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Fake News:
What is its impact? Can we do something about it?

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Fake News:
¿Cuál es su impacto? ¿Podemos hacer algo al respecto?

Resumen

El ascenso de las *fake news* provocó muchas preocupaciones públicas basadas en la creencia de que estas noticias afectan los comportamientos. Sin embargo, la evidencia de su impacto en comportamientos es escasa y poco concluyente, y no hay consensos sobre cómo lidiar con sus potenciales efectos negativos. En este trabajo conducimos un *survey experiment* para evaluar el impacto de una *fake news* acerca del activismo medioambiental. También evaluamos el efecto de un artículo que desmiente con datos a la *fake news*. Las variables resultado que medimos incluyen creencias y preferencias y comportamientos proambientales. Los sujetos tratados fueron aleatoriamente asignados para leer un extracto de una *fake news* o de una desmentida de ella. El resto de los individuos conforman el grupo control. Encontramos claros impactos en creencias: la *fake news* incrementa las creencias en hechos que son falsos, mientras que la desmentida genera el efecto contrario. Aun así, nuestros resultados muestran efectos pequeños o nulos sobre las preferencias y los comportamientos proambientales.

Palabras clave: *fake news, correcciones, noticias, survey experiments, medio ambiente.*

Códigos JEL: C90, D83, Q59.

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Abstract

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Keywords: *fake news, corrections, fact-checking, news, survey experiments, environment.*

JEL codes: C90, D83, Q59.

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Lucio Wasserman*

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Abstract

The rise of fake news led to widespread public concerns based on claims that it affects behaviors. Nevertheless, the evidence of the impact of fake news on behaviors is scarce and inconclusive, and there is no consensus on how to deal with the potential negative effects. In this paper we conduct a survey experiment to evaluate the impact of a fake news article concerning environmental activism. Additionally, the effect of a fact-checking article correcting the fake news story is also evaluated. The measured outcomes include beliefs and pro-environmental preferences and behaviors. The treated participants were randomly assigned to either read an extract of the fake news article or of the correction article. The remaining participants conform the control group. We find clear impacts on beliefs: the fake news article increases misperceptions while the correction reduces them. However, our results show small to null effects of both treatments on pro-environmental preferences and behaviors.

1. Introduction

Misinformation spread through fake news seems to have invaded our daily life. Although fake news and other types of articles disbursing misperceptions are not new and still represent a small portion of the overall media consumption, there is evidence that both fake news and fact-checking articles are becoming increasingly ubiquitous (Allcott and Gentzkow, 2017; Allen et al., 2020; Amazeen, 2013; Grinberg et al., 2019; Nyhan and Reifler, 2016; Vosoughi et al., 2018). The rise of fake news has raised widespread concerns about the negative impacts it might have. We see that in the public discourse and in the academic literature many are claiming that fake news and misperceptions more generally can affect our preferences and behaviors in key areas such as politics (Dewey, 2016; Drummond et al., 2020; Flynn et al., 2017; Levy, 2017; Parkinson, 2016; Read, 2016), health (Drummond et al., 2020) and the environment (Lata and Nunn, 2012). However, most of those claims lack empirical support, as the literature has mainly focused on the impacts on beliefs —as opposed to preferences and behaviors— and is far from reaching a consensus regarding the effects of misperceptions and corrections (Flynn et al., 2017; Nyhan, 2020; Walter and Murphy, 2018; Walter et al., 2020b).

What is the impact of fake news on preferences and behaviors? Are correction articles an effective way of fighting the effects of fake news? In this paper we provide an answer to these questions by designing and implementing a survey experiment to evaluate the impact on pro-environmental preferences and behaviors of a fake news article related to environmental activism and of a fact-checking article correcting the fake news story. The survey participants were randomly assigned to one of five groups. The participants assigned to the fake news group were presented with an extract of a fake news article claiming that the young environmental activist Greta Thunberg is the granddaughter of the multimillionaire George Soros, and that he is trying to keep the relationship a secret. Those assigned to the correction treatment

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were instead presented with an extract of a fact-checking article explaining that Greta Thunberg is not really Soros' granddaughter. It also provides evidence justifying why the fake news item should not be trusted. We had three additional groups, which serve as controls. Those in the first control group did not read any article, those in the second control group read an extract of an article covering a new discovery in a video game, and those in the third control group saw an article announcing that a documentary was being made about Greta Thunberg's activism. For most of the results the participants in the three control groups are pooled together.

After showing the articles to the participants we collected their answers to a series of questions that capture pro-environmental preferences and behaviors. We first asked them to divide a fixed budget among five public policies, of which two were associated with relatively positive impacts on the environment and two with negative impacts. Then, they had to divide a fixed budget between three NGOs, of which one was an environmental NGO. This question was incentivized. After that, they were asked to order four issues according to the level of importance they assigned to each of them. One of the issues in the list was global warming. From the answers to these three questions we construct an index, which we interpret as capturing pro-environmental preferences and behaviors. Additionally, we required participants to rate their level of agreement with the statement "The young environmental activist Greta Thunberg is the granddaughter of George Soros", which was the claim made by the fake news in study. We also asked several questions that provide control variables and are used to analyze heterogeneous effects.

The survey was implemented in October 2020 with mainly Argentinian respondents. We collected 1,867 useful answers. Our results show a clear and robust impact of the fake news and the correction treatments on beliefs. The fake news drove many to think that Greta Thunberg is Soros' granddaughter. The correction article had the opposite effect, driving people closer to the truth. Despite of the evident impacts on beliefs we see that mostly there is no effect on preferences and behaviors. For the majority of the estimations there is no significant impact on the index capturing pro-environmental preferences and behaviors. Looking at the components of the index, we see that the fake news treatment has no impact on the coins assigned to policies favorable to the environment. The estimated coefficients for the correction treatment on this dimension are all positive but usually statistically insignificant. This suggests that at least the correction does no harm in this dimension, and it may even be doing some good. Focusing on the NGO component, we observe that the estimated coefficients for both treatments are negative. However, only some of them are statistically significant. Those obtaining statistical significance are mainly the ones of the fake news treatment. This indicates that the fake news article has a small negative impact on the donations directed to the environmental NGO. Finally, we find that there is no effect of any of the treatments on the priority assigned to global warming.

This paper is encompassed under the growing literature of misperceptions and misinformation. Following [Nyhan \(2020\)](#) we define misperceptions as the belief in assertions which are demonstrably false (e.g. that Greta Thunberg is the granddaughter of George Soros) or which go against systematic evidence (e.g. that vaccines cause autism). The term misinformation refers to the assertions which spread these beliefs. The fake news article used in this paper clearly promotes misinformation and the spread of a misperception.

Most of the papers from the literature of misperception and misinformation that present causal evidence focus on beliefs. It is established that many people believe in fake news and hold misperceptions ([Allcott and Gentzkow, 2017](#); [Silverman and Singer-Vine, 2016](#)), and that articles spreading misperceptions can affect beliefs ([Berinsky, 2017](#); [Thorson, 2015](#)). Relatedly, a large body of literature analyzes the impact of corrections on beliefs. The evidence of their effectiveness is mixed. Many papers find that corrections can reduce misperceptions ([Bode and Vraga, 2015](#); [Hopkins et al., 2019](#); [Nyhan et al., 2014](#); [Nyhan and Reifler, 2018](#); [Walter et al., 2020a](#); [Wood and Porter, 2018](#)), while others find that there is no effect or that corrections can even increase misperceptions ([Holman and Lay, 2019](#); [Flynn et al., 2017](#); [Nyhan and Reifler, 2010](#); [Walter and Murphy, 2018](#); [Walter et al., 2020b](#)).

However, as argued by [Aird et al. \(2018\)](#), [Flynn et al. \(2017\)](#), [Hopkins et al. \(2019\)](#) and [Nyhan](#)

(2020), and evidenced by Nyhan et al. (2014) and Swire et al. (2017a), affecting beliefs is not the same as affecting preferences or behaviors. For example, a person could have a firm position against a certain political candidate. If that person sees a fake news article stating how corrupt that candidate is, she may believe in it, although it might not change how much she dislikes the candidate or how she will vote. In that case we would see that fake news increase misperceptions, but there would not be any effect on preferences or behaviors. The impacts on beliefs and behaviors can even have opposing signs. For instance, Nyhan et al. (2014) finds that showing information explaining that there is no evidence suggesting that vaccines cause autism effectively reduced misperceptions. Nevertheless, that treatment decreased the declared intent to vaccinate among some of the parents. Highlighting this fact—that impacts on beliefs do not directly or necessarily translate into changes on preferences and behaviors—is one of the objectives of the present work. Certainly, having people believing things that are false is a problem on its own. However, the problem becomes severely more serious if apart from changing the beliefs of a person fake news leads that person to avoid vaccination, or to vote against a good policy to reduce CO2 emissions. As was mentioned earlier, those worried about the potential impacts of fake news are mostly worried about how it may affect behaviors.

Of course there are exceptions, and some papers do look at the impact that spreading misinformation has on behaviors or something closely related to them. Aird et al. (2018) and Thorson (2015) do so in the politics realm, and Berinsky (2017) analyzes how rumors can affect support for a health reform. A larger number of papers evaluate the impact that correcting misperceptions has on behaviors (Agadjanian et al., 2019; Bowles et al., 2020; Marghetis et al., 2019; Nyhan et al., 2014; Thorson, 2015; Scartascini et al., 2020). The literature is far from reaching a consensus on the impact that articles spreading misperceptions and fact-checking articles have on behaviors, and more evidence is needed to achieve that goal (Nyhan, 2020).

This paper makes three specific contributions to the literature of misperceptions and misinformation. First, we make a general contribution to this literature by adding to the almost non-existent evidence of the causal effect of misinformation on behaviors. As we find clear impacts on beliefs but small to null impacts on preferences and behaviors, it is imperative that the literature shifts its focus away from beliefs and begins to analyze more seriously the effects on behaviors, which is what everyone is most worried about. Our results indicate that the current concerns about the impacts of fake news might be an overstatement.

Second, we contribute to the more specific literature of misperceptions related to environmental problems or activism. It is worth mentioning that environmental problems should not be considered as just a concern for some marginal groups. The problems that could emerge as a consequence of the human disruption of the environment are one of the major threats to our future well-being (IPCC, 2018; Nordhaus, 2019). Even more, it has been shown that there are wide misperceptions in this realm (Lata and Nunn, 2012; Marghetis et al., 2019; Nyhan and Reifler, 2018), and that there have been coordinated campaigns to spread misinformation about anthropogenic climate change (Farrell et al., 2019). Past papers have analyzed the impact of correcting misperceptions related to environmental problems on beliefs and behaviors (Marghetis et al., 2019; Nyhan and Reifler, 2018), and some have studied the impact that spreading misperceptions related to the environment can have on beliefs (Drummond et al., 2020; Sunstein et al., 2017). To the best of our knowledge, this would be the first paper presenting evidence of the causal impact on behavior of spreading misinformation about environmental activism. This work also adds to the existing evidence of the impact of misinformation on beliefs, and of the impact of correcting misperceptions related to the environment.

Third, this paper contributes to the literature of misperceptions on a different dimension. The lack of consensus and the mounting mixed results could be a reflection of a lack of consideration of relevant heterogeneities. In particular, past research has pointed out that there could be important differences across different societies (Aird et al., 2018; Walter and Murphy, 2018), the way in which the misinformation is spread (Allcott and Gentzkow, 2017) and the political context surrounding the specific

misperception being studied (Nyhan, 2020). A great proportion of the literature uses participants from the United States. This paper effectively diversifies the population studied, as most of the participants were from Argentina.

With regards to the way in which the misperceptions are spread, this study uses a fake news article. We adopt the definition provided by Allcott and Gentzkow (2017) and define fake news as “news articles that are intentionally and verifiably false, and could mislead readers.” Allcott and Gentzkow (2017) differentiates fake news from other related concepts such as: reporting mistakes made unintentionally, rumors, conspiracy theories, satires with low chance of being mistaken for factual reporting, statements pronounced by politicians which are demonstrably false and articles that are biased and misleading but not technically false. Most of the past works study rumors, conspiracy theories or politicians’ false statements. The evidence of the specific impact of fake news is particularly scarce, and we contribute to its expansion.

Finally, the context surrounding the fake news article and its topic is considerably different from most works. Nyhan (2020) explains that most of the studies focus on polarizing issues that are widely portrayed on the media. They usually also concentrate on matters for which the main political parties have clearly defined positions. These characteristics might affect the responsiveness of beliefs and behaviors to the fake news and corrections. Even more, the focus on those kinds of issues might not be adequately representing the misperceptions held by the population. This work is a deviation in those dimensions, as environmental problems and activism are not matters usually portrayed in the Argentinian media, and there are no clear positions associated with any of the main political parties. Although no general conclusion can be obtained about the potential heterogeneities between societies, ways of distributing the misinformation, and political contexts from this paper alone, it provides evidence that could contribute to the future development of a more comprehensive study designed to disentangle these potential differential effects.

The rest of the paper proceeds as follows. In section 2 we introduce the experimental design and the econometric framework. Section 3 presents descriptive statistics of the data used. Section 4 presents the main results, analyzes heterogeneous effects and conducts robustness checks. Section 5 concludes.

2. Methodology

In order to evaluate the impact of a fake news article and a correction article on preferences and behaviors we designed a survey experiment. Figure 1 summarizes the design of the experiment. Respondents were invited to answer the survey through social media. Everyone who entered to the survey link was shown the same introduction, which stated the objective of the survey quite generally (so that the participants would not be able to deduce the goal of the survey, thus minimizing the possibility of experimenter demand effect), explained that the answers were anonymous and asked the participants if they were willing to continue with the survey. This question was included to make it absolutely clear that participation was voluntary. Those who answered that they were unwilling to participate were presented with only one more question, asking why they declined to participate. Those who accepted were directed to a set of questions which are used as control variables and to analyze heterogeneous effects. In this block we first asked about gender and age. Then, participants were required to select if they considered themselves to be poorly informed, somewhat informed or well-informed, and to report how many minutes a day they spent consuming news through traditional media and through social networks. After that, we showed them six factual statements, and respondents were required to answer for each of the statements if they thought they were true or false (or if they declined to answer for that statement). The six statements were about political issues. Three of the six statements were true. The remaining three contained false

information which was spread as true at some point in the past.¹

The next block of the survey is where the treatments occur. Participants were randomly assigned into one of five groups, which differed in the news' extract that was presented in each of them. All the extracts were accompanied by a heading that said where and when the article was published, and they also all had roughly the same structure: a bold title, an image and then some short text. The first group had no extract, and the participants were directly sent to the outcome variables. The second group was presented with an extract of a news article that is irrelevant in this context, it was about the video game Minecraft. The third group read an extract of a neutral news article about the young environmental activist Greta Thunberg, which mentioned that a documentary series about her was being prepared by the BBC. The fourth group saw an extract of one fake news article that said that Greta Thunberg was the granddaughter of the multimillionaire George Soros. According to that article, the relationship was accidentally revealed because Thunberg wrote a message congratulating her "dear grandfather" for his birthday on a social network. Moreover, the article said that the message was immediately deleted by Soros, but that some users were fast enough to see it before its deletion. That article was in fact fake news fabricated by a parody media outlet. The image presented in the article—showing Greta Thunberg together with Soros—was edited. The image originally portrayed Thunberg posing with Al Gore. In the edited image Al Gore's face was replaced with Soros' face. The final group read an extract of a correction article explaining that Greta Thunberg is not Soros' granddaughter. It also shows the source of the fake news article and demonstrates that the image was edited.

As for the main results the participants from the first three groups will be pooled to form the control group, to maximize the statistical power we decided to assign 1/9 of the participants to each of the first three groups, and 1/3 to each of the two treatments.

It is relevant to mention some of the repercussions of the fake news article presented. Many used it to feed the conspiracy theory that claims that Thunberg is being manipulated and funded by some very powerful people, including Soros. Furthermore, they take it as evidence that climate change is not a real problem, and that active environmental policies are not necessary. This was done, for example, by Eduardo Bolsonaro, a Brazilian congressman and son of the president (Argentina Ya, 2019; Clarín, 2019; Sousa, 2019). President Bolsonaro is known to fiercely oppose environmental policies, and has scaled back on many of the policies established by his predecessors (Aznar Erasun, 2019; Fox and Land, 2019; Simões, 2019).

After reading the extract assigned to them, each participant was sent to the questions that are here used as outcome variables. There were four different questions in this block. The first one asked participants to divide a budget of 100 coins among five different policies, which were: (i) development of renewable energies, (ii) improvement of the waste management system to make it more environmentally friendly, (iii) development of an oil field, (iv) promoting the cattle industry and (v) preventing drug consumption. The first two policies are considered to be beneficial towards the environment, while the third and fourth are considered harmful (IPCC, 2018; Springmann et al., 2018). The full budget had to be allocated.

The second question required the participants to distribute a budget of 5,000 Argentinian pesos between three NGOs. The name of each NGO was accompanied with a brief description of their objectives. The NGOs used were: (i) RIOD (an organization that reunites different NGOs dealing with drug abuse related problems), (ii) Greenpeace (an environmental NGO) and (iii) TECHO (an NGO fighting poverty). Again, the full budget had to be allocated. This question was incentivized. That is, participants were told that among the respondents one would be randomly chosen and the amounts assigned by that person

¹The six statements were chosen after analyzing various fact-checking portals. The goal was to choose real statements which were presented as news. We also chose statements that did not appear to be obviously true or false, because the answers would not be informative in that case. In the appendix we show the statements used and the distributions of the answers for each statement. We see that there is variability in the six statements, indicating that none was clearly true or false.

to each of the three NGOs would be donated to each organization.² This is important because it made answering honestly a dominant strategy. For the first two questions of this block an allocation of a fixed budget was preferred over Likert-type questions, as it better reflects the budget constraints and the trade-offs and opportunity costs inherent to directing funds to one policy or NGO.

The third question of the block directly asked about preferences. The participants were required to order four issues from the most pressing to the least pressing. The issues considered were: (i) global warming, (ii) poverty, (iii) drug consumption and (iv) lack of information.³

Finally, the fourth question providing an outcome variable presented participants with the following statement: “The young environmental activist Greta Thunberg is the granddaughter of George Soros.” Then, they were asked if they believed that the statement was true. Respondents were given five options, ranging from “definitely true” to “definitely false.” In reality, Greta Thunberg is not the granddaughter of George Soros, but this relationship is one of the false facts spread by the fake news article used in this experiment.

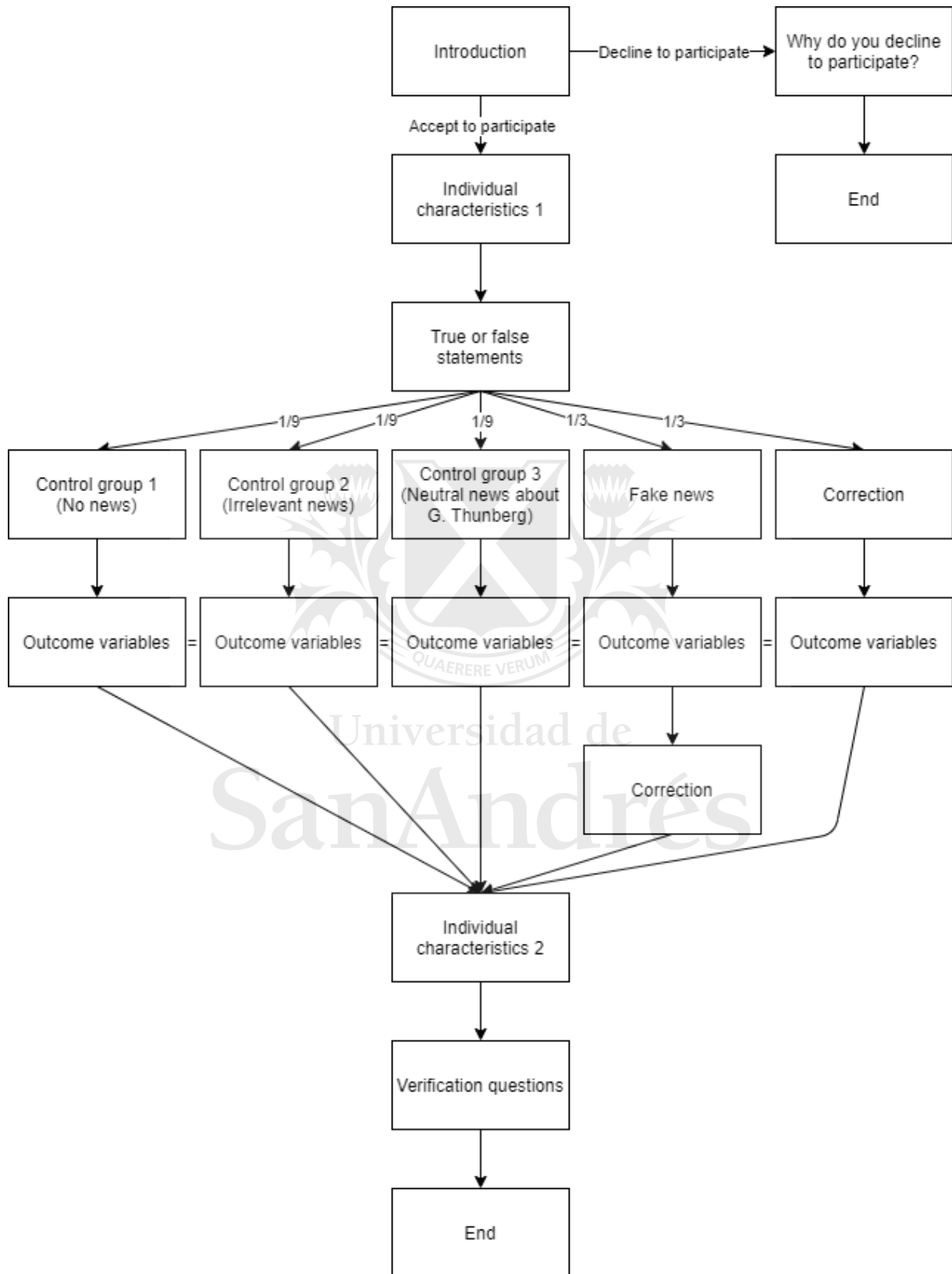
After answering those questions, the fake news group was presented with the correction. This was done to avoid the dissemination of fake news and to guarantee that the participants from that group were told about the full story. Then, they were directed to another block of questions. The subjects from all the other groups were taken to this block directly after the last question from the previous block. In this section we asked about some additional pre-treatment characteristics: country of birth, country of residence, if they were students, if they were employed and which was their level of education.

Finally, everyone was shown two verification questions. The first question attempted to detect if the respondent was paying attention or just rushing through the survey. It had a somewhat longer text as the question. It started mentioning how behavior can be influenced by our context. In the end of the text it asked participants to select the option “none of the above” to verify that they were paying attention. The other options were different emotions. Those who selected one of the emotions were probably not paying much attention to the questions. The second verification question asked how much of the survey’s questions they understood. An optional open text question was placed after that, where participants could leave comments. This was the last question of the survey. In the appendix we present screenshots with the exact questions and extracts used.

²The donations were really implemented, there was no deception.

³Actually, there is no perfect translation for the Spanish word used, which was “desinformación”. A better translation would be a combination between lack of information and misinformation

Figure 1: Structure of the survey



The first three questions in the outcomes block are interpreted as giving information about preferences and behaviors. The second question (distribution of funds among NGOs) most nearly maps a behavior decision. As it was incentivized, we can interpret it as corresponding to an actual donation decision. The third question (ordering issues according to one’s priorities) clearly reflects preferences. The first one (distribution of funds for public policies) could be interpreted as reflecting either behavior or preferences. Using these three questions we will construct an index to capture in a single measure the environmental preferences and pro-environmental behaviors of the participants. This index —which we will call green index— is our main variable of interest.

To construct the index we will first aggregate the answers provided to the question of the distribution of funds among policies, as four of the five options were related in a positive or negative way with the environment. Specifically, we will define:

$$\begin{aligned} \text{Coins good for the environment} &= \text{coins for developing renewable energies} + \\ &+ \text{coins for making the waste management system more environmentally friendly,} \end{aligned}$$

$$\begin{aligned} \text{Coins bad for the environment} &= \text{coins for developing an oilfield} + \\ &+ \text{coins for promoting the cattle industry,} \end{aligned}$$

$$\begin{aligned} \text{Good net of bad coins for the environment} &= \text{coins good for the environment} - \\ &\text{coins bad for the environment.} \end{aligned}$$

Then, we proceed to construct the index considering this newly defined variable (good net of bad coins for the environment), the donations assigned to the environmental NGO and the place assigned to global warming in the priorities ordering. We follow [Kling et al. \(2007\)](#) for the construction of the index. That is, for each individual and each of these three variables we define a z-score by subtracting the mean of the control group and then dividing by the standard deviation of the control group. This means that each of the three components will have mean 0 and standard deviation 1 for the control group. The index is then computed by calculating the equally weighted average of the three z-scores.⁴ A greater value in this index is interpreted as an indicator of more pro-environmental preferences and behaviors.

To evaluate the impact on beliefs we will use the question about the relationship between Greta Thunberg and George Soros. As the respondents had five options —ranging from “definitely true” to “definitely false”— we codify the responses by assigning the numbers 1 through 5 to the options, with higher numbers meaning that the participant’s answer was closer to the truth (that is, to the option “definitely false”). We then standardize the variable.

The impact of the treatments is obtained by estimating the following regression models:

$$Y_i = \alpha + \beta_F \text{FakeNews}_i + \beta_C \text{Correction}_i + X_i' \delta + \epsilon_i \quad (1)$$

where Y_i is an outcome variable, FakeNews_i is a dummy variable taking value 1 if the person i was assigned to the fake news group, Correction_i is a dummy variable taking value 1 if the subject i was part of the correction treatment, X_i is a vector of pre-treatments characteristics and ϵ_i is the error term. X_i is included to improve precision and to control for small imbalances of these characteristics across groups. A version of equation (1) without the control variables term is also estimated and presented. The main

⁴Following [Kling et al. \(2007\)](#) we also impute the values of the donations to the environmental NGO and/or the order of priority assigned to global warming for those who at least answered the coins distribution question (the first question providing outcome variables) but did not provide an answer for the NGOs question or the priorities question. For each individual we impute the mean of their group. This is done before computing the z-scores. We do not maintain these imputations when we present the results for each individual variable (in the appendix).

parameters of interest are β_F and β_C , which provide the intention-to-treat effect⁵ of the fake news and the correction articles respectively. As we are measuring the outcome variables immediately after the treatments, we obtain an estimation of the effect on the short-term. Previous evidence (e.g. Berinsky (2017), Swire et al. (2017a), Swire et al. (2017b)) suggests that the effects fade over time, so we would be obtaining an upper bound estimate of the impacts over a longer term.

As there was random assignment we expect all characteristics to be balanced among groups. This implies that OLS provides unbiased and consistent estimators of the main parameters of interest: β_F and β_C . The random assignment is key to guaranteeing the internal validity of the results.

Additionally, we will analyze if there are heterogeneous effects. To do that we will estimate equation (1) but adding interaction terms between the dummy variables identifying the assignment into treatments and variables of individual pre-treatment characteristics.

A final remark is necessary. Although we are pooling the subjects in the first three groups to form the control group for the main analysis, there is a reason why they were separated in three different groups. It is not clear which would theoretically be the best control group for the analysis being made here. The answer depends on the specific substitution in news consumption that fake news generate. We are considering here three different alternatives: (i) people being reached by one fake news article read one additional article (the fake news story); (ii) people being reached by one fake news article do not change the amount of total articles they will consume, they replace another article from a different topic with the fake news story; (iii) people being reached by one fake news article do not change the amount of total articles they will consume, they replace another article from the same topic but with neutral information with the fake news item. Our first group is the one best suited to be the control if the first of these alternatives is the best description of the substitution in news consumption generated by fake news, our second group would be the best control for the second alternative, and the third group would be the best for the third alternative.

Furthermore, the three different control groups are also useful to disentangle a different effect that could be caused by reading the fake news or the correction extracts. One might think that there is an effect generated by the mere act of reading a short extract. By comparing the first control group (which read no news) to the second control group (which read an irrelevant news) we can verify if that is the case. One could also think that there is salience effect: mentioning Greta Thunberg brings to mind some thoughts which could affect the answers provided to the questions. By comparing the second control group with the third control group (which read a neutral news about Greta Thunberg) we can estimate that effect. Finally, by comparing the treatment groups to the second control group we net out the potential effect of reading an extract. By comparing the treatments to the third control group we net out the potential salience effect and the potential effect of reading an extract.

3. Data and descriptive statistics

The survey was implemented between October 8 and October 22, 2020. Respondents were invited to participate through social networks. 2,598 persons started the survey⁶ and all but 5 indicated that

⁵We understand that being treated means reading the extract assigned to the treated group. Being assigned to the group does not guarantee that the person was treated, as someone could continue to the next question without reading the extract. For this reason, the coefficients of this regression will give us an estimation of the intention-to-treat. In the analysis of robustness we make efforts to get closer to the local average treatment effect.

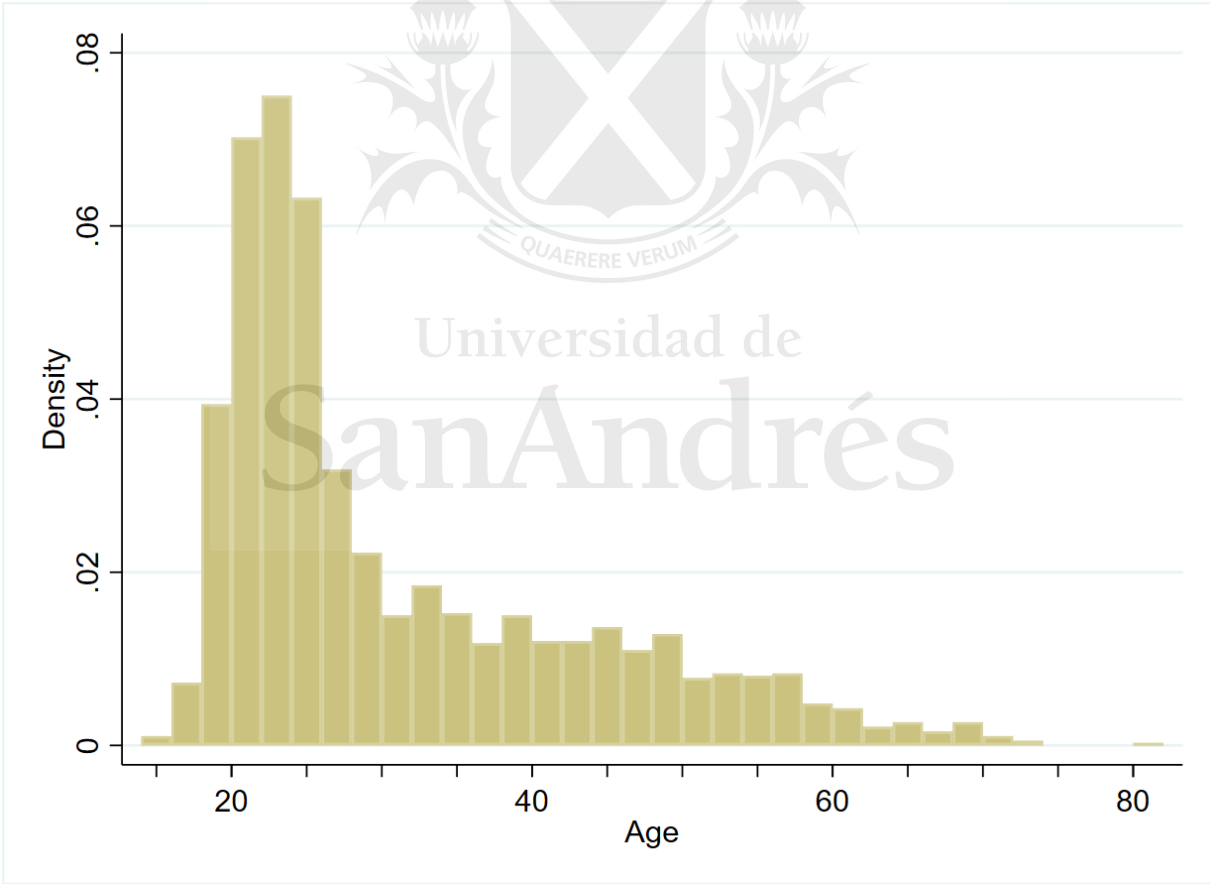
⁶Strictly speaking, as the survey was anonymous and there was not identity check, we cannot guarantee that each answer corresponds to a different individual. We can check the amount of different IPs. We have 2,517 different IPs. We cannot identify individuals by IP, as it could be the case that two persons from the same household answered the survey, which could be represented as two different answers with the same IP. Putting together the fact that almost all the answers come from IPs that appear only once with the fact that there were no relevant incentives to provide more than one answer, we can safely assume that each answer corresponds to one individual, and that repeated answers, if there are any, represent a negligible portion of the sample. Having made this clarification, we will refer to individual answers as individual persons.

they were willing to participate. For the 5 who indicated that they were unwilling to participate in the survey we did not collect any relevant information, so all the following analysis excludes them.

Among those who accepted to participate in the survey, 1,768 (68%) finished it, while the remaining 825 (32%) abandoned the survey before reaching the end. All of those who completed the whole survey have data for all the outcomes. Among the ones who only partially completed the survey, 99 (12%) have data for at least one of the outcome variables, and 26 have provided answers to all the questions that are used as outcome variables. This means that we are left with 1,867 observations for which we have at least one outcome variable and 1,794 observations for which we have all the outcome variables. Unless otherwise stated, for the remaining part of the paper we will consider only the 1,867 persons that provided an answer to at least the first outcome variable, while all the others will be excluded, as they did not provide relevant information for the analysis of the results.

In our sample, 1,178 (63%) respondents were men, 676 (36%) were women and 13 (1%) chose another option as their gender. The youngest participant was 14 years old, and the oldest selected the option of 100 years old or more.⁷ The median age was 25 and the mean 31. The following figure shows a histogram of the ages:

Figure 2: Histogram of the respondents' ages



Histogram of the respondents' ages. One observation with an older age was excluded to provide a clearer representation of the distribution.

As expected due to the age distribution, most of the participants were students. More specifically, 38% were full-time students, 28% were part-time students and the remaining 34% were not students at that moment. 61% of the sample had a job, while the other 39% did not. The distribution of education

⁷The age of this person was set to 100.

levels indicates that less than 2% of the individuals in the sample had a low education level (they did not finish high school), almost 55% had an intermediate education level (they finished high school but did not have a tertiary or bachelor degree at the moment of the survey), and almost 44% had a high education level (they had at least a tertiary or bachelor degree). The big majority of the respondents were born and resided in Argentina (more than 93% of the sample for both cases). No other country had a significant amount of the participants.

We were able to collect information about the time spent by each person in each section of the survey. This is relevant, as it allows us to verify that the respondents were not just rushing through the survey. The data show that the great majority of the respondents (about 87%) spent a reasonable amount of time reading the news item assigned to their group. The median time spent reading the news (excluding the first control group, as these participants were not presented with any news) was 37 seconds, and the average was 49 seconds. In addition, 99% of those who finished the survey spent at least 4 minutes answering it, a duration which was deemed as sufficient to provide a thoughtful response during the design stage of the experiment. Figures 12 and 13 in the appendix provide more details of these distributions.

Another block of questions before the random assignment into groups captured the self-reported level of information of each person and the time spent in traditional news media and consuming news through social media. 4% of the individuals considered themselves to be poorly informed, 62% declared being somewhat informed, and the remaining 34% said that they were well-informed. For the subjects in our sample, social networks seem to be more important as a source of information than traditional news media. On average, participants report spending 56 minutes per day consuming news through traditional media, while they report spending on average 78 minutes consuming news through social networks. The median values of those distributions are 30 minutes and 60 minutes, respectively.

We now exploit the question that asked the participants to identify if six statements were true or false. Of the six, half were true and half were false statements that were somewhat widely dispersed. We assign one point to the participants every time they correctly identified if the statement was true or false, we subtract one point if they misidentified and we assign no points if they chose not to provide an answer for that statement. Hence, for example, if a person has 6 points it means that she correctly assigned all the statements into true or false. On average people were way better than random at identifying if the statements were true or false. The average score was of 2.68, and the median one was 3. We can decompose this in the performance identifying true statements and the performance identifying false statements. The average score identifying true statements was of 1.89, and the average score identifying false statements was of 0.79; the median scores were 2 and 1, respectively. Only 2 persons out of 1,867 thought the six statements were false, 24 thought all statements were true, and 31 chose not to provide an answer for all six statements. In table 12, included in the appendix, we present the distributions of the answers for the six individual statements. There we can see that none of the statements was obviously true or false.

Before proceeding any further, we will provide evidence that the randomization was effective at balancing the observed characteristics, suggesting that it was also successful in adequately balancing the unobserved characteristics, which is fundamental to guarantee the internal validity of the results.

Table 11 presents the mean and standard deviation of each group for the collected pre-treatment characteristics. It also includes the two variables used to verify that the individuals understood the survey and that they were paying attention. The number of observations presented in the table is the number of participants in each group for which we have at least one outcome variable. The last column of the table includes the p-value of a test that has as null hypothesis that the mean is equal for the three groups.

From the table we see that all the variables are quite balanced among the three groups. The means are not statistically different aside from a few exceptions, which is something expected when there are

many variables. In the few cases where the hypothesis of mean equality is rejected, the differences do not appear to be quantitatively very relevant. Looking at the last two variables of the table we also identify that the percentage of people who understood most of the questions and who were paying attention is near 100% and almost the same in the three groups. This provides greater confidence in the internal validity and relevance of the results.

As many people began the survey but did not finish it, one could be concerned about the possibility that those leaving the survey in some of the groups differ from those abandoning the survey in another group. Nevertheless, we are confident that attrition is not a problem for three reasons. First, most of those who abandoned the survey without finishing it do it before the part of the survey where the treatments occur, hence, there is no reason to believe that the factors driving these persons to abandon the survey are correlated with the treatments. Those who abandon the survey before reaching the treatments might be different from those who finished it, we are not claiming that there are no differences between these two groups. However, that would not be a threat to the internal validity. Second, table 1 shows that the characteristics of the three groups are mostly balanced. If some relevant characteristics were correlated with the treatments we would expect greater differences between groups in the observed variables. Third, the number of observations in each group is quite balanced. If we look at the percentage of people in each group in four different cases — considering everyone who was randomized into a group, considering only those who have at least one outcome, considering only those who gave an answer for all the outcomes, and taking into account just the subjects who finished the survey— we see that in all the cases each of the three groups has between 32% and 35% percent of the sample.

The evidence just presented is useful to support the internal validity of the results, but does not say much about the external validity. As is the case with most of the literature that identifies causal effects, we cannot guarantee the external validity of our results. Our subjects and those from a larger population might differ in various observed and unobserved dimensions, and the effects for different groups of the population could differ. For example, table 13 (presented in the appendix) shows that our sample has many differences with Argentina's urban population in many observed variables. When comparing with Argentina's urban population we see that in our sample the subjects are on average younger, women are underrepresented and the students and the persons with a job are overrepresented. We also see that the individuals in our sample have much more formal education. Furthermore, it is most likely that our subjects differ from the average Argentinian citizen in unobserved characteristics, which we cannot include as controls nor use to analyze heterogeneous effects. Additionally, a similar point can be made with regards to the generalizability of the results to different articles or contexts. All of this does not mean that the results presented in our paper do not generalize to a larger population or different contexts, it is just a recognition that we do not know with certainty to which larger population and contexts they can be extrapolated. The discussion about the external validity of economic experiments is definitely not new, and the evidence in this regard is mixed. That is, many studies show that some results can be generalized to larger populations and other contexts despite of the different characteristics, while other find significant differences in the results obtained between samples or contexts (discussions and evidence about the external validity of economic experiments can be found for example in Cleave et al. (2013), Harrison and List (2004), Henrich (2000), Levitt and List (2007), List (2006), Ludwig et al. (2011) and Roth (1988)). So, we must be cautious before making generalizations, and future investigations could replicate our experimental design with different samples, articles and contexts to determine the external validity of our result, which is, in the end, an empirical matter.

Table 1: Balance of observable individual characteristics across groups

| Variables | Controls | Fake news | Correction | Difference test p-val |
|--|------------------|------------------|-------------------|-----------------------|
| Age | 30.26 (12.28) | 30.98 (12.69) | 31.04 (12.31) | 0.46 |
| Women | 0.33 (0.47) | 0.40 (0.49) | 0.35 (0.48) | 0.03 |
| Other gender or no answer | 0.01 (0.09) | 0.01 (0.09) | 0.01 (0.07) | 0.75 |
| Somewhat informed | 0.60 (0.49) | 0.62 (0.49) | 0.63 (0.48) | 0.64 |
| Well-informed | 0.36 (0.48) | 0.33 (0.47) | 0.34 (0.47) | 0.61 |
| Mins consuming news from traditional media | 56.43 (64.49) | 51.35 (62.84) | 60.63 (88.10) | 0.09 |
| Mins consuming news from social networks | 74.69 (71.48) | 73.99 (72.85) | 86.94 (100.06) | 0.02 |
| Score identifying false statements | 0.78 (1.58) | 0.78 (1.52) | 0.80 (1.51) | 0.97 |
| Score identifying true statements | 1.89 (1.23) | 1.86 (1.25) | 1.92 (1.21) | 0.61 |
| Born or lives in Argentina | 0.96 (0.19) | 0.97 (0.18) | 0.94 (0.24) | 0.09 |
| Part-time student | 0.28 (0.45) | 0.29 (0.45) | 0.28 (0.45) | 0.89 |
| Full-time student | 0.38 (0.49) | 0.38 (0.49) | 0.37 (0.48) | 0.88 |
| Intermediate education level | 0.56 (0.50) | 0.52 (0.50) | 0.56 (0.50) | 0.25 |
| High education level | 0.42 (0.49) | 0.47 (0.50) | 0.42 (0.49) | 0.17 |
| Working | 0.61 (0.49) | 0.62 (0.48) | 0.60 (0.49) | 0.78 |
| Understood most of the questions | 0.95 (0.21) | 0.97 (0.16) | 0.97 (0.18) | 0.26 |
| Final question correctly answered | 0.98 (0.14) | 0.98 (0.15) | 0.98 (0.15) | 0.94 |
| Observations | 639 | 629 | 599 | |

Means for different individual-level characteristics by group. The last column presents the p-value of a test that has as null hypothesis that the mean is equal for the three groups. The last two variables are not pre-treatment characteristics but questions included at the end of the survey to verify understanding and attention. Standard deviations in parentheses.

4. Results

In this section we will explore the results of the experiment. We will first present the impact of the treatments on beliefs, followed by the impact on the green index and each of its components. After that we analyze heterogeneous effects and do robustness checks.

4.1 Beliefs

The fake news treatment presented the subjects an extract of a fake news article that stated that Greta Thunberg is the granddaughter of George Soros, while the correction group was presented with an extract of an article explaining that actually she is not his relative. Given the characteristics of the treatments, we would expect an impact on the beliefs regarding the relationship between these two characters. That is in fact what we find. Both groups changed their beliefs in the expected direction, with the correction group coming closer to the truth and the fake news group increasingly believing in something which is in fact false. Table 2 presents these results in the form of regressions.

Table 2: Effect on beliefs

| Variables | (1) Believes that G. Thunberg is not the granddaughter of G. Soros | (2) Believes that G. Thunberg is not the granddaughter of G. Soros |
|--------------|--|--|
| Fake news | -0.347*** (0.0596) | -0.320*** (0.0553) |
| Correction | 0.397*** (0.0484) | 0.397*** (0.0465) |
| Constant | -0.0145 (0.0363) | -0.659*** (0.243) |
| Observations | 1,794 | 1,778 |
| R-squared | 0.091 | 0.210 |
| Controls | No | Yes |

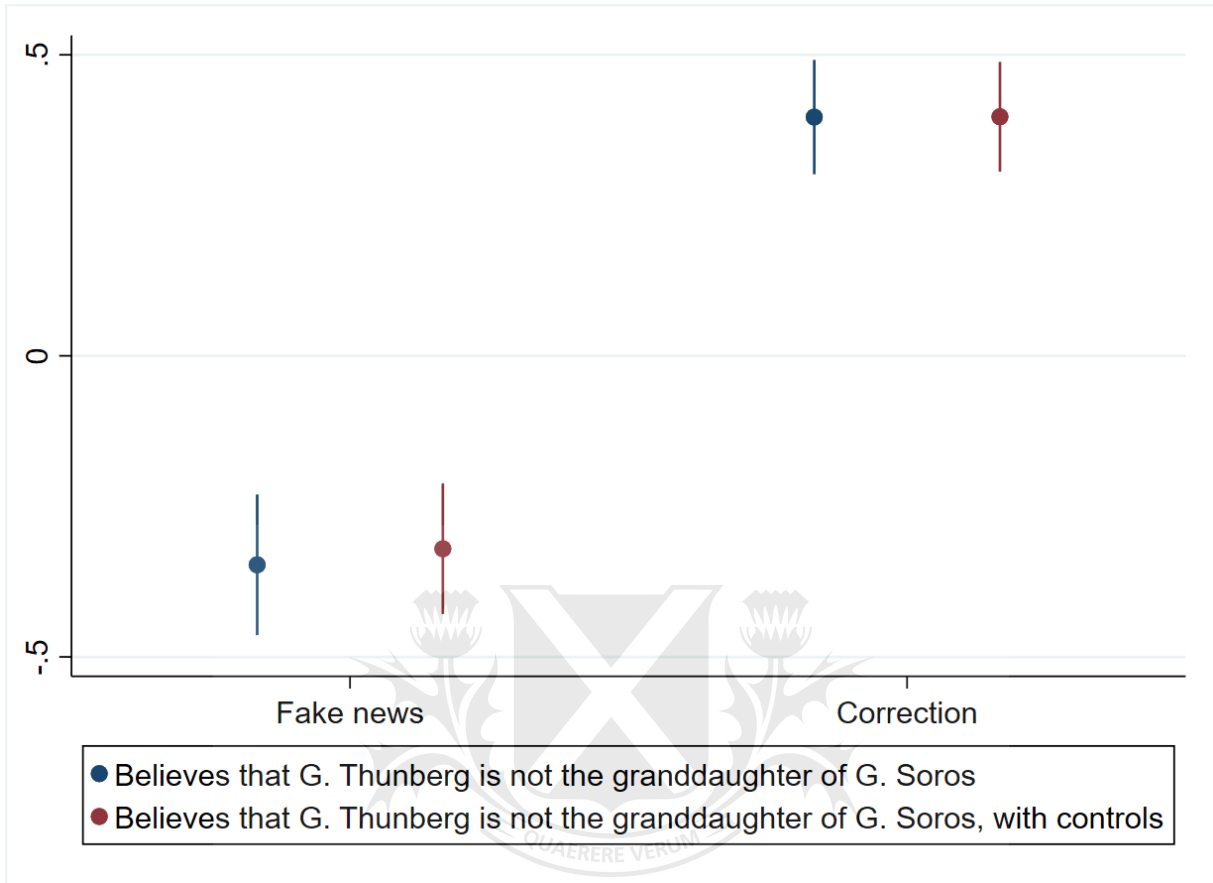
Robust standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

This table presents the effect of each of the treatments on beliefs. The outcome variable is standardized. The first column presents the estimation of a regression without control variables. The second column presents the estimation of a regression that includes as control variables all the pre-treatment characteristics listed in table 1.

As can be seen in table 2 the coefficients of the effects for both groups are between 30% and 40% of one standard deviation, which is a relevant magnitude in the context being analyzed. It is also evident that the qualitative and quantitative results are practically the same if we include control variables in the regression, which was expected, as the assignment into groups was random. These same results can be clearly seen in the figure 3.

Figure 3: Effect on beliefs



This figure presents the coefficients from the regressions of table 2 and their corresponding 95% confidence intervals.

4.2 Preferences and behavior

It is established that fake news and corrections can impact beliefs. We corroborate that finding. However, the evidence of the impacts on preferences and behaviors is scarce (Nyhan 2020). As we already argued, it could be the case that fake news and corrections change the beliefs but not the preferences or behaviors. Although an impact of fake news on beliefs might be an objective and a problem on its own, if they also produce changes in behaviors and preferences it becomes considerably more relevant.

In this subsection we present the impacts of our treatments on an index that captures preferences and behaviors. The index is composed by three equally weighted dimensions: (i) the coins assigned to policies that benefit the environment net of the coins assigned to policies harmful to the environment; (ii) the funds assigned to the environmental NGO; (iii) the position of climate change among an ordering of priorities. The details of the index construction were presented in the methodology section. A greater value on the index or on any of the dimensions reflects a higher importance given to the environment or a more pro-environmental behavior.

Table 3 and figure 4 present the results of our estimation.

Table 3: Effect on the green index

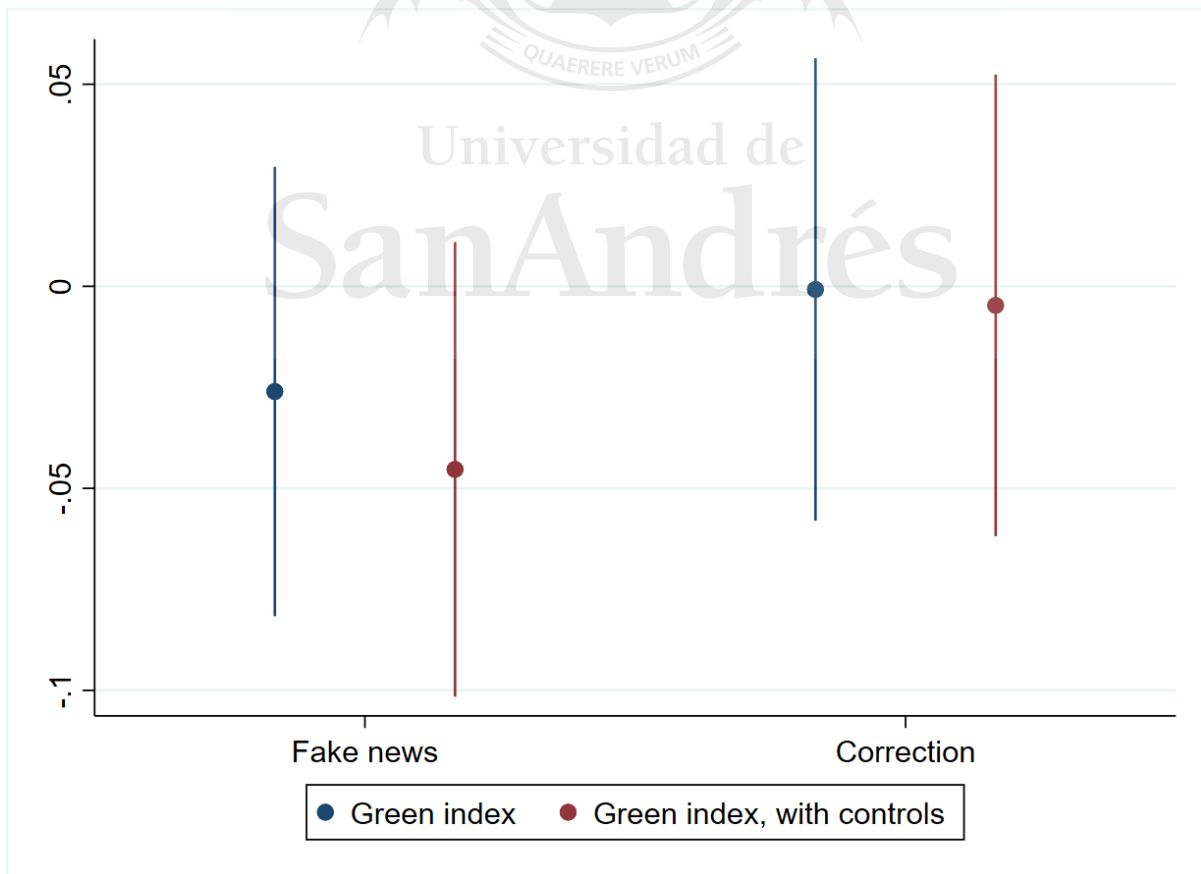
| Variables | (1) Green index | (2) Green index |
|--------------|-----------------------|----------------------|
| Fake news | -0.0260 (0.0284) | -0.0453 (0.0287) |
| Correction | -0.000791 (0.0292) | -0.00473 (0.0291) |
| Constant | 0 (0.0200) | 0.0483 (0.136) |
| Observations | 1,867 | 1,778 |
| R-squared | 0.001 | 0.062 |
| Controls | No | Yes |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

This table presents the effect of each of the treatments on the green index. The first column presents the estimation of a regression without control variables. The second column presents the estimation of a regression that includes as control variables all the pre-treatment characteristics listed in table 1.

Figure 4: Effect on the green index



This figure presents the coefficients from the regressions of table 3 and their corresponding 95% confidence intervals.

We can see that although there is an impact on beliefs, there is no impact on the index that captures pro-environmental behaviors and preferences. The coefficients for the fake news treatment in both regressions (with and without controls) are negative but small (less than 10% of the standard deviation, which is 0.50) and neither is statistically significant. The coefficients of the variable identifying assignment into the correction treatment are in practical terms a very precisely estimated zero. Even more, as we are measuring the outcome variables immediately after the treatments, we expect our results to be an upper bound estimate of the effect over a longer term. This strengthens the idea that there are no relevant impacts on preferences and behaviors.

However, as usual, the index masks heterogeneities, and in this case it aggregates measures of dimensions that are not fully comparable (i.e. variables of preferences and variables of behaviors). For that reason, we also analyze each of the dimensions of the index separately. In table 4 and figure 5 we present the impact on each of the three components of the index. Further details can be found in the tables 14 to 17 and figures 14 to 17 included in the appendix, where we present the effects on each of the individual outcome variables. These estimations show that there is no statistically significant impact on any of the dimensions except for the donations to the environmental NGO. There is a small statistically significant negative impact of both treatments on the funds allocated to this NGO, although the effect for the correction is only barely significant at the 10% level, as the p-values are above 0.095. We later show that the sign of the coefficients quantifying the impact on the NGO component is robust, but the coefficients are not statistically significant in all the robustness checks. The magnitude of the effect is small, approximately 10% of one standard deviation of the control group. If we use the original unit of the variables we could say that, on average, the treatments reduced by around \$100 (of a total of \$5,000 which had to be divided among three NGOs) the amount given to the environmental NGO. As the whole budget had to be allocated, we see an increase in the funds directed towards the NGO dedicated to fighting poverty. None of the treatments had a significant effect on the priority assigned to any of the four issues listed (global warming, lack of information, poverty and drug consumption). When looking at the impact on the distribution of funds among policies we see that the coefficients that correspond to the fake news are all very close to zero, are statistically insignificant and alternate signs, being in some regressions positive for the environment and the opposite happening in the other estimations. With regards to the effect of the correction treatment on the coins assigned to different policies, we observe that while all the coefficients are statistically insignificant, they all have a sign indicating a benefit for the environment.

Table 4: Effect on the components of the green index

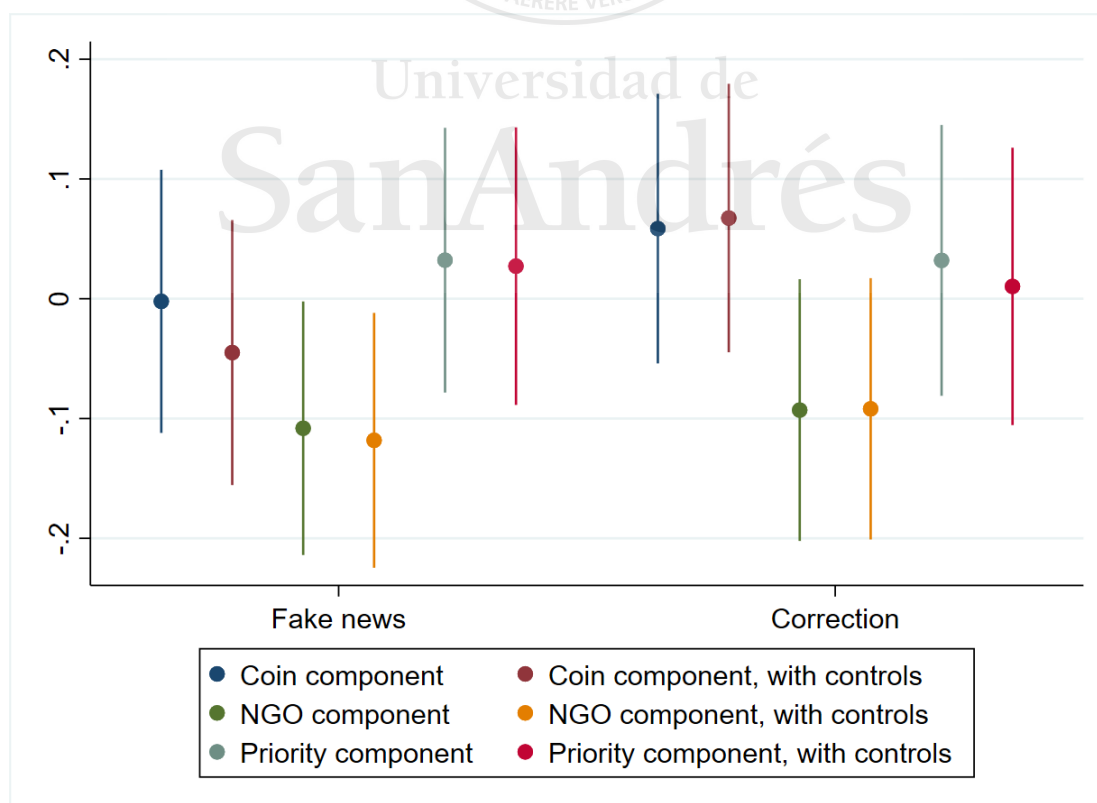
| Variables | (1) Coin component | (2) Coin component | (3) NGO component | (4) NGO component | (5) Priority component | (6) Priority component |
|--------------|--------------------------|--------------------------|-------------------------|-------------------------|------------------------------|------------------------------|
| Fake news | -0.00219 (0.0560) | -0.0449 (0.0564) | -0.108** (0.0540) | -0.118** (0.0542) | 0.0322 (0.0563) | 0.0272 (0.0591) |
| Correction | 0.0585 (0.0574) | 0.0674 (0.0571) | -0.0929* (0.0557) | -0.0919* (0.0556) | 0.0320 (0.0576) | 0.0103 (0.0590) |
| Constant | 0 (0.0396) | 0.00973 (0.262) | -0 (0.0396) | 0.276 (0.230) | -0 (0.0396) | -0.141 (0.296) |
| Observations | 1,867 | 1,778 | 1,867 | 1,778 | 1,867 | 1,778 |
| R-squared | 0.001 | 0.059 | 0.003 | 0.068 | 0.000 | 0.018 |
| Controls | No | Yes | No | Yes | No | Yes |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

This table presents the effect of each of the treatments on the components of the green index. Columns (1), (3) and (5) present the results of estimating regressions without control variables. Columns (2), (4) and (6) present the results of estimating regressions that include as control variables all the pre-treatment characteristics listed in table 1.

Figure 5: Effect on the components of the green index



This figure presents the coefficients from the regressions of table 4 and their corresponding 95% confidence intervals.

4.3 Heterogeneous effects

We analyze heterogeneous effects on beliefs and on the green index by all the pre-treatment characteristics included in table 1. The most relevant results are presented in table 5. The remaining ones show no significant new information and are presented in the appendix tables 18 to 20.

The estimations using the belief in G. Thunberg’s and G. Soros’ relationship as the outcome variable show that there are several subgroups of the sample which are more or less affected by the treatments than an average subject. We first see that women are more affected by the correction but not by the fake news story. Regarding working status, we see a smaller impact of the fake news treatment on those employed. No significant heterogeneous effect of the correction by employment status is identified. The heterogeneous effects by level of education are quite interesting. Although the sample size is not large enough to get statistically significant coefficients in this case, the estimations suggest that those with lower education are the ones most affected by the fake news item but the ones least affected by the correction. This would indicate that the beliefs of the least educated are more easily influenced by the type of contents included in fake news, but it is more difficult to get this subgroup to adjust their beliefs after reading a factual article with evidence and well known sources. It is also worth mentioning that although the quantitative effects appear to be different according to the level of education, the effects of both treatments have the same sign for the three level-of-education groups.

The heterogeneous effects by the score identifying false statements show that those who are better at discerning which statements were false are less affected by the treatments. This might be explained by a greater general disbelief of those with higher scores, which leads them to smaller adjustments of their priors after any type of news. The coefficients of the interaction between the treatments and the score identifying true statements are not statistically significant.

If we look at the differences in the effects by the self-reported level of information we observe U-shaped and inverted U-shaped figures. The fake news and the correction treatments have the greatest effect on those who consider themselves to be somewhat informed, which is the category in the middle. However, our sample size is not large enough to find statistically significant coefficients in this case, so we should take it with caution to avoid an overinterpretation.

We finally turn our focus to the heterogeneous effects on the green index. All but one of these regressions are left for the appendix, as they all show that the main finding—that there is no effect on the index—is quite homogeneous among the different subgroups of the sample. The regression here presented is the one estimating the heterogeneous effects by self-reported level of information. The findings are quite engaging in this case. The main effect of the fake news and the interactions with the variables of information levels are not statistically significant. However, some of the coefficients for the correction are. The estimations show that the correction generated a positive effect on the index for the least informed group, while the interactions of the correction variable with the dummies of the more informed groups have a negative sign that drive the effects for these two groups practically to zero. This is particularly interesting considering what we mentioned above about the effects on beliefs, as it clearly shows the disconnection between impacts on beliefs and on behaviors and preferences. The group whose beliefs were least affected by the correction—the group of subjects who considered themselves to be poorly informed—is the only group for which we find an effect on the index, while for the groups whose beliefs were more affected we identify no significant impact on the green index. This shows that affecting beliefs is not equivalent to having an impact on preferences or behaviors. Highlighting this point is one of the main motivations of the present work.

Table 5: Analysis of heterogeneous effects

| Variables | (1) | (2) | (3) | (4) | (5) | (6) |
|-------------------------------------|--|-----------------------|--------------------|----------------------|---------------------|--------------------|
| | Believes that G. Thunberg is not the granddaughter of G. Soros | | | | | Green index |
| Fake news | -0.289*** (0.0686) | -0.451*** (0.0941) | -0.605 (0.478) | -0.377*** (0.103) | -0.237 (0.224) | 0.172 (0.157) |
| Correction | 0.305*** (0.0557) | 0.449*** (0.0754) | 0.256 (0.525) | 0.394*** (0.0912) | 0.190 (0.243) | 0.325* (0.192) |
| Fake news * Woman | -0.0695 (0.116) | | | | | |
| Correction * Woman | 0.271*** (0.0992) | | | | | |
| Fake news * Working | | 0.211* (0.117) | | | | |
| Correction * Working | | -0.0857 (0.0950) | | | | |
| Fake news * Intermediate edu level | | | 0.219 (0.484) | | | |
| Fake news * High edu level | | | 0.372 (0.484) | | | |
| Correction * Intermediate edu level | | | 0.161 (0.529) | | | |
| Correction * High edu level | | | 0.122 (0.530) | | | |
| Fake news * Score false statements | | | | 0.0860** (0.0358) | | |
| Fake news * Score true statements | | | | -0.00516 (0.0438) | | |
| Correction * Score false statements | | | | -0.0529* (0.0302) | | |
| Correction * Score true statements | | | | 0.0242 (0.0384) | | |
| Fake news * Somewhat informed | | | | | -0.184 (0.236) | -0.217 (0.161) |
| Fake news * Well-informed | | | | | 0.0895 (0.240) | -0.246 (0.163) |
| Correction * Somewhat informed | | | | | 0.296 (0.250) | -0.352* (0.195) |
| Correction * Well-informed | | | | | 0.0566 (0.253) | -0.324 (0.198) |
| Constant | -0.624** (0.242) | -0.618** (0.244) | -0.532* (0.313) | -0.632*** (0.244) | -0.606** (0.260) | -0.118 (0.163) |
| Observations | 1,778 | 1,778 | 1,778 | 1,778 | 1,778 | 1,778 |
| R-squared | 0.215 | 0.214 | 0.212 | 0.218 | 0.220 | 0.066 |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

This table presents the result of estimating a series of regressions that quantify the heterogeneous effects of the treatments by different pre-treatment characteristics. The outcome variable of columns (1)-(5) is standardized. All the regressions include as control variables all the pre-treatment characteristics listed in table 1.

4.4 Analysis of robustness

We will now conduct two types of analysis of robustness. The first exercise alternates which is the group that is taken as the control group. The second exercise will use a subset of the sample, discarding those most likely to have rushed through the survey without paying much attention and those who said that they did not understand most of the questions.

As was already mentioned, the experiment included three different groups which could be considered as the best control group. The comparisons between the control groups also allowed us to estimate the direct effect of reading an extract and the salience effect of mentioning G. Thunberg and the environment. In the table 21 included in the appendix we present the means of all the original outcome variables, as well as the results of a mean difference test between the three possible pairs that can be made from the three control groups. There we can verify that it makes sense to pool the three groups together for the main analysis, as the mean differences are not statistically significant, except for a few exceptions, which are expected due to the large number of variables considered. This is equivalent to saying that, in this context, the effect of reading an extract with no relevant content and the salience effect are negligible. One particular variable is worth mentioning. As we found a significant effect of the fake news and the correction treatments on the belief that G. Thunberg is the granddaughter of G. Soros it is particularly relevant that we see no significant differences in this variable between the three control groups.

We will now present the estimations of the effects of the fake news and correction treatments on beliefs, on the green index and on its components alternatively using each of the three groups as the control. Formally, we will estimate:

$$Y_i = \alpha + \beta_{C2}Control_i^2 + \beta_{C3}Control_i^3 + \beta_FFakeNews_i + \beta_CCorrection_i + X_i'\delta + \epsilon_i \quad (2)$$

$$Y_i = \alpha + \beta_{C1}Control_i^1 + \beta_{C3}Control_i^3 + \beta_FFakeNews_i + \beta_CCorrection_i + X_i'\delta + \epsilon_i \quad (3)$$

$$Y_i = \alpha + \beta_{C1}Control_i^1 + \beta_{C2}Control_i^2 + \beta_FFakeNews_i + \beta_CCorrection_i + X_i'\delta + \epsilon_i \quad (4)$$

where $Control_i^1$, $Control_i^2$ and $Control_i^3$ are dummies that take value 1 if the individual i was part of the first, second and third control group respectively. The other variables have the same meaning as before.

Table 6 and figure 6 show that the effect of the fake news and the correction treatments on the belief is quite robust to changing the control group considered. The point estimates are quite close in the three regressions, and we see no changes in signs. All the estimations show that the fake news article leads some people to believe in what it states, while the correction brings people closer to the truth.

Table 6: Effect on beliefs using different control groups

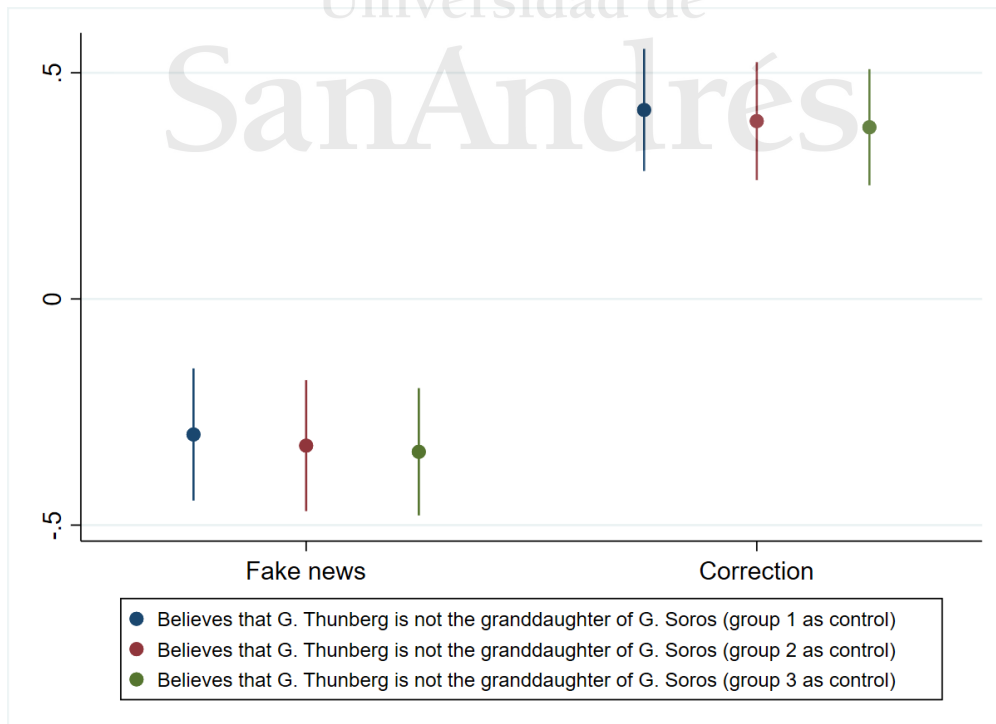
| Variables | (1) Believes that G. Thunberg is not the granddaughter of G. Soros | (2) Believes that G. Thunberg is not the granddaughter of G. Soros | (3) Believes that G. Thunberg is not the granddaughter of G. Soros |
|--------------|--|--|--|
| Fake news | -0.300*** (0.0745) | -0.324*** (0.0738) | -0.338*** (0.0717) |
| Correction | 0.418*** (0.0688) | 0.393*** (0.0665) | 0.380*** (0.0655) |
| Constant | -0.684*** (0.250) | -0.659*** (0.251) | -0.645*** (0.246) |
| Observations | 1,778 | 1,778 | 1,778 |
| R-squared | 0.210 | 0.210 | 0.210 |
| Controls | Yes | Yes | Yes |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

This table presents the effect of the treatments on beliefs changing the group that is used as the control group. For column (1) the first group (the one with no news) is used as the control group. For column (2) the second group (the one that read the irrelevant news) is used as the control group. For column (3) the third group (the one that saw the neutral news about G. Thunberg) is used as the control group. The outcome variable is standardized. All the regressions include as control variables all the pre-treatment characteristics listed in table 1.

Figure 6: Effect on beliefs using different control groups



This figure presents the coefficients from the regressions of table 6 and their corresponding 95% confidence intervals.

We now turn to the effect on the index that captures pro-environmental preferences and behaviors. A methodological remark is necessary. For this analysis we are not just modifying the regression, we are also constructing again the z-scores and the index, changing the group whose mean and standard deviation we use to standardize the components of the index.

In table 7 and figure 7 we present the results of the estimations using the green index as the outcome variable. Again, we see that the conclusions are robust to changing which of the three possible groups is considered as the control group. The coefficients for the fake news treatment are all small, negative and not statistically significant. The coefficients for the correction treatment are very close to zero, alternate sign and are not statistically significant.

Table 7: Effect on the green index using different control groups

| Variables | (1) Green index (group 1 as control) | (2) Green index (group 2 as control) | (3) Green index (group 3 as control) |
|--------------|---|---|---|
| Fake news | -0.0629 (0.0402) | -0.0497 (0.0398) | -0.0226 (0.0407) |
| Correction | -0.0185 (0.0407) | -0.00859 (0.0401) | 0.0144 (0.0409) |
| Constant | 0.0603 (0.148) | 0.0471 (0.139) | 0.0498 (0.133) |
| Observations | 1,778 | 1,778 | 1,778 |
| R-squared | 0.065 | 0.064 | 0.060 |
| Controls | Yes | Yes | Yes |

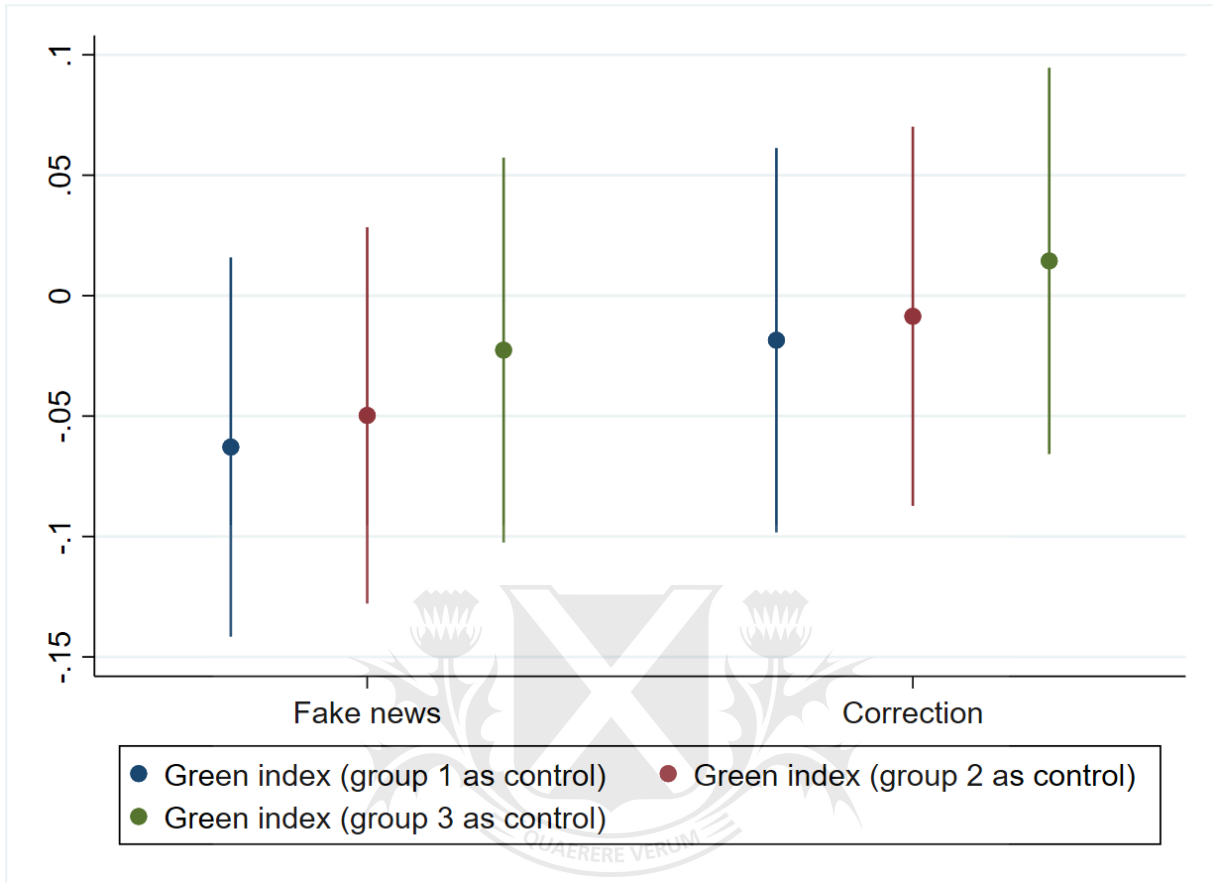
Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

This table presents the effect of the treatments on the green index changing the group that is used as the control group. For column (1) the first group (the one with no news) is used as the control group. For column (2) the second group (the one that read the irrelevant news) is used as the control group. For column (3) the third group (the one that saw the neutral news about G. Thunberg) is used as the control group. All the regressions include as control variables all the pre-treatment characteristics listed in table

1.

Figure 7: Effect on the green index using different control groups



This figure presents the coefficients from the regressions of table 7 and their corresponding 95% confidence intervals.

As we know, the index can mask heterogeneities between the components. In table 8 and figure 8 we present the estimations of the effects of the fake news and the correction treatments on each of the components of the index, again, changing which group is used as the control group.

In the coin component estimations we see that the coefficients for the fake news are quite close to zero and alternate signs between the different estimations. This suggests that this treatment did not have an impact on the amount of funds assigned to pro-environmental policies net of the funds assigned to policies harmful to the environment. In this dimension the coefficients for the correction are always positive, but only if we use the second group as the control we see statistical significance. We could say that the correction does no harm (to this dimension) in its intent to clarify the misperceptions spread by the fake news article, and it may even be slightly beneficial to its cause. These are the same conclusions we reached before. Turning to the NGO component, we see that the signs of the effects of both treatments are negative in all of the specifications, but the coefficients are only statistically significant when we use the group that read an irrelevant news item as the control. So, the statistical significance seen earlier is not robust. Finally, looking at the priority component, it seems clear that there is not effect on this dimension. The point estimates are all very close to zero, alternate signs and are all statistically insignificant.

Table 8: Effect on the components of the green index using different control groups

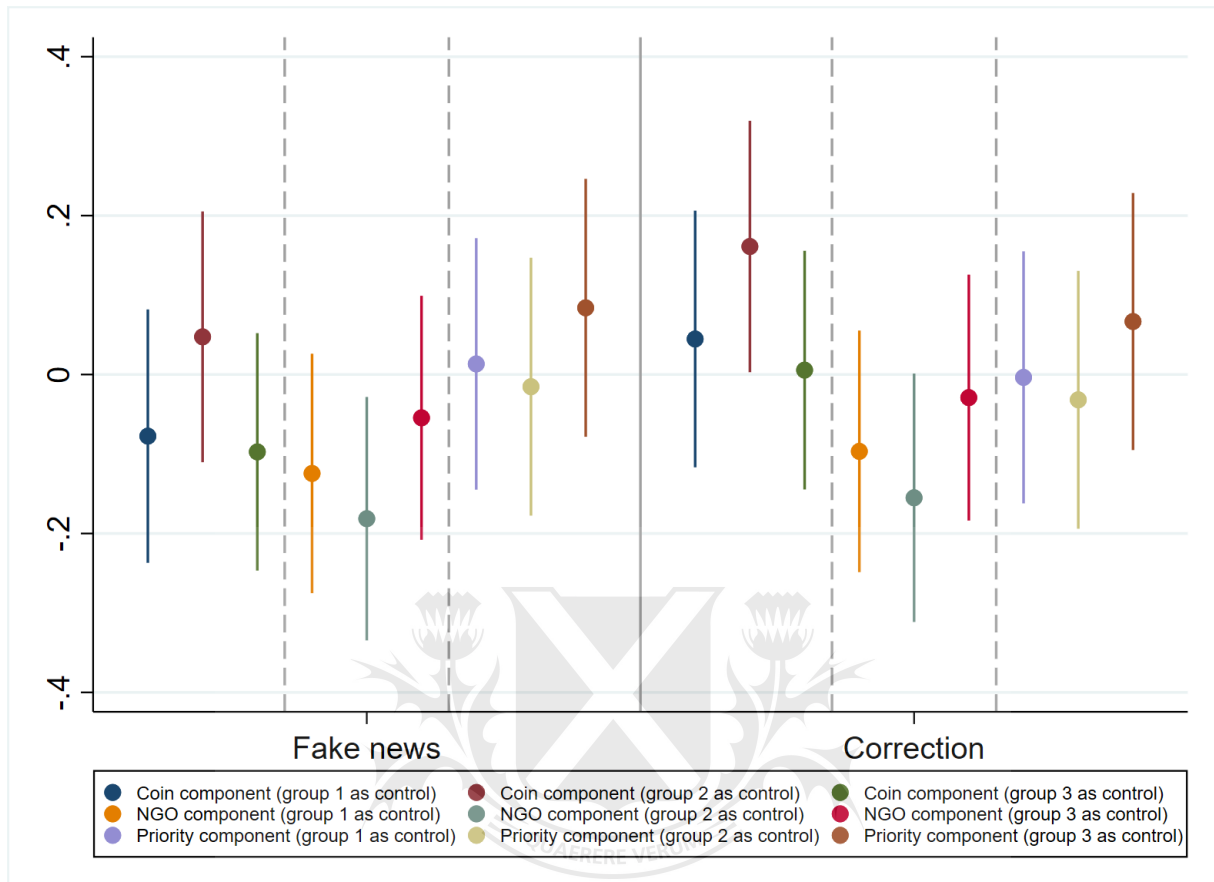
| Variables | (1) Coin component (group 1 as control) | (2) Coin component (group 2 as control) | (3) Coin component (group 3 as control) | (4) NGO component (group 1 as control) | (5) NGO component (group 2 as control) | (6) NGO component (group 3 as control) | (7) Priority component (group 1 as control) | (8) Priority component (group 2 as control) | (9) Priority component (group 3 as control) |
|--------------|---|---|---|--|--|--|---|---|---|
| Fake news | -0.0775 (0.0813) | 0.0475 (0.0805) | -0.0973 (0.0762) | -0.124 (0.0768) | -0.181** (0.0781) | -0.0544 (0.0783) | 0.0134 (0.0807) | -0.0153 (0.0827) | 0.0839 (0.0827) |
| Correction | 0.0447 (0.0823) | 0.161** (0.0807) | 0.00556 (0.0766) | -0.0967 (0.0775) | -0.155* (0.0797) | -0.0290 (0.0789) | -0.00358 (0.0808) | -0.0318 (0.0827) | 0.0667 (0.0825) |
| Constant | -0.0167 (0.290) | 0.0103 (0.271) | 0.00936 (0.248) | 0.317 (0.250) | 0.258 (0.235) | 0.286 (0.228) | -0.119 (0.305) | -0.127 (0.297) | -0.146 (0.305) |
| Observations | 1,778 | 1,778 | 1,778 | 1,778 | 1,778 | 1,778 | 1,778 | 1,778 | 1,778 |
| R-squared | 0.060 | 0.060 | 0.060 | 0.069 | 0.069 | 0.069 | 0.018 | 0.018 | 0.018 |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

This table presents the effect of the treatments on the components of the green index changing the group that is used as the control group. For columns (1), (4) and (7) the first group (the one with no news) is used as the control group. For columns (2), (5) and (8) the second group (the one which read the irrelevant news) is used as the control group. For columns (3), (6) and (9) the third group (the one which saw the neutral news about G. Thunberg) is used as the control group. All the regressions include as control variables all the pre-treatment characteristics listed in table [1](#)

Figure 8: Effect on the components of the green index using different control groups



This figure presents the coefficients from the regressions of table 8 and their corresponding 95% confidence intervals.

Another analysis of robustness we conduct is based on restricting the sample. We know that there are participants who, although they were randomized to a particular group and answered some outcome questions, were potentially not properly treated. This could include respondents who skipped the extract without reading it. For the following analysis we drop from our sample the 10% of the respondents of each group who provided an answer for at least one outcome and spent the least time reading the extract of the group. This cut is done group by group and not for the sample taken as a whole, so the proportions of participants in each group is maintained for four of the groups. As the first group was not presented with an extract we do not drop anyone from this group in this step. Next, we make use of the verification questions of the survey. One of the questions asked the participants how much of the survey questions they understood. We drop those who said that they did not understand anything or that they understood very little. These represented less than 4% of the sample. Finally, there was a question designed to identify those who were not paying attention. This one had a somewhat longer text as a question. It started mentioning how behavior can be influenced by our context and in the end of the text it asked participants to select the option “none of the above” to verify that they were paying attention. The other options were different emotions. Almost 98% of the participants correctly chose the “none of the above” option. The remaining 2% percent was most likely not paying much attention to the survey, so their answers might not be too informative, and we drop them for this analysis. The restricted sample contains 1,538 observations. If we consider that being treated means reading and understanding the extract assigned to the group, these restrictions eliminate some non-compliers, and the estimations

with the restricted sample would drive us closer to the local average treatment effect.

In table 9 and figure 9 we present the results of estimating the effect of the fake news and the correction treatments on the belief using the restricted sample. We show the results of the estimations both with and without control variables. We see, as expected, an increase in the absolute value of the coefficients for the fake news and the correction compared to the results obtained with the full sample. The signs are unchanged. Once again, it is clear that the fake news item makes some people believe in its content, while the correction moves the participant's belief closer to the truth. But the effects in this sample, which consists of those most likely to have payed attention to the extracts and questions of the survey and who understood most of the contents, are larger than the ones found for the whole sample.

Table 9: Effect on beliefs using the restricted sample

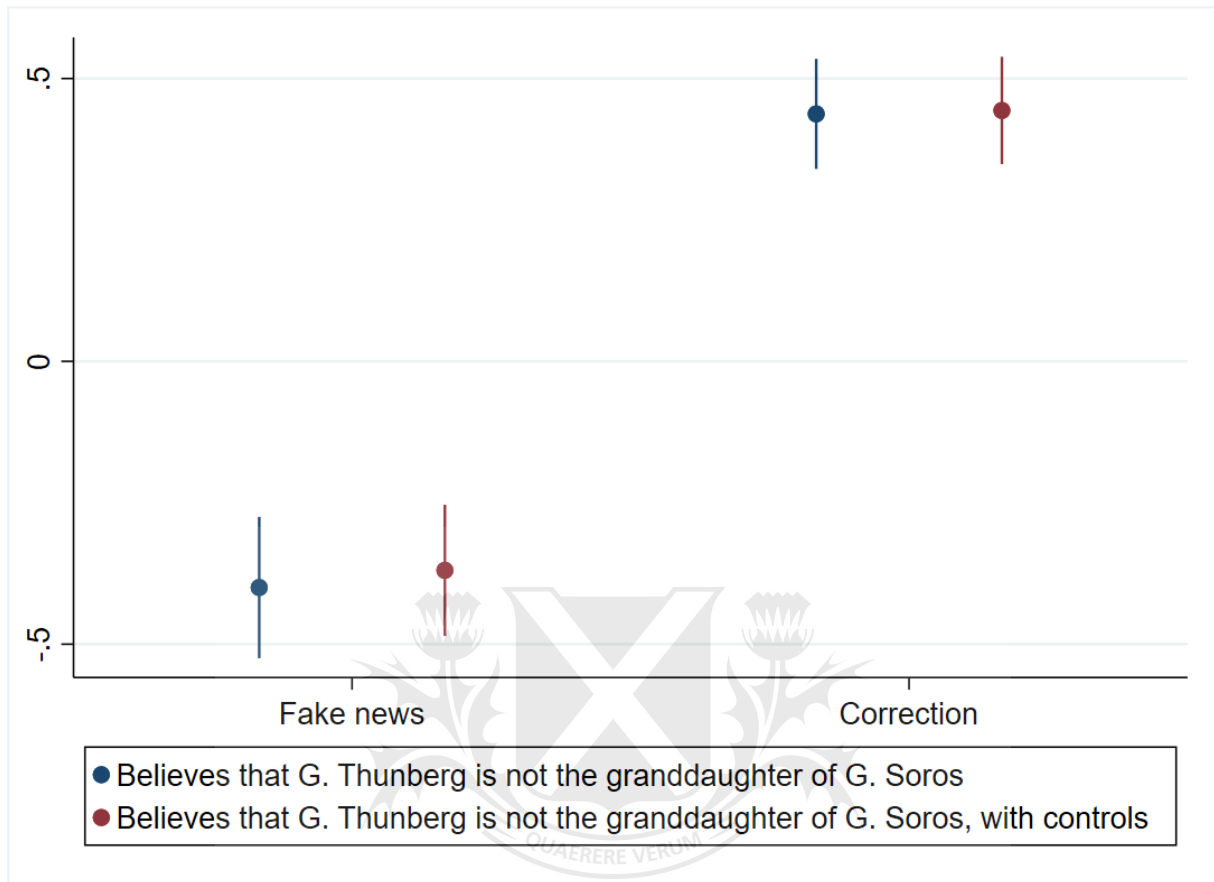
| Variables | (1) | (2) |
|--------------|--|--|
| | Believes that G. Thunberg is not the granddaughter of G. Soros | Believes that G. Thunberg is not the granddaughter of G. Soros |
| Fake news | -0.400*** (0.0637) | -0.369*** (0.0591) |
| Correction | 0.438*** (0.0496) | 0.444*** (0.0484) |
| Constant | 0.0113 (0.0384) | -0.805*** (0.269) |
| Observations | 1,538 | 1,538 |
| R-squared | 0.117 | 0.225 |
| Controls | No | Yes |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

This table presents the effect of each of the treatments on beliefs using only the restricted sample. The outcome variable is standardized. The first column presents the estimation of a regression without control variables. The second column presents the estimation a regression that includes as control variables all the pre-treatment characteristics listed in table 1.

Figure 9: Effect on beliefs using the restricted sample



This figure presents the coefficients from the regressions of table 9 and their corresponding 95% confidence intervals.

The estimations of the effects of the treatments on the green index when using only the restricted sample are almost identical to the ones obtained with the full sample. That is, the coefficients of the fake news variable are small, negative and statistically insignificant, while the ones corresponding to the correction are practically a precisely estimated zero. If there really was an effect on the index we would expect the coefficients estimated with the restricted sample to be larger (in absolute value, maintaining the same sign) than the ones estimated with the full sample, as we saw it happens with the beliefs' estimations. However, this is not the case for the index's estimations. The coefficients for the fake news are slightly smaller (in absolute value) with the restricted sample, and the ones of the correction are almost zero but alternate signs. This suggests that the lack of statistical significance is not a matter of lack of power or small sample size, but an adequate reflection of an absence of any significant effect. These estimations are presented in table 10 and figure 10.

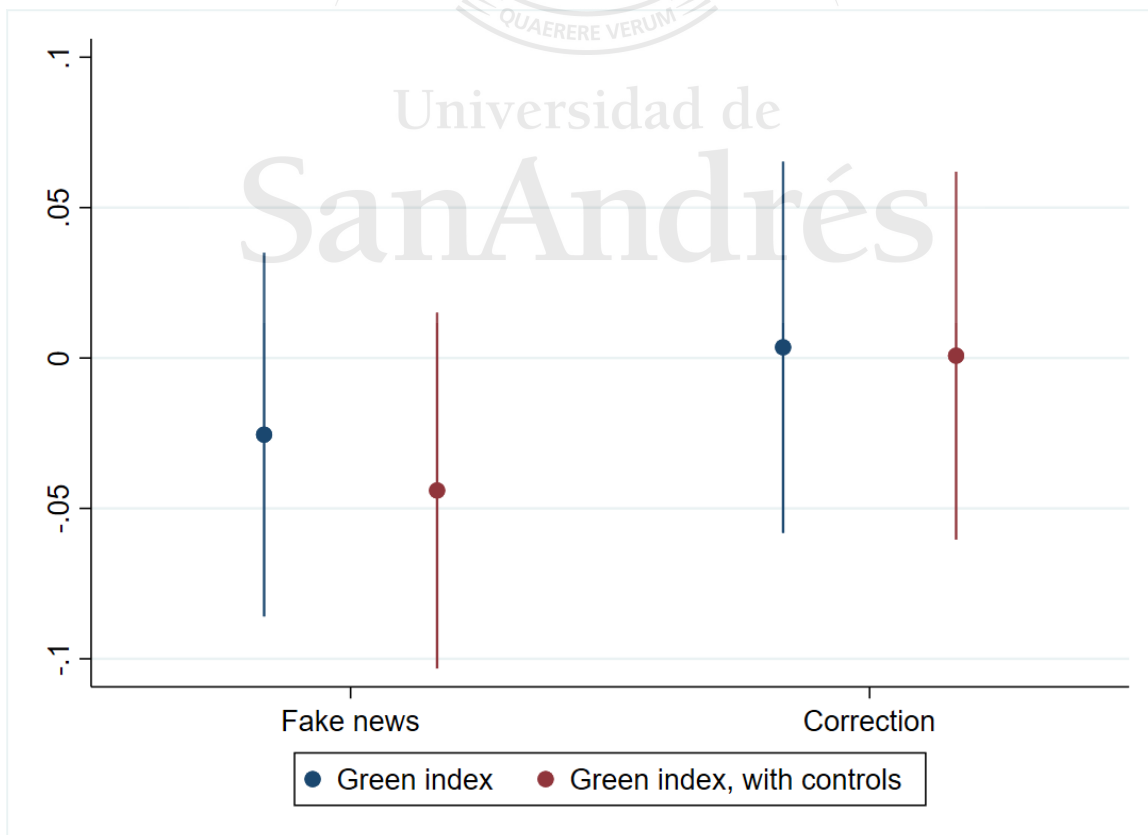
Table 10: Effect on the green index using the restricted sample

| Variables | (1) Green index | (2) Green index |
|--------------|---------------------|----------------------|
| Fake news | -0.0255 (0.0308) | -0.0440 (0.0302) |
| Correction | 0.00356 (0.0315) | 0.000771 (0.0312) |
| Constant | 0.00511 (0.0211) | 0.0590 (0.150) |
| Observations | 1,538 | 1,538 |
| R-squared | 0.001 | 0.058 |
| Controls | No | Yes |

Robust standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

This table presents the effect of each of the treatments on the green index using only the restricted sample. The first column presents the estimation of a regression without control variables. The second column presents the estimation of a regression that includes as control variables all the pre-treatment characteristics listed in table 7.

Figure 10: Effect on the green index using the restricted sample



This figure presents the coefficients from the regressions of table 10 and their corresponding 95% confidence intervals.

As we have seen, the effects on the components of the index were not homogeneous, so, in table 11 and figure 11 we present the impact of the treatments on each of the components using the restricted sample. The estimated coefficients for the coin component are very similar but slightly larger (in absolute value) to the ones obtained in the main results. They suggest that there is no effect of the fake news on this component, and that there is possibly a positive impact of the correction, but small enough so that the estimated coefficients are not statistically significant in these estimations. The coefficients of the effect on the NGO component are, one more time, all negative. They also are slightly smaller (in absolute value) than the ones found using the full sample. Even more, the statistical significance obtained in the main results is not robust, the only statistically significant coefficient at the 10% level is the one corresponding to the fake news treatment in the regression with controls. Finally, the picture for the priority component points once again towards a null effect of both treatments.

Table 11: Effect on the components of the green index using the restricted sample

| Variables | (1) Coin component | (2) Coin component | (3) NGO component | (4) NGO component | (5) Priority component | (6) Priority component |
|--------------|--------------------------|--------------------------|-------------------------|-------------------------|------------------------------|------------------------------|
| Fake news | -0.0179 (0.0608) | -0.0580 (0.0600) | -0.0914 (0.0608) | -0.112* (0.0584) | 0.0328 (0.0637) | 0.0381 (0.0634) |
| Correction | 0.0892 (0.0627) | 0.0945 (0.0618) | -0.0821 (0.0608) | -0.0819 (0.0598) | 0.00357 (0.0637) | -0.0103 (0.0636) |
| Constant | 0.0126 (0.0424) | 0.0338 (0.301) | -0.00895 (0.0432) | 0.261 (0.250) | 0.0117 (0.0435) | -0.118 (0.319) |
| Observations | 1,538 | 1,538 | 1,538 | 1,538 | 1,538 | 1,538 |
| R-squared | 0.002 | 0.059 | 0.002 | 0.064 | 0.000 | 0.022 |
| Controls | No | Yes | No | Yes | No | Yes |

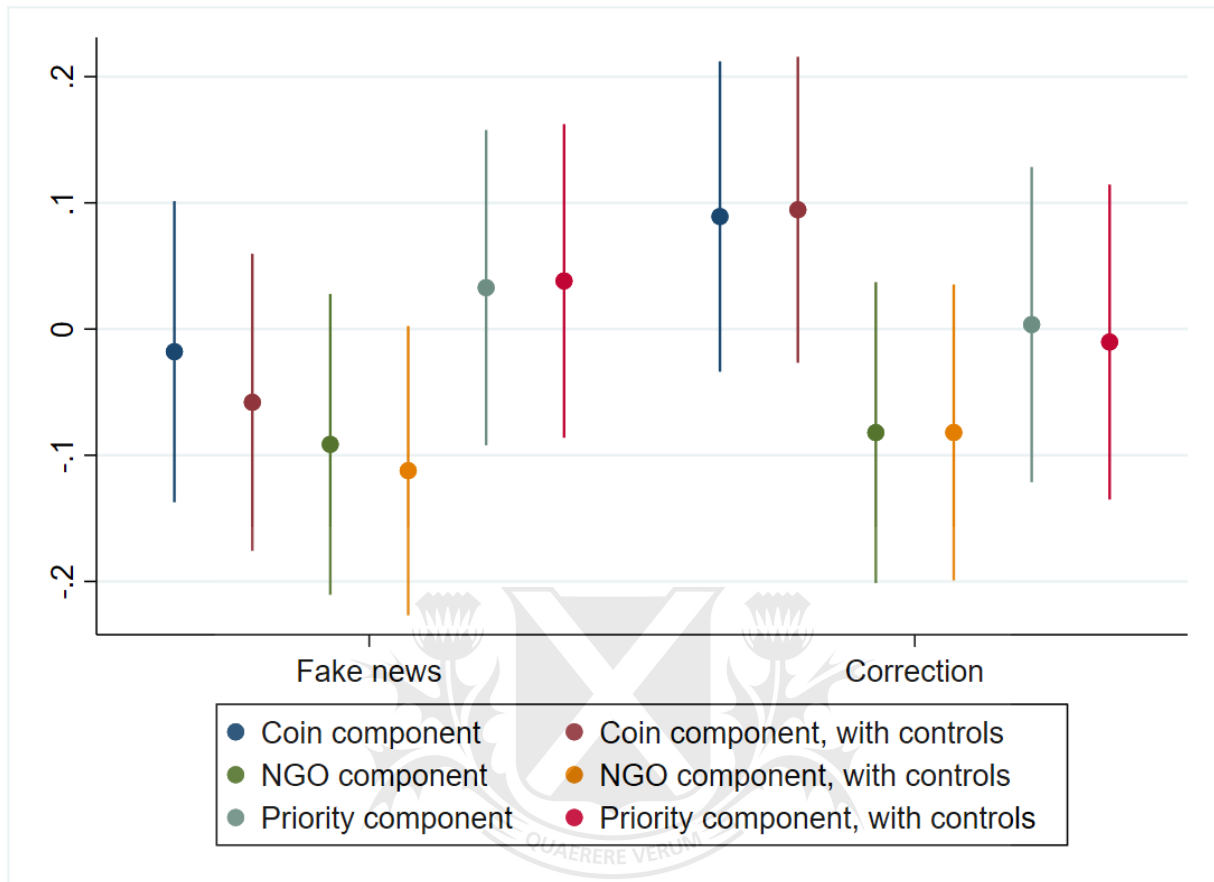
Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

This table presents the effect of each of the treatments on the components of the green index using the restricted sample. Columns (1), (3) and (5) present the results of regressions without control variables.

Columns (2), (4) and (6) present the results of regressions that include as control variables all the pre-treatment characteristics listed in table 1.

Figure 11: Effect on the components of the green index using the restricted sample



This figure presents the coefficients from the regressions of table 11 and their corresponding 95% confidence intervals.

In conclusion, we see that the effect on the belief is significant and very robust. Despite of this, it is not obvious that there is an effect on preferences and behaviors, and our results indicate otherwise. We see that in most estimations there is no significant effect on the index that captures pro-environmental preferences and behaviors. Focusing on the coin component of the index, the estimations strongly suggest an absence of an effect of the fake news treatment. The coefficients of the effect of the correction on the coin component are all positive but usually statistically insignificant. We could say that the results indicate that at least the correction does no harm in this dimension, and it may even do some good. Regarding the NGO component, we see that in all the estimations the coefficients for both treatments are negative, but only some of them are statistically significant. The ones that are statistically significant are usually the ones corresponding to the effect of the fake news treatment. This suggests that there is a small negative impact of the fake news article on the funds assigned to the environmental NGO. Finally, we see no effect of any of the treatments on the priority given to global warming.

5. Conclusions

The presence of fake news and fact-checking articles has bursted in the recent past, and with them, the apocalyptic discourses worried about the destructive effect that fake news might have in areas such as politics, health and the environment. However, most of those concerns do not have empirical evidence to

support the causal relationship between fake news and behaviors that they posit. In fact, the literature of misperceptions currently has large gaps and a lack of consensus.

For this paper we designed a survey experiment to identify the effect of a fake news and a correction article on beliefs, preferences and behaviors. The articles used were about an environmental activist. Our results show that fake news clearly increases misperceptions and that the correction article was effective in driving people closer to the truth. Despite of the impact on beliefs, we see small to null effects of both treatments on pro-environmental preferences and behaviors.

Although further research is needed to determine the generalizability of our findings, this work has implications for the public discourse, the literature and policies. First, it should serve as evidence to tone down some of the public preoccupations, as the impact of fake news on behaviors seems to be more limited than what many believe. Second, it emphasizes the need for the literature to let go of its focus on beliefs and produce more evidence of the impact on behaviors, as these two do not always go hand in hand. Finally, it can be used as an argument to oppose extreme proposals that pretend to counter fake news through severe freedom of speech limitations. Those policies could end up inflicting a greater harm on democracy than fake news themselves. The response should be proportional to the threat, and our results suggest that fake news might not be a threat that severe. Hence, corrections and other measures that do not restrict freedoms should be prioritized in the fight against fake news.



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6. Appendix

6.1 Details of the survey

In this subsection we include screenshots of all the parts of the survey, showing exactly how it was presented. The survey was in Spanish, and for this work we add a translation to English.

First, everyone saw the same introduction presented in the following image:

Le invitamos a participar de una encuesta con fines académicos sobre información, preferencias y creencias. Esta investigación está a cargo de un investigador de la Universidad de San Andrés.

Completar la encuesta le va a llevar entre 4 y 9 minutos aproximadamente.

La información revelada en este cuestionario es anónima y será tratada con carácter confidencial.

¡Se agradece mucho su colaboración!

Acepto participar de la encuesta

No acepto participar de la encuesta

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Nota: si usted tiene alguna pregunta sobre este estudio, se puede comunicar conmigo al siguiente email:

lwasserman@udesa.edu.ar

Siguiente →

The text translates into:

We invite you to participate in a survey with academic purposes about information, preferences and beliefs. This research is in charge of a researcher from Universidad de San Andrés.

Completing this survey will take you between 4 and 9 minutes approximately.

The information revealed in this questionnaire is anonymous and will be treated as confidential.

We thank you for your collaboration!

The options are:

I agree to take part in this survey

I do not agree to take part in this survey

Finally, the text below reads:

Note: if you have any question about this study you can contact me at: lwasserman@udesa.edu.ar

Those who did not agree to take part in the survey were redirected to the following question and then to the end:

Muchas gracias por la respuesta. Para finalizar, elija uno de los siguientes motivos que lo llevan a no participar en la encuesta.

No me interesa

No tengo tiempo ahora, lo haría en otro momento

Nunca participo de encuestas

Desconfío de este tipo de estudios

Ninguna de las anteriores

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[Siguiente →](#)

The text reads:

Thank you for your answer. To finish, choose one of the following reasons that lead you to decline to participate in the survey.

The options are:

I am not interested

I do not have time right now, I would do it at another moment

I never participate in surveys

I distrust these types of studies

None of the above

Those who agreed to participate were redirected to the following questions:

¿Cuál es su género?

Hombre

Mujer

Otro

Prefiero no responder

¿Cuál es su edad?



Siguiente →

The first of these two questions asks:

What is your gender?

The options are:

Male

Female

Other

I prefer not to answer

The second question asks

What is your age?

The options ranged from *11 years* to *99 years*, plus an option that said *10 years or less* and one that said *100 years or more*.

Then, participants were asked the following questions:

Usted se considera una persona

Poco informada

Medianamente informada

Muy informada

En un día promedio, ¿cuántos minutos dedica a consumir noticias por los medios tradicionales (diarios, diarios online, revistas, radio, televisión)?

En un día promedio, ¿cuántos minutos dedica a consumir noticias por redes sociales?

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Siguiente →

The first of these three questions reads:

Do you consider yourself to be

And the options are:

Poorly informed

Somewhat informed

Well-informed

The second question translates into:

On an average day, how many minutes do you dedicate to the consumption of news through traditional media (newspapers, online newspapers, magazines, radio, television)?

The last question in the image above translates into:

On an average day, how many minutes do you dedicate to the consumption of news through social networks?

After this we had the true or false questions:

Por favor, responda si cada una de las siguientes frases le parece verdadera o falsa:

| | Verdadera | Falsa | Prefiero no contestar |
|--|-----------------------|-----------------------|-----------------------|
| Alberto Fernández fue el candidato presidencial más votado entre los presos en las elecciones generales del 2019 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| María Eugenia Vidal compró una mansión en Berazategui por US\$ 10 millones | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| En términos reales, entre 2015 y 2018 hubo una caída de aproximadamente un 25% en el presupuesto del gobierno nacional destinado a Ciencia y Técnica | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Insfrán, el gobernador de Formosa, le pegó una cachetada a una fiscal de mesa en las elecciones del 2019 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| El dirigente sindical Hugo Moyano dijo: "No hace falta estudiar, hace 32 años que dirijo el sindicato" | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Mauricio Macri fue el candidato presidencial más votado entre los argentinos en el exterior en las elecciones generales del 2019 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |



Verdadera Falsa
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The text of the question reads:

Please, indicate for each of the following phrases if you consider that the phrase is true or false:

The statements read:

(i) *Alberto Fernández was the most voted presidential candidate among the imprisoned in the 2019 general election*

This statement is true, as can be seen in the [article from the fact-checking site Reverso](#) (Nasanovsky, 2019).

(ii) *María Eugenia Vidal bought a mansion in Berazategui for US\$ 10 million*

This statement is false, as can be seen in the [article from the fact-checking site Reverso](#) (Leiva and Corti, 2019).

(iii) *In real terms, between 2015 and 2018 there was a fall of approximately 25% in the budget from the national government destined to Science and Technology*

This statement is true, as can be seen in the [article from the fact-checking site Chequeado](#) (Chequeado 2019).

(iv) *Insfrán, the governor of Formosa, slapped an election clerk in the 2019 elections*

This statement is false, as can be seen in the [article from the fact-checking site Chequeado](#) (Subiela Salvo, 2019).

(v) *The labor union leader Hugo Moyano said “There is no need to study, I have been conducting the union for 32 years”*

This statement is false, as can be seen in the [article from the fact-checking site Reverso](#) (Marina, 2019).

(vi) *Mauricio Macri was the most voted presidential candidate among the Argentinians living abroad in the 2019 general elections*

This statement is true, as can be seen in the [article from the fact-checking site Reverso](#) (Nasanovsky, 2019).

The three options for all the statements are: *True, False, I prefer not to answer.*

After these questions, the participants were randomly assigned to one of five groups. Those assigned to the first group were directly sent to the next questions. Those in the other groups were first presented with an extract of an article. We now include the four extracts corresponding to groups 2 to 5.

Extract presented to the second group

Por favor, leé el siguiente extracto de una publicación del 20 de julio del 2020 realizada por el sitio BOLAVIP:

Jugadores de Minecraft descubren el mundo original de la histórica pantalla de carga

Finalmente podrán explorar el mundo desde el cual los desarrolladores sacaron la pantalla del juego.



Minecraft es un juego de infinitas posibilidades y así ha quedado demostrado una y otra vez, como sucedió recientemente, con un nuevo descubrimiento por parte de los jugadores, ésta vez con tintes históricos, y gracias a un esfuerzo en conjunto.

Y es que un grupo de fanáticos realizó un esfuerzo en conjunto para descubrir uno de los misterios más grandes de la historia del juego: el mapa que se ve en la pantalla de carga del juego. Sí, **encontraron el mundo al que pertenece el acantilado que vimos durante más de siete años al iniciar el juego.**

El mapa, que se ve algo borroso y gira lentamente mientras iniciamos sesión nunca antes había sido encontrado por los fanáticos de Minecraft, pero ya todos pueden acceder a él y jugarlo gracias al descubrimiento de estos jugadores.

Siguiente →

This article was obtained from the following site:

<https://bolavip.com/gamer/Jugadores-de-Minecraft-descubren-el-mundo-original-de-la-historica-pantalla-de-carga-20200720-0112.html> (Celsan, 2020).

The translation is:

Please, read the following extract of a publication of July 20, 2020 made by the site BOLAVIP:

Minecraft players discover the original world of the historic loading screen.

You'll finally be able to explore the world from which the developers obtained the game's screen.

Minecraft is a game of infinite possibilities, as it has been proven time after time. It was proven once again with a recent discovery from the players, this time, with historic significance and thanks to a joint work.

A group of fans did a joint effort to discover one of the biggest mysteries in the history of the game: the map that is seen in the loading screen of the game. Yes, they found the world to which the cliff we've seen for more than seven years when the game is starting belongs.

The map, which is a little blurry and slowly rotates while we log in, had never been found by Minecraft's fans, but now everyone can have access to it and play in it thanks to the discovery of these players.



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Extract presented to the third group

Por favor, leé el siguiente extracto de una publicación del 11 de febrero del 2020 realizada por el sitio EL ESPAÑOL:

Greta Thunberg tendrá su serie de televisión: la BBC prepara un documental sobre la activista



La cinta seguirá los encuentros de la joven alrededor del mundo mientras asiste a cumbres internacionales y se entrevista con líderes políticos.

La activista contra la crisis climática Greta Thunberg tendrá su propia serie de televisión en la cadena BBC, que seguirá sus encuentros alrededor del mundo mientras asiste a cumbres internacionales y se entrevista con líderes políticos.

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Siguiente →

This article was obtained from the following site:

https://www.elespanol.com/ciencia/medio-ambiente/20200211/greta-thunberg-television-bbc-prepara-documental-activista/466704006_0.html (El Español, 2020).

The translation is:

Please, read the following extract of a publication of February 11, 2020 made by the site EL ESPAÑOL: Greta Thunberg will have her television series: the BBC is preparing a documentary of the activist.

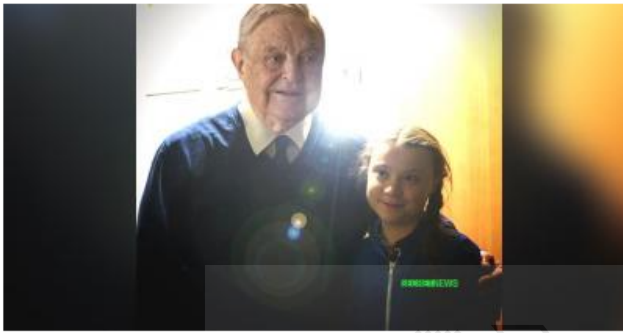
The program will follow her encounters around the world while she goes to international summits and meets political leaders.

The activist against climate change Greta Thunberg will have her own television series in the BBC chain, which will follow her encounters around the world while she goes to international summits and meets political leaders.

Extract presented to the fourth group

Por favor, leé el siguiente extracto de una publicación del 28 de agosto del 2019 realizada por el sitio SecretNews:

Greta Thunberg es la nieta del multimillonario de izquierda George Soros



La información se le escapó a la propia joven activista por el medioambiente Greta Thunberg. Mientras ayer se celebraba el cumpleaños 101 del multimillonario más odiado por la extrema derecha, la joven dejó un comentario bajo una foto para desearle un "feliz cumpleaños a mi querido abuelo". El comentario fue eliminado inmediatamente por George Soros, pero no escapó a la atención de los usuarios de la red.

(Traducción propia)

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Siguiente →

This article was obtained from the following site:

<https://secretnews.fr/greta-thunberg-georges-soros/> (SecretNews, 2019).

The translation is:

Please, read the following extract of a publication of August 28, 2019 made by the site SecretNews:

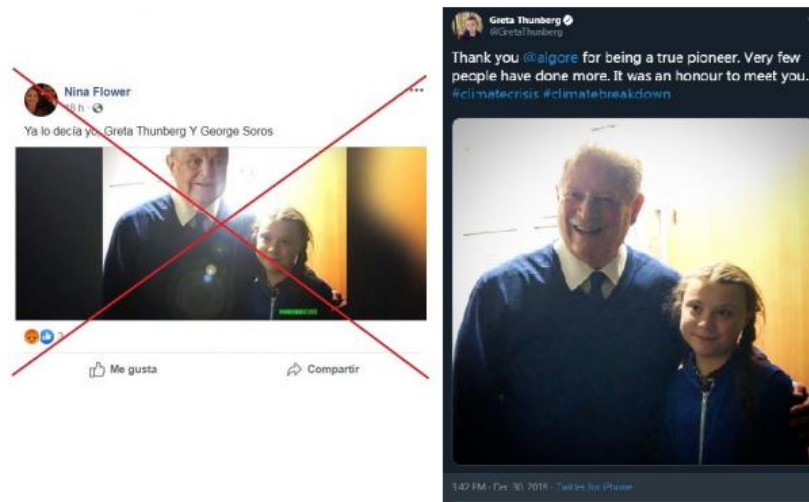
Greta Thunberg is the granddaughter of the leftist multimillionaire George Soros

The young environmental activist Greta Thunberg herself let the information slip. While the 101st birthday of the multimillionaire most hated by the far-right was being celebrated, she posted a comment under a picture to congratulate "my dear grandfather for his birthday". The comment was immediately deleted by George Soros, but it did not escape the attention of the network users.

(Own translation)

Por favor, leé el siguiente extracto de una publicación del 27 de septiembre del 2019 realizada por el sitio AFP Factual:

No, es un montaje: en la foto original Greta posa con Al Gore



Una imagen que supuestamente muestra a la activista Greta Thunberg junto al magnate George Soros ha sido compartida miles de veces en redes sociales en varios idiomas. Pero es falsa: se trata del montaje de una foto en la que la joven sueca en realidad posa junto al ex vicepresidente estadounidense Al Gore. [...]

Una búsqueda inversa de la imagen permitió dar con la foto original, publicada el 30 de diciembre de 2018 por la propia Thunberg en sus cuentas de Instagram y de Twitter, en la que posa con el ex vicepresidente de Estados Unidos, Al Gore. [...]

Una segunda búsqueda inversa por imágenes reveló que el fotomontaje de Thunberg y Soros fue publicado el 28 de agosto de 2019 en un sitio web satírico francés, Secret News. El título del artículo paródico, traducido del francés, dice: "Greta Thunberg es la nieta del multimillonario de izquierda George Soros".

Al final de cada artículo, Secret News se define como "un medio satírico colaborativo, gratuito independiente, que reúne a varios colaboradores". Además, se advierte que "la mayor parte de la información en este sitio es probablemente falsa, publicada con un fin satírico y humorístico y no puede considerarse auténtica".

A sus 16 años, Greta Thunberg se ha convertido en el rostro y la voz del ecologismo. En 2018 comenzó a manifestarse todos los viernes frente al Parlamento sueco en Estocolmo con un cartel hecho a mano para sensibilizar a los diputados sobre la emergencia climática. Su "huelga escolar" se transformó en un movimiento global, que la llevó a ser la representante de toda una generación.

This article was obtained from the following site:

<https://factual.afp.com/no-es-un-montaje-en-la-foto-original-greta-posa-con-al-gore>

(AFP Factual, 2019).

The translation is:

Please, read the following extract of a publication of September 27, 2019 made by the site AFP Factual: No, it's edited: in the original photo Greta poses with Al Gore

An image that supposedly shows the activist Greta Thunberg with the magnate George Soros has been shared thousands of times in social networks in various languages. But it is fake: it was edited from a picture in which the Swedish activist poses with the American ex vice-president Al Gore. [...]

A reverse image search led to the original photo published on December 30, 2018 by Thunberg in her Instagram and Twitter accounts. In that image she poses with the American ex vice-president Al Gore. [...]

Another reverse image search revealed that the edited image of Thunberg and Soros was published on August 28, 2019 in the satiric French website Secret News. The title of the parody article, translated from French, says "Greta Thunberg is the granddaughter of the leftist multimillionaire George Soros."

At the bottom of each article Secret News describes itself as "a satiric, collaborative, free, independent media outlet that brings together several contributors." Additionally, it warns that "most of the information in this site is probably false, published with a satiric and humorous objective and cannot be considered authentic."

At her 16 years Greta Thunberg has become the face and voice of environmentalism. In 2018 she began to manifest every Friday in front of the Swedish Parliament in Stockholm with a handmade sign to sensitize the representatives to the climatic emergency. Her "school strike" was turned into a global movement, which made her the representative of a whole generation.

After the extracts, the participants were sent to the questions that are here used as outcome variables. We now present the screenshots of those questions.

Tiene un presupuesto de 100 monedas que debe ser distribuido entre 5 políticas diferentes. ¿Cómo asignaría este presupuesto entre las 5 políticas? (La suma de las monedas asignadas debe ser 100).

| | |
|---|--------------------------------|
| Monedas para el desarrollo de energías renovables | <input type="text" value="0"/> |
| Monedas para mejorar el manejo de residuos, de forma que se vuelva más amigable para el medioambiente | <input type="text" value="0"/> |
| Monedas para el desarrollo de Vaca Muerta (un yacimiento petrolífero) | <input type="text" value="0"/> |
| Monedas para impulsar al sector ganadero | <input type="text" value="0"/> |
| Monedas para la prevención del consumo de drogas | <input type="text" value="0"/> |
| Total | <input type="text" value="0"/> |

[Siguiente →](#)

The translation is:

You have a budget of 100 coins that must be distributed among 5 different policies. How would you assign this budget between the 5 policies? (The sum of the coins assigned must be 100).

Coins to develop renewable energies

Coins to improve the waste management system to make it more environmentally friendly

Coins to develop Vaca Muerta (an oil field)

Coins to stimulate the cattle industry

Coins to prevent drug consumption

Total

Suponga que tiene \$5000 para donar entre las siguientes ONGs. ¿Cómo quiere distribuir ese monto? (La suma de los montos asignados debe ser 5000).

Uno de los participantes de la encuesta será seleccionado al azar y se donará a cada una de las ONGs el monto que esa persona le haya asignado.

RIOD (organización sin ánimo de lucro que engloba a ONGs de Iberoamérica que trabajan en el ámbito de las drogas y otras adicciones, tanto en prevención, tratamiento, inserción, investigación e incidencia política)

Greenpeace (ONG ambientalista)

TECHO (organización que trabaja para superar la situación de pobreza que viven millones de personas en asentamientos populares)

Total

[Siguiente →](#)

The translation is:

Assume you have \$5000 to donate to the following NGOs. How do you want to distribute the funds? (The sum of the assigned funds must be 5000).

One of the survey participants will be randomly chosen and a donation of the amount assigned by that person will be made to each NGO.

RIOD (non-profit organization that brings together the NGOs from Ibero-America that work in the prevention, treatment, insertion, research and political incidence of drugs and other addictions)

Greenpeace (environmental NGO)

TECHO (organization that works to overcome the poverty situation of the millions that live in slums)

Total

Ordene los siguientes temas del más grave al menos grave. Asigne el 1 al que usted considera como el más grave, el 2 al segundo más grave, el 3 al tercero y el 4 al menos grave.

| | 1 | 2 | 3 | 4 |
|----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Calentamiento global | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Pobreza | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Consumo de drogas | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Desinformación | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

[Siguiete →](#)

The translation is:

Order the following issues from the most pressing to the least pressing. Assign the 1 to the one you consider as the most pressing, the 2 to the second most pressing, the 3 to the third and the 4 to the least pressing.

Global warming

Poverty

Drug consumption

*Lack of information*⁸

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⁸Actually, there is no perfect translation for the Spanish word used. A better translation would be a combination between lack of information and misinformation

"La joven activista medioambiental Greta Thunberg es la nieta de George Soros"
Usted cree que esa afirmación es:

Definitivamente verdadera

Probablemente verdadera

Ni verdadera ni falsa

Probablemente falsa

Definitivamente falsa



Siguiente →

The translation is:

"The young environmental activist Greta Thunberg is the granddaughter of George Soros."

You believe that the statement is:

Definitely true

Probably true

Neither true nor false

Probably false

Definitely false

Then, the participants were sent to another block of questions capturing pre-treatment individual characteristics (before this, the fake news group saw the correction). The questions are presented in the following screenshots.

¿En qué país nació?

¿En qué país reside?

¿Cuál de las siguientes categorías lo describe mejor?

- No soy estudiante
- Estudiante de tiempo parcial
- Estudiante de tiempo completo

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¿Cuál de las siguiente categorías describe mejor su estatus laboral?

- Empleado, trabajando entre 1 y 20 horas semanales
- Empleado, trabajando entre 21 y 39 horas semanales
- Empleado, trabajando 40 o más horas por semana
- Sin empleo, buscando trabajo
- Sin empleo, no buscando trabajo
- Retirado

¿Cuál es el máximo nivel educativo que alcanzaste?

Primario incompleto o menos

Primario completo

Secundario incompleto

Secundario completo

Terciario incompleto

Terciario completo

Universitario incompleto

Universitario completo

Posgrado incompleto

Posgrado completo o más



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[Siguiente →](#)

The first of these five questions translates into:

What country were you born in?

The second question translates into

In which country do you reside?

Both questions had a list of countries as options.

The third question reads:

Which of the following categories best describes you?

Not a student

Part-time student

Full-time student

The fourth question reads:

Which of the following categories best describes your labor status?

Employed, working between 1 and 20 hours a week

Employed, working between 21 and 39 hours a week

Employed, working 40 or more hours a week

Not employed, looking for a job

Not employed, not looking for a job

Retired

The fifth question reads:

Which is the highest level of education you achieved?

Incomplete primary school or less

Completed primary school

Incomplete secondary school

Completed secondary school

Incomplete tertiary school

Completed tertiary school

Incomplete undergraduate degree

Completed an undergraduate degree

Incomplete graduate degree

Completed a graduate degree or more



We then had a question to identify those most likely to have been rushing through the survey without paying much attention. It is presented in the following screenshot.

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Estudios recientes sobre la toma de decisiones muestran que éstas se encuentran afectadas por el contexto en el que se toman. Hay diferencias en cómo las personas se sienten, en su conocimiento y experiencia previa, y en el ambiente. Gracias por prestar atención a las instrucciones; de lo contrario, los resultados de la encuesta no serían muy útiles. Para ayudarnos a confirmar que usted ha leído estas instrucciones, por favor seleccione la opción "Ninguna de los anteriores" entre las siguientes alternativas:

Enojo

Alegría

Tristeza

Miedo

Sorpresa

Ninguna de las anteriores



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[Siguiete →](#)

The translation is:

Recent studies of decision-making show that decisions are influenced by the context in which they are made. There are differences in how people feel, their knowledge and previous experience, and in the environment. Thank you for paying attention to the instructions; otherwise, the results from the survey would not be very useful. To help us confirm that you have read the instructions, please choose the option "None of the above" from the following options:

Anger

Happiness

Sadness

Fear

Surprise

None of the above

The last two questions of the survey were:

¿Qué tanto entendió las preguntas de la encuesta?

Entendí todo

Entendí casi todo

Entendí parcialmente

No entendí nada

¿Quiere hacernos llegar algún comentario o impresión sobre la encuesta?



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[Siguiete →](#)

The translation to the first of these two questions is:

How much of the questions of the survey did you understand?

I understood everything

I understood almost everything

I partially understood

I did not understand anything

The second questions says:

Do you want to send us any comment or impression from the survey?

All the previous screens had the same blue button that had to be clicked in order to continue to the following screen. The text in the button translates into *next*.

After those questions the survey ended, and all the participants were sent to the following screen:

¡Muchas gracias por responder a esta encuesta!

¿Me ayudás a seguir difundirla?

Para difundirla podés:

- Compartir el link de la encuesta: <http://bit.ly/lw-encuesta>
- Compartir, citar o retwittear el siguiente Tweet: bit.ly/lw-encuesta-tw
- Compartir este post de Facebook: bit.ly/lw-encuesta-fb

The translation of the final screen is:

Thank you very much for answering this survey!

Would you help me to spread it?

To spread it you can:

- *Share the link of the survey: <http://bit.ly/lw-encuesta>*
- *Share, quote or retweet the following Tweet: bit.ly/lw-encuesta-tw*
- *Share this Facebook post: bit.ly/lw-encuesta-fb*

6.2 Data and descriptive statistics

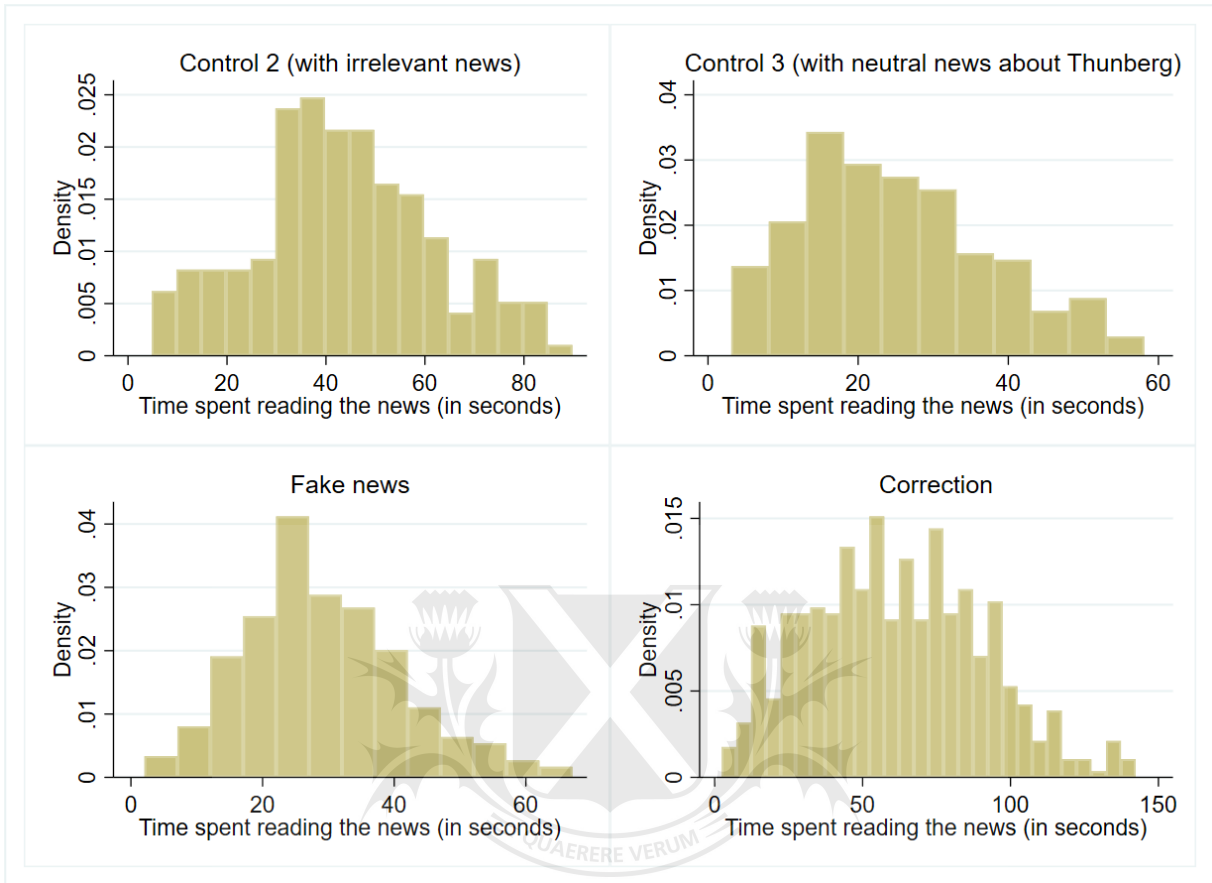
In this subsection we present additional descriptive statistics of the data used in this work.

Table 12: Distribution of the answers given to the true or false question

| | Statement 1 | Statement 2 | Statement 3 | Statement 4 | Statement 5 | Statement 6 |
|------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| False | 168 | 172 | 433 | 565 | 688 | 165 |
| I prefer not to answer | 171 | 354 | 241 | 537 | 392 | 129 |
| True | 1,528 | 1,341 | 1,193 | 765 | 787 | 1,573 |
| Total | 1,867 | 1,867 | 1,867 | 1,867 | 1,867 | 1,867 |

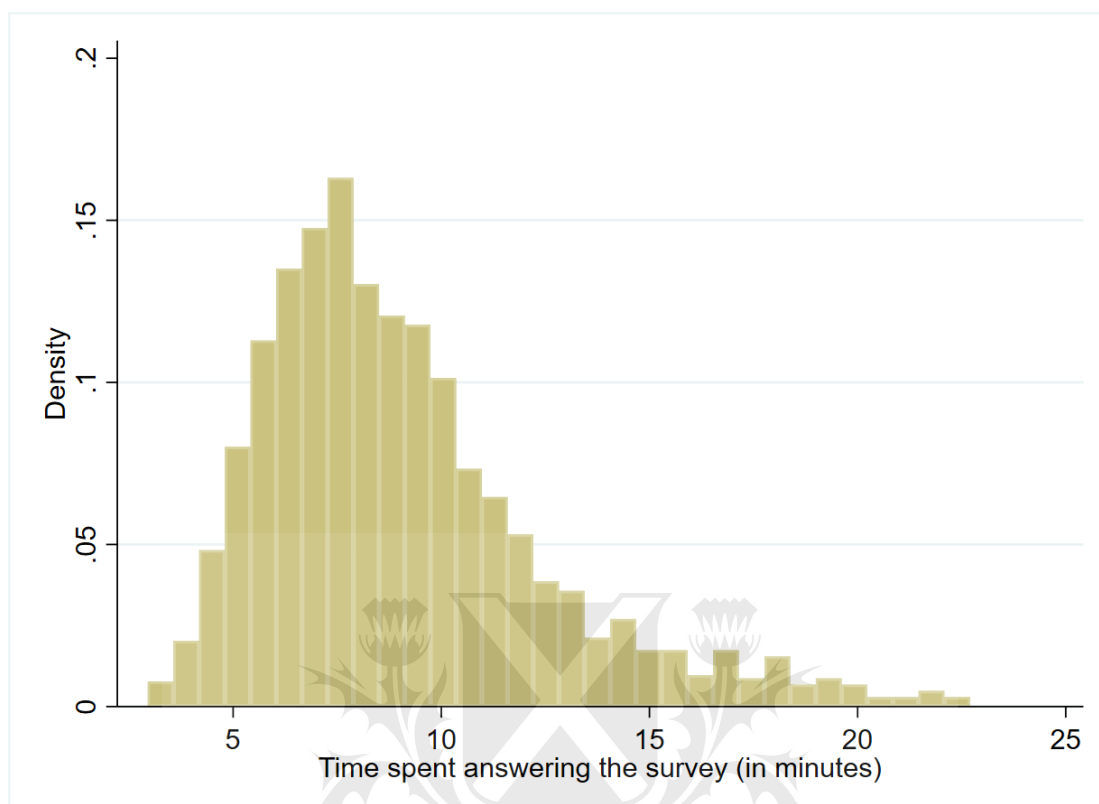
This table presents the distribution of answers given to the question in which the participants had to answer for six statements if they thought they were true or false

Figure 12: Histograms of the time spent reading the extract for each group



These histograms represent the time the individuals spent reading the news assigned to their group. The first control group is excluded, as they did not have any news to read. Only individuals who answered at least one outcome variable are included. From each of these figures we exclude the 5% of individuals who spent the most time reading the news to provide a better representation of the distribution.

Figure 13: Histogram of the time spent in the survey



This histogram represents the time the individuals spent in the survey. Only the individuals who finished the survey are included. We exclude the 5% of individuals who spent the most time in the survey to provide a better representation of the distribution.

Table 13: Descriptive statistics of our sample and Argentina's urban population

| Variables | Our sample | Argentina's urban population |
|-------------------------------------|------------|------------------------------|
| Age (mean) | 31 | 42 |
| % of women | 36 | 52 |
| % of students | 66 | 20 |
| % working | 61 | 43 |
| % with intermediate education level | 55 | 38 |
| % with high education level | 44 | 16 |
| % born in Argentina | 93 | 94 |

Note: the data for Argentina's urban population was obtained from [INDEC \(2020\)](#). For the description of Argentina's urban population we included only those with at least 14 years old, as the youngest individual from our sample had that age. Strictly, the variables for the % of women in each sample are slightly different, as in our questionnaire we asked about gender and the questionnaire providing the data for Argentina's urban population asked about sex.

6.3 Additional results

In this subsection we present some additional results in the form of tables and graphs.

Table 14: Effect on the coins assigned to the different policies

| Variables | (1) Good net of bad coins for the environment | (2) Good net of bad coins for the environment | (3) Good for the environment | (4) Good for the environment | (5) Developing renewable energies | (6) Developing renewable energies | (7) Making waste management more environmentally- friendly | (8) Making waste management more environmentally- friendly |
|--------------|--|--|------------------------------------|------------------------------------|--|--|--|--|
| Fake news | -0.0804 (2.058) | -1.652 (2.073) | -0.0960 (1.026) | -0.678 (1.042) | -0.119 (0.674) | -0.294 (0.682) | 0.0235 (0.596) | -0.384 (0.614) |
| Correction | 2.152 (2.109) | 2.477 (2.100) | 0.853 (1.045) | 1.157 (1.048) | 0.545 (0.701) | 0.818 (0.701) | 0.308 (0.591) | 0.339 (0.593) |
| Constant | 7.584*** (1.454) | 7.942 (9.643) | 47.14*** (0.726) | 45.41*** (5.734) | 26.90*** (0.477) | 23.65*** (3.513) | 20.24*** (0.427) | 21.76*** (3.038) |
| Observations | 1,867 | 1,778 | 1,867 | 1,778 | 1,867 | 1,778 | 1,867 | 1,778 |
| R-squared | 0.001 | 0.059 | 0.001 | 0.039 | 0.001 | 0.025 | 0.000 | 0.042 |
| Controls | No | Yes | No | Yes | No | Yes | No | Yes |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

This table presents the effect of each of the treatments on the coins assigned to different policies. Columns (1), (3), (5) and (7) present the estimations of regressions without control variables. Columns (2), (4), (6) and (8) present the estimations of regressions that include as control variables all the pre-treatment characteristics listed in table [1](#)

Table 15: Effect on the coins assigned to the different policies

| Variables | (1) Bad for the environment | (2) Bad for the environment | (3) Developing an oil field | (4) Developing an oil field | (5) Promoting the cattle industry | (6) Promoting the cattle industry | (7) Preventing drug consumption | (8) Preventing drug consumption |
|--------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|---|---|---------------------------------------|---------------------------------------|
| Fake news | -0.0155 (1.113) | 0.974 (1.113) | -0.332 (0.747) | 0.166 (0.750) | 0.316 (0.708) | 0.809 (0.715) | 0.112 (0.588) | -0.297 (0.591) |
| Correction | -1.299 (1.145) | -1.320 (1.132) | -0.615 (0.759) | -0.680 (0.756) | -0.684 (0.748) | -0.640 (0.734) | 0.446 (0.595) | 0.163 (0.587) |
| Constant | 39.56*** (0.792) | 37.47*** (5.115) | 20.75*** (0.520) | 16.18*** (3.165) | 18.81*** (0.524) | 21.29*** (3.297) | 13.30*** (0.438) | 17.12*** (5.010) |
| Observations | 1,867 | 1,778 | 1,867 | 1,778 | 1,867 | 1,778 | 1,867 | 1,778 |
| R-squared | 0.001 | 0.077 | 0.000 | 0.069 | 0.001 | 0.044 | 0.000 | 0.071 |
| Controls | No | Yes | No | Yes | No | Yes | No | Yes |

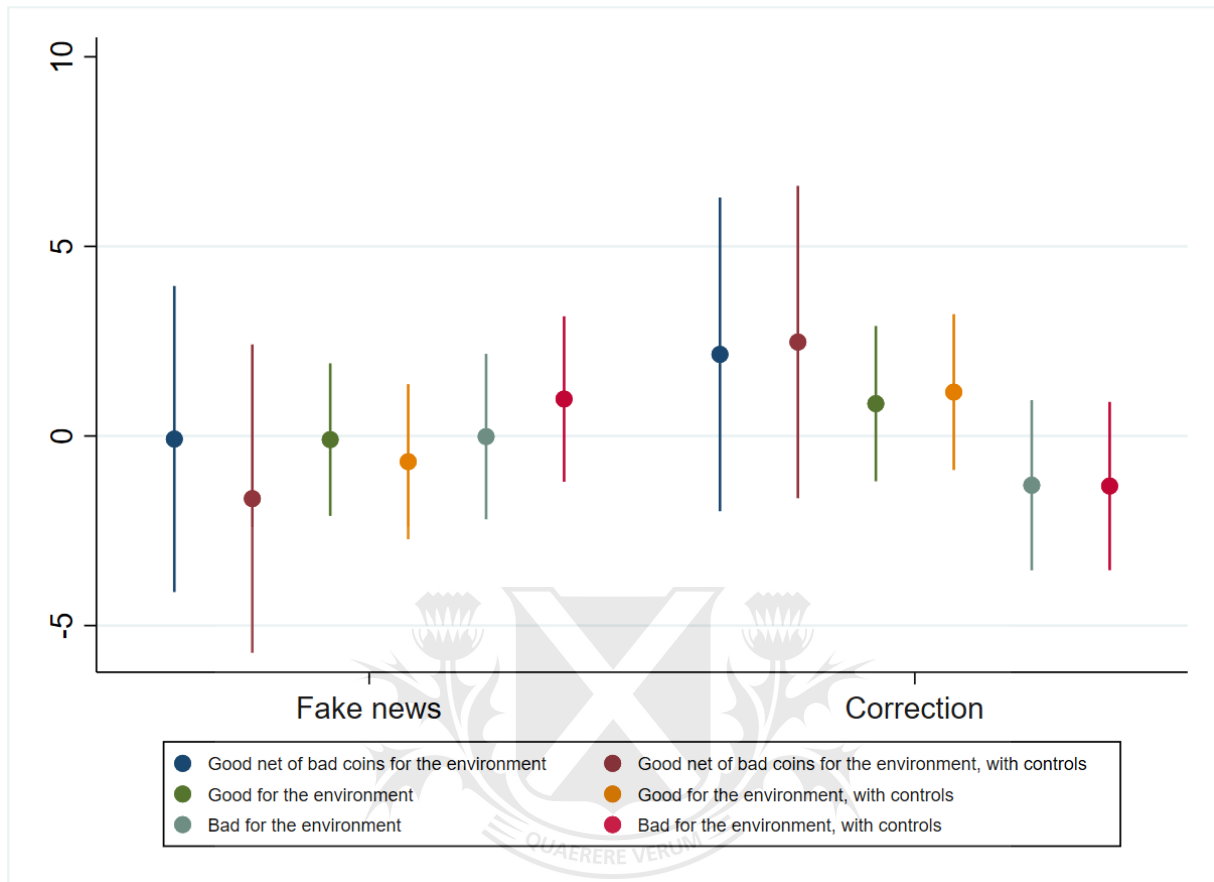
Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

This table presents the effect of each of the treatments on the coins assigned to different policies. Columns (1), (3), (5) and (7) present the estimations of regressions without control variables. Columns (2), (4), (6) and (8) present the estimations of regressions that include as control variables all the pre-treatment characteristics listed in table 1.

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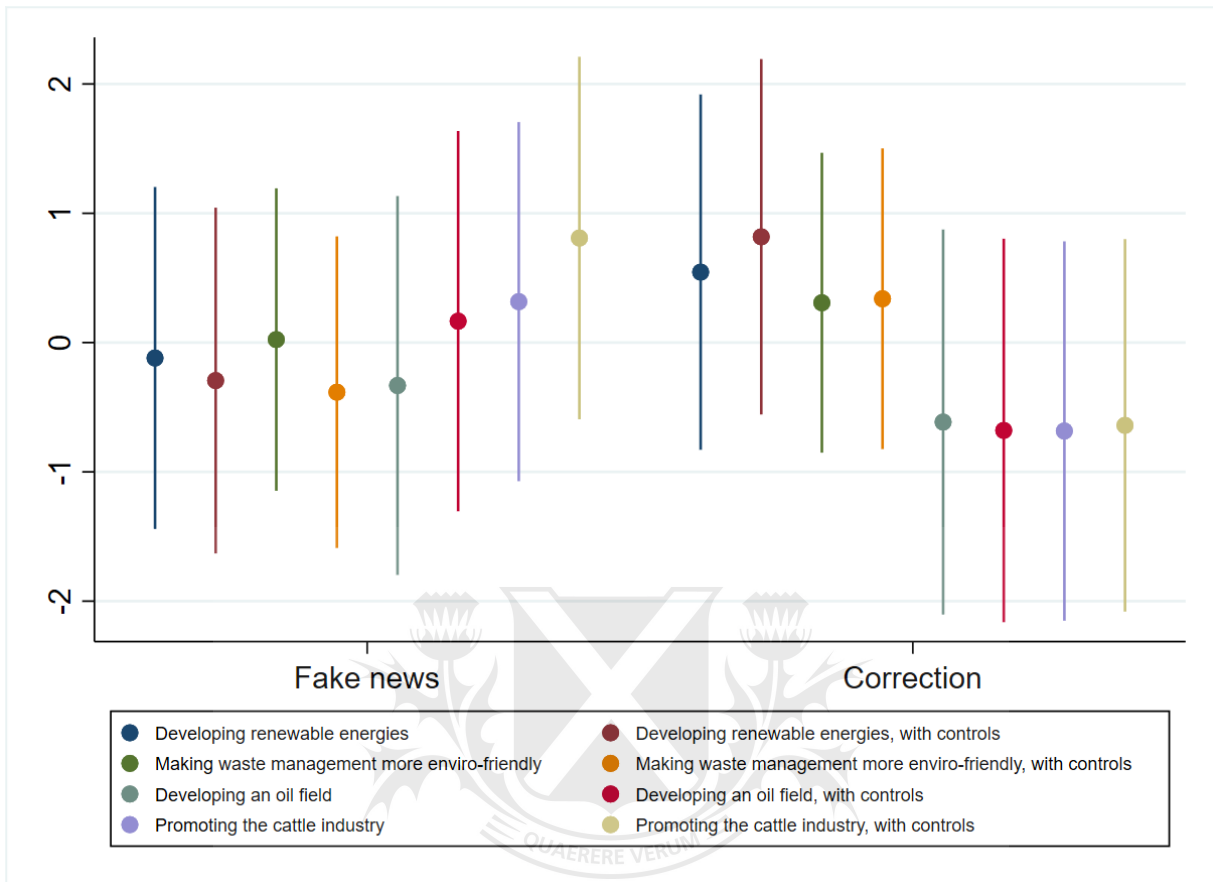
Figure 14: Effect on the coins assigned to the different policies



This figure presents some of the coefficients from the regressions of tables 14 and 15, and their corresponding 95% confidence intervals.

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Figure 15: Effect on the coins assigned to the different policies



This figure presents some the coefficients from the regressions of tables 14 and 15, and their corresponding 95% confidence intervals.

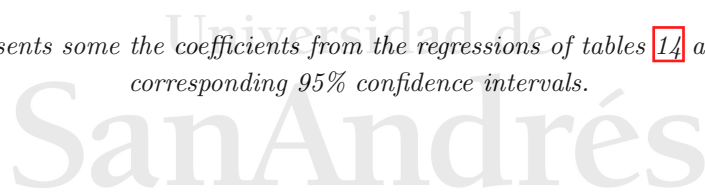


Table 16: Effect on the funds assigned to the different NGOs

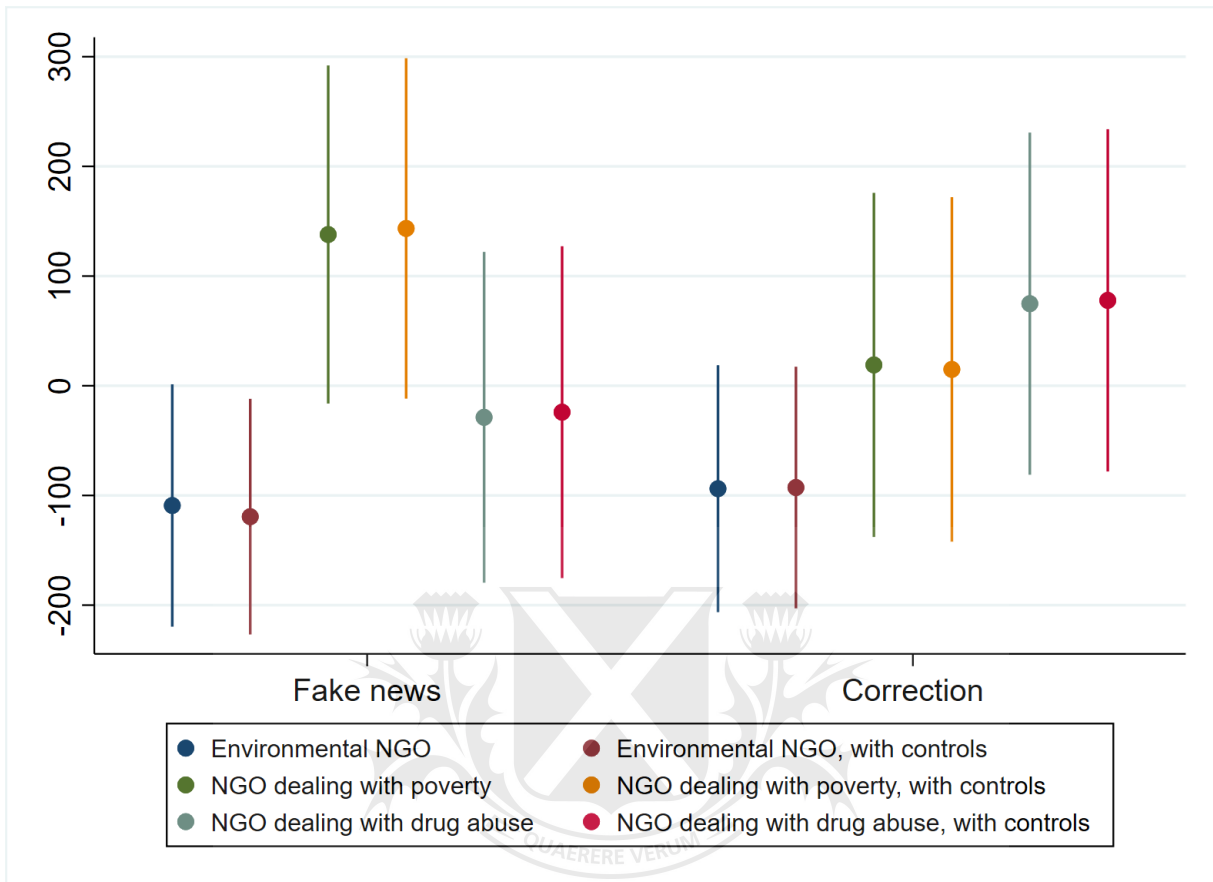
| Variables | (1) Environmental NGO | (2) Environmental NGO | (3) NGO dealing with poverty | (4) NGO dealing with poverty | (5) NGO dealing with drug abuse | (6) NGO dealing with drug abuse |
|--------------|-----------------------------|-----------------------------|---------------------------------------|---------------------------------------|--|--|
| Fake news | -109.1* (56.32) | -119.3** (54.76) | 137.9* (78.57) | 143.4* (79.11) | -28.75 (76.89) | -24.07 (77.12) |
| Correction | -93.83 (57.40) | -92.77* (56.15) | 18.99 (79.97) | 14.92 (80.06) | 74.84 (79.51) | 77.86 (79.55) |
| Constant | 960.6*** (40.71) | 1,240*** (232.3) | 2,250*** (55.87) | 1,943*** (313.8) | 1,789*** (54.37) | 1,817*** (328.8) |
| Observations | 1,812 | 1,778 | 1,812 | 1,778 | 1,812 | 1,778 |
| R-squared | 0.002 | 0.068 | 0.002 | 0.025 | 0.001 | 0.032 |
| Controls | No | Yes | No | Yes | No | Yes |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

This table presents the effect of each of the treatments on the funds assigned to the different NGOs. Columns (1), (3) and (5) present the estimations of regressions without control variables. Columns (2), (4) and (6) present the estimations of regressions that include as control variables all the pre-treatment characteristics listed in table 1.

Figure 16: Effect on the funds assigned to the different NGOs



This figure presents the coefficients from the regressions of table 16 and their corresponding 95% confidence intervals.

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Table 17: Effect on the priority assigned to the different issues

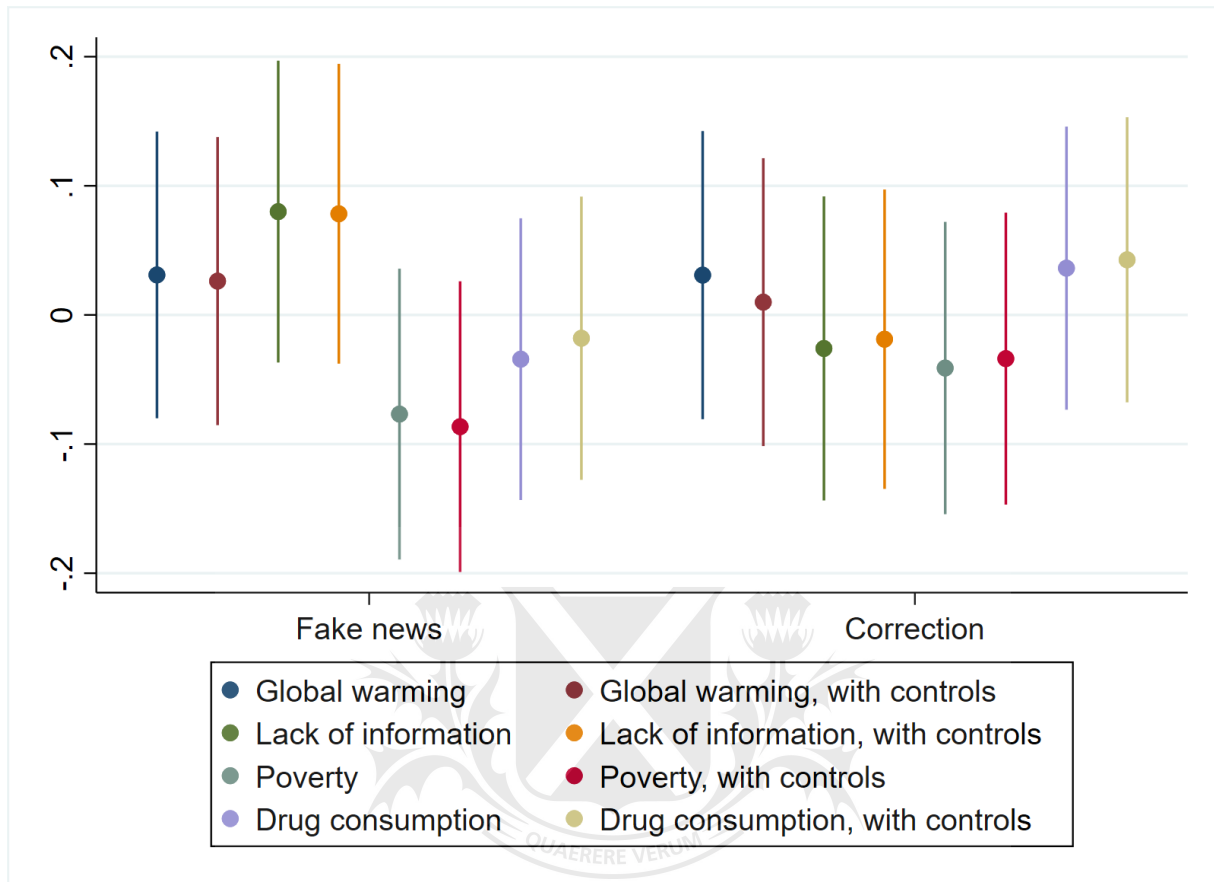
| Variables | (1) Global warming | (2) Global warming | (3) Lack of information | (4) Lack of information | (5) Poverty | (6) Poverty | (7) Drug consumption | (8) Drug consumption |
|--------------|--------------------------|--------------------------|-------------------------------|-------------------------------|----------------------|---------------------|----------------------------|----------------------------|
| Fake news | 0.0310 (0.0566) | 0.0262 (0.0569) | 0.0800 (0.0596) | 0.0783 (0.0592) | -0.0768 (0.0574) | -0.0865 (0.0574) | -0.0342 (0.0556) | -0.0180 (0.0559) |
| Correction | 0.0308 (0.0569) | 0.00992 (0.0568) | -0.0260 (0.0600) | -0.0188 (0.0591) | -0.0411 (0.0577) | -0.0338 (0.0576) | 0.0362 (0.0559) | 0.0427 (0.0563) |
| Constant | 2.514*** (0.0391) | 2.379*** (0.285) | 2.698*** (0.0416) | 1.861*** (0.286) | 1.728*** (0.0416) | 2.622*** (0.277) | 3.059*** (0.0391) | 3.138*** (0.257) |
| Observations | 1,801 | 1,778 | 1,801 | 1,778 | 1,801 | 1,778 | 1,801 | 1,778 |
| R-squared | 0.000 | 0.018 | 0.002 | 0.041 | 0.001 | 0.031 | 0.001 | 0.018 |
| Controls | No | Yes | No | Yes | No | Yes | No | Yes |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

This table presents the effect of each of the treatments on the priority assigned to the different issues. Columns (1), (3), (5) and (7) present the estimations of regressions without control variables. Columns (2), (4), (6) and (8) present the estimations of regressions that include as control variables all the pre-treatment characteristics listed in table 1.

Figure 17: Effect on the priority assigned to the different issues



This figure presents the coefficients from the regressions of table 17 and their corresponding 95% confidence intervals.

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Table 18: Analysis of heterogeneous effects

| Variables | (1) | (2) | (3) |
|---|--|----------------------|-------------------------|
| | Believes that G. Thunberg is not the granddaughter of G. Soros | | |
| Fake news | -0.469*** (0.156) | -0.203** (0.0927) | -0.319*** (0.0810) |
| Correction | 0.416*** (0.130) | 0.375*** (0.0794) | 0.433*** (0.0678) |
| Fake news * Age | 0.00486 (0.00470) | | |
| Correction * Age | -0.000601 (0.00394) | | |
| Fake news * Part-time student | | -0.137 (0.139) | |
| Fake news * Full-time student | | -0.203 (0.131) | |
| Correction * Part-time student | | 0.0596 (0.116) | |
| Correction * Full-time student | | 0.0168 (0.111) | |
| Fake news * Mins consuming news from traditional media | | | 6.22e-06 (0.000819) |
| Fake news * Mins consuming news from social networks | | | -1.60e-05 (0.000815) |
| Correction * Mins consuming news from traditional media | | | -8.26e-05 (0.000707) |
| Correction * Mins consuming news from social networks | | | -0.000386 (0.000663) |
| Constant | -0.602** (0.249) | -0.695*** (0.245) | -0.677*** (0.246) |
| Observations | 1,778 | 1,778 | 1,778 |
| R-squared | 0.211 | 0.212 | 0.210 |
| Controls | Yes | Yes | Yes |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

This table presents the result of estimating a series of regressions that quantify the heterogeneous effects of the treatments by different pre-treatment characteristics. The outcome variable is standardized. All the regressions include as control variables all the pre-treatment characteristics listed in table [1](#).

Table 19: Analysis of heterogeneous effects

| Variables | (1) Green index | (2) Green index | (3) Green index | (4) Green index |
|--------------------------------|------------------------|-----------------------|----------------------|---------------------|
| Fake news | -0.0424 (0.0753) | -0.0561 (0.0366) | -0.0656 (0.0430) | -0.0204 (0.0469) |
| Correction | 0.0331 (0.0778) | -0.000536 (0.0370) | -0.0301 (0.0449) | 0.00992 (0.0468) |
| Fake news * Age | -0.000106 (0.00211) | | | |
| Correction * Age | -0.00124 (0.00223) | | | |
| Fake news * Woman | | 0.0288 (0.0590) | | |
| Correction * Woman | | -0.0120 (0.0593) | | |
| Fake news * Part-time student | | | -0.00195 (0.0712) | |
| Fake news * Full-time student | | | 0.0545 (0.0656) | |
| Correction * Part-time student | | | 0.0238 (0.0730) | |
| Correction * Full-time student | | | 0.0496 (0.0670) | |
| Fake news * Working | | | | -0.0406 (0.0596) |
| Correction * Working | | | | -0.0240 (0.0597) |
| Constant | 0.0396 (0.140) | 0.0478 (0.136) | 0.0634 (0.137) | 0.0364 (0.138) |
| Observations | 1,778 | 1,778 | 1,778 | 1,778 |
| R-squared | 0.063 | 0.063 | 0.063 | 0.063 |
| Controls | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

This table presents the result of estimating a series of regressions that quantify the heterogeneous effects of the treatments by different pre-treatment characteristics. All the regressions include as control variables all the pre-treatment characteristics listed in table [1](#).

Table 20: Analysis of heterogeneous effects

| VARIABLES | (1) Green index | (2) Green index | (3) Green index |
|---|--------------------|----------------------|-------------------------|
| Fake news | 0.258 (0.245) | -0.0672 (0.0548) | -0.0392 (0.0457) |
| Correction | 0.0837 (0.189) | 0.0260 (0.0550) | 0.00132 (0.0471) |
| Fake news * Intermediate edu level | -0.331 (0.249) | | |
| Fake news * High edu level | -0.283 (0.248) | | |
| Correction * Intermediate edu level | -0.0855 (0.194) | | |
| Correction * High edu level | -0.0975 (0.194) | | |
| Fake news * Score false statements | | 0.0158 (0.0190) | |
| Fake news * Score true statements | | 0.00526 (0.0233) | |
| Correction * Score false statements | | -0.0168 (0.0191) | |
| Correction * Score true statements | | -0.00889 (0.0238) | |
| Fake news * Mins consuming news from traditional media | | | -0.000170 (0.000463) |
| Fake news * Mins consuming news from social networks | | | 4.86e-05 (0.000425) |
| Correction * Mins consuming news from traditional media | | | -0.000371 (0.000530) |
| Correction * Mins consuming news from social networks | | | 0.000189 (0.000431) |
| Constant | -0.0558 (0.178) | 0.0514 (0.137) | 0.0523 (0.139) |
| Observations | 1,778 | 1,778 | 1,778 |
| R-squared | 0.064 | 0.064 | 0.063 |
| Controls | Yes | Yes | Yes |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

This table presents the result of estimating a series of regressions that quantify the heterogeneous effects of the treatments by different pre-treatment characteristics. All the regressions include as control variables all the pre-treatment characteristics listed in table [1](#).

Table 21: Differences in the outcome variables between the three control groups

| Variable | (1) Control 1 (no news) | (2) Control 2 (irrelevant news) | (3) Control 3 (neutral news about G. Thunberg) | (4) (2)-(1) | (5) (3)-(1) | (6) (3)-(2) |
|--|-------------------------------|--|---|----------------------|----------------------|-----------------------|
| Good net of bad coins for the environment | 9.158 (33.691) | 3.890 (36.231) | 9.504 (40.015) | -5.268 (3.396) | 0.346 (3.548) | 5.614 (3.730) |
| Good for the environment | 47.656 (16.641) | 45.276 (17.336) | 48.394 (20.723) | -2.380 (1.650) | 0.738 (1.802) | 3.118* (1.869) |
| Developing renewable energies | 26.536 (10.742) | 26.320 (12.292) | 27.825 (13.054) | -0.216 (1.119) | 1.289 (1.147) | 1.505 (1.239) |
| Making waste management more environmentally-friendly | 21.120 (10.909) | 18.956 (9.947) | 20.569 (11.387) | -2.164** (1.016) | -0.551 (1.070) | 1.613 (1.045) |
| Bad for the environment | 38.498 (18.769) | 41.385 (19.946) | 38.890 (21.230) | 2.888 (1.880) | 0.392 (1.923) | -2.495 (2.012) |
| Developing an oil field | 19.909 (13.055) | 21.498 (12.339) | 20.895 (13.975) | 1.589 (1.236) | 0.986 (1.298) | -0.603 (1.289) |
| Promoting the cattle industry | 18.589 (11.902) | 19.888 (14.267) | 17.995 (13.543) | 1.299 (1.273) | -0.594 (1.223) | -1.892 (1.357) |
| Preventing drug consumption | 13.847 (11.105) | 13.339 (9.169) | 12.716 (12.612) | -0.508 (0.993) | -1.130 (1.140) | -0.623 (1.080) |
| Environmental NGO | 945.442 (969.895) | 1,052.921 (1,022.108) | 887.233 (1,062.897) | 107.479 (97.550) | -58.209 (98.662) | -165.687 (102.799) |
| NGO dealing with poverty | 2,232.372 (1,365.490) | 2,202.010 (1,284.360) | 2,314.357 (1,536.051) | -30.362 (130.012) | 81.985 (140.900) | 112.347 (139.771) |
| NGO dealing with drug abuse | 1,822.186 (1,346.822) | 1,745.069 (1,282.358) | 1,798.410 (1,452.017) | -77.117 (128.952) | -23.777 (135.809) | 53.340 (135.160) |
| Global warming | 2.516 (0.974) | 2.554 (0.992) | 2.473 (0.964) | 0.038 (0.097) | -0.043 (0.095) | -0.081 (0.097) |
| Lack of information | 2.812 (1.052) | 2.584 (1.049) | 2.691 (1.005) | -0.228** (0.103) | -0.121 (0.100) | 0.107 (0.102) |
| Poverty | 1.732 (1.041) | 1.733 (1.016) | 1.720 (1.061) | 0.000 (0.101) | -0.013 (0.103) | -0.013 (0.103) |
| Drug consumption | 2.939 (1.000) | 3.129 (0.953) | 3.116 (0.963) | 0.190** (0.096) | 0.177* (0.096) | -0.013 (0.095) |
| Believes that G. Thunberg is not the granddaughter of G. Soros | -0.015 (0.920) | -0.025 (0.901) | -0.004 (0.897) | -0.010 (0.090) | 0.011 (0.089) | 0.022 (0.089) |
| Observations | 219 | 205 | 215 | 424 | 434 | 420 |

*** p<0.01, ** p<0.05, * p<0.1

Means of the original outcome variables for the three control groups. For columns (1)-(3) standard deviations reported in parentheses. For columns (4)-(6) standard errors from a t-test of equality of means reported in parentheses.