, I found evidence that the number of articles reporting or referring somehow to climate change affects people's attitudes, while controlling for other factors such as gender, age, education, unemployment status, income, religion, and type of settlement. Overall, climate change media coverage one week before the interview has a larger effect than the coverage on the day of the survey.

Climate change and global warming are often marked as an issue of the young generation. This argument motivates me to have a look at the variance of the effect of the explanatory variables across different age categories. In the previous section, in Table 5, we observed that the youngest generation is more worried about climate change than the older generations on average. In the following part of the analysis, I run regressions on different age categories, namely people *below 30*, *between 30-55*, *55-70*, and *above 70*. The output of the regression analysis is reported in Table 8.

	DV: Attitudes t	cowards climate change	2	
	(Model 1)	(Model 2)	(Model 3)	(Model 4)
	Below 30	30-55	55-70	Above 70
Media coverage on the day of the interview	0.0112 <sup>*</sup>	0.00141	0.00411	0.00207
	(0.00561)	(0.00331)	(0.00410)	(0.00577)
Media coverage 2-8 days prior to the interview	0.00122	0.000855	0.00217 <sup>*</sup>	0.00406 <sup>**</sup>
	(0.00133)	(0.000701)	(0.000917)	(0.00141)
Gender	-0.123***	-0.0942***	-0.0988***	-0.156***
	(0.0304)	(0.0185)	(0.0248)	(0.0326)
Age	-0.0229***	0.00498***	0.00201	-0.00444
	(0.00434)	(0.00138)	(0.00289)	(0.00323)
Level of Education	0.204 <sup>***</sup>	0.197 <sup>***</sup>	0.167 <sup>***</sup>	0.108 <sup>***</sup>
	(0.0142)	(0.00773)	(0.00942)	(0.0118)
Unemployment	-0.0295	-0.0114	0.0185	-0.371
status	(0.0544)	(0.0503)	(0.0812)	(0.431)
Monthly Income	0.0000561**	0.0000303***	0.0000126	0.0000500 <sup>***</sup>
	(0.0000199)	(0.00000643)	(0.00000920)	(0.0000150)
Religion	-0.184***	-0.192***	-0.148***	-0.140***
	(0.0334)	(0.0199)	(0.0255)	(0.0388)
Urban area	0.000674	-0.0345	-0.0469	-0.0621
	(0.0390)	(0.0223)	(0.0293)	(0.0376)
Constant	3.283 <sup>***</sup>	2.587***	2.862***	3.317***
	(0.113)	(0.0773)	(0.192)	(0.256)
Clustered SE	YES	YES	YES	YES
N. clusters	777	809	774	721
Observations	4 501	11 593	6 767	4 061
Adjusted R <sup>2</sup>	0.059	0.074	0.060	0.042

Standard errors in parentheses

p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

### TABLE 8: OLS REGRESSION: MEDIA EFFECT ACROSS AGE CATEGORIES

Model 1 in Table 8 is a regression conducted on the sample of people who are younger than 30. In this model, it seems that media coverage on the day of the survey has a statistically significant effect, although the effect is weaker than in Table 6, as the level of significance is 0.05. Unexpectedly, media coverage one week before the interview does not show any level of significance. This indicates that the younger generation is easier and more influenced by the current discourse in society rather than the longer nature discourse. The effect of the control variables is the same as in Table 6, except for variable age and urban area. While the variable age has a positive coefficient, in the previous regression (Table 6), the coefficient is negative. The positive coefficient of age in Model 1 in Table 7 suggests that within the age category below 30, the effect is the opposite. The younger people (close to 18) have greater climate fear than the people closer to 30. The variable urban area lost its statistical significance in this model.

Moving to Model 2, where the sample is people between 30 and 55, none of the media coverage variables are statistically significant. It might suggest that the middle-aged generation has more crystallized attitudes towards climate change and are less likely to be affected by media coverage either on the day or one week before the interview. The interpretation of the other control variables remains the same - only the variable urban area is not statistically significant anymore.

In the following Model, the sample is people aged from 55 to 70. Media coverage one week before the interview seems to affect attitudes, with a level of significance of 0.05, while media coverage on the day of interviews appears to have no effect. In this model it is interesting to notice the effect of monthly income, which is not statistically significant. One of the speculations might be that the variance in income in the age category shortly before retirement is small, and therefore the estimates are not statistically significant. As it was in the previous Models, the control variables have the same effects and urban area no effect.

And finally, Model 4 has a sample of people above 70, so people in retirement age. The effect of media coverage is the same as in the previous age group – the count of reports on the day of the interview does not affect people's opinion while the coverage one week before does have an effect. The second media coverage variable has a level of significance of 0.01 which is slightly higher than in the previous Model. In Model 4, the income variable becomes statistically

significant again. It should be noted that the income variable is not just income from labour work but also passive income. Thus, some retired people might have larger incomes due to passive income. The control variables have the same effect as in the previous model with the exception of the variable urban area which is not statistically significant in Model 4.

The second set of regressions conducted across different age categories ameliorate our knowledge about the effect of media coverage. Table 7 reveals that the media effect varies across age categories. While the youngest generation seems to be affected most by the current discourse, the middle generation appears to have well-formed attitudes towards climate changes that are not substantially affected by media. On the other hand, the older generations are affected by coverage from last week rather than by coverage on the day of the interview. I might ask the question of why we observe the different effect of media coverage variable in the youngest generation and the oldest ones.

One possible explanation is how fast the media reports reach their recipient. The younger generation is more digitally skilled, and intensively use smartphones, which cannot be said about the older generation. Intensive usage of smartphones means access to news apps and receiving the news more quickly. On the contrary, the most common channel of receiving news for old people is TV news or paper newspapers, and therefore they are more likely to get the news later compared to people using news apps and social media. In practical terms, it might mean that young people who were interviewed on a given day had already more information from that day's news compared to older people who probably would receive the daily news in the evening news on television.

## GLOBAL CLIMATE STRIKES

In 2019, three large global strikes took place worldwide, and several of the UK's towns were among the participating cities. The first global climate strike was held on March 15, 2019, the second on September 20, 2019, and the third on September 27, 2019. I am interested in whether these events brought a larger attention of the media to the topic of climate change. I plot the number of articles one week before and one week after the protests in Figure 7.







### FIGURE 7: MEDIA COVERAGE OF CLIMATE CHANGE DURING THE GLOBAL CLIMATE STRIKES

All protests were organized on a Friday, and therefore the coverage right after the event was not very intense, as it was the weekend - this is clearly noticeable in all three of these plots (day 1 and day 2). Surprisingly, there seems to be no real increase in climate change coverage. Evidently, there is some coverage of climate change on the day of the strike, but the number of articles is not significantly greater than in the previous days. In some cases, the coverage is even

higher some days before the strikes, for example in the case of Strike 1, three days before the strike, the coverage was larger than on the day of the strike. The same pattern is observed in Strike 2 when again the coverage three days before the protest is larger than on the day of the strike. In the case of Strike 3, it should be noted that in this plot, the 7 days before the strike on September 27, 2019 is also included in the post-coverage of the strike organized one week before (September 20, 2019) and therefore the coverage seems to be larger.

Overall, based on Figure 7, I infer that climate strikes did not lead to an increase in the volume of climate change-related articles. Therefore, running instrumental variable regression would not make sense, as the instrument variable (climate strike) is not really correlated with the other independent variable (media coverage). But this does not mean that people cannot be influenced by climate change strikes. There might be two channels through which people's attitudes might be influenced by climate strikes - one is direct, that the person takes part in a march, or a person saw a protest with his own eyes. The other channel is indirect - either they know someone who took part in a protest, or they heard about the protests from the media. Also, I should point out that although I have evidence that the volume of climate change articles did not increase on the day of a strike, I do not know whether these articles were headlines or one of the main articles in that day's edition.



#### FIGURE 8: CLIMATE CHANGE SCORES STRIKE COMPARISON

In Figure 8, I visualized the violin plot of the two groups of people being interviewed during the strike (or 5 days after), and the others, and the comparison of their climate change worries. It appears that people in both these categories seem to have a more or less identical score for climate change fear. The black dot in the plot indicates the average, which also seems to be identical. In numerical terms, the average score is almost the same, but the mean of climate change worries variable for people in a category no strike is 3.42, while the score of strike category is 3.40. Surprisingly, the average score is higher for a no-strike category, but I need to stress that the number of observations in the category of climate strike is much smaller (approx. 600) compared to the no-strike (approx. 32 000). Additionally, I do not know what kind of people were interviewed during the climate strike as well, as I did not control for other factors.

To get a better estimate of the effect of climate strikes on people's attitudes, a linear regression indicates where all variables from the previous regressions are included, except media coverage variables. Exclusion of these variables means that all the variables in the regression are measured on an individual level, thus I did not cluster standard errors on days.

	DV: Attitudes towards climate
	change
	Model 1
Climate Strike	0.0211
	(0.0455)
Gender	-0.111***
	(0.0128)
Age	$0.000898^{*}$
	(0.000373)
Level of Education	0.169***
	(0.00483)
Unemployment status	-0.0218
	(0.0344)
Monthly Income	0 0000250***
Wolding meonie	(0.0000230)
	(0.00000442)
Religion	-0.168***
8	(0.0127)
Urban area	-0.0382**
	(0.0144)
Constant	2.952***
	(0.0306)
Clustered SE	NO
Observations	26 922
Adjusted $R^2$	0.062

Standard errors in parentheses p < 0.05, p < 0.01, p < 0.001

### TABLE 9:REGRESSION STRIKE EFFECT

According to the regression results reported in Table 9, it seems that the climate strikes does not affect people's view on climate change. The coefficient for climate strike is not statistically significant. Also, this coefficient is a positive number, but the p-value is large (0.6), which means we are far away from significance. On the other hand, the variables that showed an effect on attitudes towards climate change in the previous regressions remained the same. The regression in Table 9 confirms the effect of gender, age, education, monthly income, religion, and urban area.

Certainly, I cannot confirm based on my analysis that the global climate strikes do not have any effect on public opinion. Even though the analysis in my research setting did not produce any evidence about the actual effect of climate strikes, there may be several reasons why I failed to prove Hypothesis 2, stating that newly emerging climate change movements affect public opinion. One of the problems is the sample size. I compared two asymmetric groups. Secondly, I do not really know what the sample of the group in the climate strike variable is, and whether this group is representative or not. Perhaps, this group is not representative, and the results for this group are biased, as maybe only people from small towns in which the global strikes did not take place, or people who do not have a personal direct or indirect experience with the global strikes, are included in the strike group.

Another possible problem of my research setting may be that there is a spillover effect of the climate strikes. It means that maybe the effect of climate strikes has a long-term effect and also people who were included in the group as no-strike are influenced by climate strikes.

To summarize the test of Hypothesis 2, I failed to find evidence of the climate strike effect. It appears that public opinion on climate change on average is not different on a day when a climate strike takes place, compared to days with no climate strikes.

## 6.3. Ecological Behaviour

This thesis clearly demonstrates that climate change worries are on the rise in the last few years. But how about the behaviour of the people? Does "being scared of climate change" also mean people adjust their behaviour in order to slow the pace of climate change? In this section, I want to examine whether climate change fear is also linked to more ecological behaviour. Wave 10 from Understanding Society has a special section where participants were asked questions about their environmental behaviour. The full wording of these questions is reported in Table 10.

Name	Question
Car share	Car share with others who need to make a similar journey
Fewer Flights	Take fewer flights when possible
Heating	Put more clothes on when you feel cold rather than putting the heating on or turning it up
Lights	Switch off lights in rooms that aren't being used
Packaging	Decide not to buy something because you feel it has too much packaging
Public Transport	Use public transport (e.g. bus, train) rather than travel by car
Recycled Paper	Buy recycled paper products such as toilet paper or tissues
Shopping Bags	Take your own shopping bag when shopping
Journeys by	Walk or cycle for short journeys less than 2 or 3 miles
Bike/Walk	
Turning off TV	Leave your TV on standby for the night
Water	Keep the tap running while you brush your teeth

TABLE 10: ENVIROMENTAL BEHAVIOUR QUESTIONS

One way to examine the relationship between attitudes towards climate change and Environmental behaviour is to compute the correlation between them. The visualisation of the correlations is reported in Figure 9.



Correlation of Climate Change attitudes with Environmental Behaviour variables

FIGURE 9: CORRELATION BETWEEN CLIMATE FEAR AND ENVIRONMENTAL BEHAVIOR

Based on the correlation bar plot (Figure 9), I conclude that there is no single environmental behaviour variable that would show significant correlations, as all the coefficients are small and insignificant. To put it differently, there seems to be no link between environmental behaviour and climate change fear. People who are seriously afraid of climate change will not necessarily behave in a more environmentally friendly way. The same can be said in the opposite direction - someone who is climate change sceptical will not necessarily behave in a non-ecological way. To shed more light on the interaction between climate fear and behaviour, I plotted four selected environmental behaviour variables with the climate fear variable in Figure 10.



### FIGURE 10:INTERACTION OF ENVIRONMENTAL BEHAVIOR AND CLIMATE FEAR

In Bar Plot 1 (Figure 10) it seems that even the people who are not afraid of climate change to a great deal, tend to stop the tap, as the answer "never" was picked by twice as many people as "always". Although, on average it seems that in this question, the people who are more afraid of climate change also behave in an eco-friendlier manner. In Bar Plot 2, it seems that there is no difference in the behaviour between the fearful people and those who are not. It seems that people do not buy products from recycled papers on a large scale. Bar Plot 3 indicates that people are not really willing to use public transport and if they do, there seems to be no difference between their climate fear scores. And the last Bar Plot 4 suggests the same trend, as there is no significant difference between the sceptical and scared people in their flying habits.

# 7. ROBUSTNESS CHECK

After interpretation of the results, it is always necessary to ask and examine the question of how robust, in other words, how valid the results are. I ran several robustness tests, and this section provides a discussion of them. All tests were conducted on Model 5 from Table 1, where both media effect variables are included in one regression. The last robustness test was also conducted on the Model testing effect of strikes.

The first set of robustness tests incorporates the exclusion of some newspaper media. In the data section, I pointed out that the newspaper The Sun might have some duplication in the corpora. Therefore, I want to test whether excluding The Sun from the analysis would produce a different result. The results of this robustness test are displayed in Appendix in Table 2 Model 1. Overall, the results are precisely the same in terms of significance level, and the only difference is the coefficients of media coverage variables which are slightly larger.

As one may argue that people form their opinion only based on serious broadsheet media, I want to control for this and therefore I ran the analysis only on the media coverage variables which counted the articles published exclusively by The Guardian. Again, the results can be found in Appendix Table 2 Model 2. In terms of statistical significance, control variables indicate the same level of significance, but the media coverage variable counting the articles on the day of the interview became statistically significant. Also, the size of the coefficients of the media coverage variables doubled. This increase in the coefficient indicates that the Guardian has more strength to shape people's opinions than tabloids. Even excluding all newspapers except the Guardian did not produce significantly different results and my results still seem to be consistent and robust.

To check whether the media effect is not driven only by the Guardian, I ran the analysis with all other articles except the one published by the Guardian (Appendix Table 2 Model 3).

The only difference in the results was the size of the p-value for variable media coverage one week before the survey, which increased at the level of 0.001.

As the dependent variables were coded based on the dictionary analysis results, I tested the results with a different dependent variable. Instead of using the count of articles that scored more than 0.3 in the dictionary analysis (for details see the dictionary analysis part) I included all articles which were collected in a keyword search for the terms "climate change" and "global warming". The output of the regression is reported in Appendix Table 2 Model 4. The coefficient of media coverage on a day of interview remained the same as in the main model, while the coefficient of media coverage 2-8 days prior to the interview is slightly higher and the level of significance is also greater, but otherwise, the results are the same.

The next robustness test examined how reliable the measurement of my DV is. The operationalization of the variable climate fear was not direct - people were not asked about their opinion on climate change but were asked a proxy question instead. To test whether a different kind of question but still a proxy of public opinion on climate change would produce the same results, I adopted following question from Understanding Society – "the effects of climate change are too far in the future to really worry me". The participants who strongly agree with this argument are perceived as not scared of climate change, whereas participants strongly disagreeing with this argument are the ones who are afraid of climate change.

The results of the regression are reported in Appendix Table 2 Model 5. The coefficients are more or less the same. The important part is that the variable media coverage for one week before interviews is statistically significant, although with a slightly lower p-value at 0.05. This does not change anything in my interpretation. Surprisingly, the variable age is not significant while the variable unemployment became significant. I also re-ran the strike regression with this different dependent variable and the results are the same as with the original dependent variable (Appendix Table 3).

Overall, I might conclude that the result of my analysis appears to be robust. I performed five different robustness tests of my results and none of them yielded significantly different results.

# 8. LIMITATIONS OF THE STUDY

This thesis is a public opinion study, but the main explanatory variables are not truly measured on an individual level, and this might be perceived as a major problem or limitation with the thesis. To study the effect of media on an individual level, the most convenient way is by experimental research design in which the researchers are able to manipulate the treatment – who will see the media report and who does not.

This brings us to the question of the internal validity of the thesis. I tried to address this issue by using media coverage proxy measured on a day level, where different values were assigned to each individual based on the day of the interview. Moreover, the statistical consequences of using media coverage were addressed by implementing clustered standard errors. I certainly find evidence of the link between media coverage and worries, but the casualness of this link should be confirmed by a paper employing experimental design.

With regard to the second hypothesis – the effect of strikes, I found no effect, but I suspect this is due to the small number of observations. To confirm or reject the finding of this thesis, future research should consist of more individual responses and also include indicators of whether a person does know about such events.

The sample of the thesis was only people living in the United Kingdom, and this represents a low level of external validity, as the results cannot be applied to different countries. In the media coverage section in Figure 4, I clearly observed the cross-country differences in media coverage. Additionally, the UK media seems to be an outlier in comparison with other European media, meaning that the UK media covers climate change more than other countries. Such a difference in coverage might lead to a different outcome. For example, the countries with low levels of climate change coverage might experience no effect of media. Thus, future research aiming to establish a causal claim with high external validity should incorporate participants from more countries.

Last but not least, I should discuss the omitted variable bias (OVB). This is perhaps the problem of every observational study. Although the thesis attempted to include the most significant variables from previous studies, it might still face OVB. For example, I did not include variables such as temperature or weather shocks. Also, a variable measuring ideology was not included in the regression analysis as I did not have data for that. Moreover, there are some potential drivers of public opinion on climate change that are unobserved, such as some cultural-individual characteristics.

# CONCLUSION

This thesis investigated what drives public opinion on climate change. In particular, I focused on two potential drivers of climate change – media coverage and global climate strikes. To test the hypothesis, I ran a set of linear regressions. The media coverage was measured by the aggregated number of all articles published on the day when a person was interviewed and one week prior to the interview. This strategy was especially useful for detecting which kind of discourse has a stronger effect- whether the newest discourse or the one which lasts for a longer time. The effect of global climate strikes was tested as a comparison of attitudes towards climate change between the people who were interviewed in the week of climate strikes and the people interviewed at other times.

Before the empirical test, I looked at the time trend for media coverage of climate change and the development of public opinion on climate change. The climate change coverage is variable, but we have noted a clear increase with an observed peak in recent years (2019-2020) compared to significantly lower coverage in the years 2010 -2014. A comparison of European countries showed that the clear leader in climate change coverage is the United Kingdom with a large discrepancy compared with the rest. On the contrary, Russian media seems to be the least interested in climate change, followed by Portugal. Intriguingly, Sweden which is perceived as one of the greenest countries also does not devote a large proportion of media attention to climate change.

The perception of climate change as a serious problem in Europe has risen in the last 5 years. The United Kingdom is no exception and follows the European trend. While in 2009, the UK belonged among the least worried countries about climate change and was deeply under the EU average, in 2019, the UK was middle in the list of countries worried about climate change and was under the EU average by just one percentage point.
In this thesis, I tested two hypotheses; the first assumed that larger media coverage leads to greater climate fear, while the second stated that global climate strikes promote greater climate fear. Based on the empirical analysis, we might infer that this thesis found evidence that media does have an effect on people's attitudes towards climate change. The longer-term discussion of climate change in the media also correlates with a more significant effect on people's attitudes. Once I look at the media effect across different age categories, I found that the youngest generation – people aged under 30 are more affected by coverage on their interview day. On the other hand, the older generation people over 55 are affected more by the coverage 2-8 days before interview. Interestingly, I did not find statistically significant results for the media coverage in the model conducted on a sample of people between 30 and 55. This may be because the opinion of these people is well-embedded and more difficult to change. Additionally, this thesis did not find evidence that unemployed people are less skeptical about climate change, which was demonstrated in several previous papers that tested the economic hypothesis.

The test of the second hypothesis inferred no effect from the global climate strikes. The analysis did not find a significant increase in climate change coverage during the global climate strikes. Also, the people who were interviewed during the global strikes were not statistically different from those who were interviewed in non-strike weeks. I need to be very cautious about the interpretation of the strike hypothesis results, because the number of observations included in the strike variable was very low. Also, I did not account for the spill-over effect of the strikes - people are not affected by the strikes and climate change movements only during the time of the event but also beyond it.

Future research on attitudes towards climate change should aim to include additional years in the analysis to better understand the drivers of opinion. In this thesis, I only included the last three years which meant omitting the years when the topic of climate change was not

salient, as well as exclusion of the economic recession. What is more, the thesis utilized only the quantity of articles and not the content. To shed more light on this issue, content analysis could be a fruitful contribution to the literature. A second recommended approach for future research is to conduct lab experiments that enable the researcher to have full control over treatment to directly determine the effect of media on each participant.

To conclude this thesis, media has the power to shape people's opinion, and in the case of this study, the forming of opinion is moving in a negative direction, as it makes people more concerned about climate change. On the other hand, it seems that newly emerging movements such as the global climate strikes do not have such a strong influence on public opinion in general. But in the thesis, I did not control for the different effects of climate strikes across different age categories due to the absence of data. However, as observed in the analysis, being afraid of climate change does not necessarily mean behaving in a climate protective way. This, more public awareness programs are needed in relation to climate change.

## APPENDIX

- Macroeconomics Civil Rights Healthcare Agriculture Forestry Labour Immigration Education Environment Energy
- Fisheries Transportation Crime Social Welfare Housing Finance Defence Sstc Foreign Trade International Affairs

Government Ops. Land-Water Management Culture Province Local Intergovernmental Constitutional Unity Aboriginal Religion

TABLE 11: THE LIST OF TOPICS IN THE LEXICODER DICTIONARIES

	(Model 1) No Sun	(Model 2) Only Guardian	(Model 3) No Guardian	(Model 4) MediaCoverage based on keyword search	(Model 5) Different DV
Media coverage on the day of the interview	0.00336	0.00615*	-0.00113	0.000691	-0.00140
	(0.00227)	(0.00258)	(0.00504)	(0.00120)	(0.00224)
Media coverage 2-8 days prior to the interview	0.00181**	0.00219**	0.00385***	0.000831***	0.00134*
	(0.000549)	(0.000733)	(0.00110)	(0.000219)	(0.000532)
Gender	-0.111***	-0.111****	-0.112***	-0.111***	-0.111****
	(0.0126)	(0.0126)	(0.0126)	(0.0126)	(0.0127)
Age	0.000904*	0.000889*	0.000920*	0.000923*	-0.0000651
	(0.000379)	(0.000379)	(0.000380)	(0.000379)	(0.000389)
Level of Education	0.169***	0.170 <sup>***</sup>	0.169***	0.169***	0.183 <sup>***</sup>
	(0.00498)	(0.00498)	(0.00497)	(0.00497)	(0.00486)
Unemployment status	-0.0256	-0.0254	-0.0243	-0.0258	-0.149***
	(0.0332)	(0.0332)	(0.0332)	(0.0331)	(0.0371)
Monthly Income	0.0000249 <sup>***</sup>	0.0000250***	0.0000250 <sup>***</sup>	0.0000249***	0.0000315***
	(0.00000460)	(0.00000459)	(0.00000459)	(0.00000458)	(0.00000463)
Religion	-0.168 <sup>***</sup>	-0.168 <sup>***</sup>	-0.168***	-0.169***	-0.116 <sup>***</sup>
	(0.0136)	(0.0136)	(0.0136)	(0.0136)	(0.0131)
Urban Area	-0.0411**	-0.0402**	-0.0414**	-0.0435**	-0.0811***
	(0.0151)	(0.0151)	(0.0152)	(0.0152)	(0.0134)
Constant	$2.877^{***}$	$2.872^{***}$	$2.920^{***}$	2.870***	$3.131^{***}$
Clustered SE	YES	YES	YES	YES	YES
N. Clusters	828	828	828	828	828
Observations	26 922	26 922	26 922	26 922	26 925
Adjusted R <sup>2</sup>	0.062	0.063	0.062	0.063	0.076

Standard errors in parentheses \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

## TABLE 12: ROBUSTNESS TEST: MEDIA COVERAGE MODEL

	(Model 1) Different DV		
Strike	0.0136 (0.0443)		
Gender	-0.111*** (0.0125)		
Age	-0.0000873 (0.000362)		
Level of Education	0.183 <sup>***</sup> (0.00470)		
Unemployment status	-0.147*** (0.0335)		
Monthly Income	0.0000316*** (0.00000430)		
Religion	-0.115*** (0.0124)		
Urban area	-0.0790*** (0.0140)		
Constant	3.170 <sup>***</sup> (0.0297)		
Clustered SE	NO		
N. Clusters	-		
Observations	26 925		
Adjusted $R^2$	0.076		
Standard errors in pare $p < 0.05$ , ** $p < 0.01$ , **	ntheses $p < 0.001$		

TABLE 13: ROBUSTNESS TEST: CLIMATE STRIKE MODEL

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