

9

Actively Open-Minded Thinking and Science Trust: Exploring Croatian Citizens' Views on Anthropogenic Climate Change and Scientific Consensus on the Issue

Marina Maglić

*The Institute of Social Sciences Ivo Pilar, Zagreb, Croatia
Marina.Maglic@pilar.hr*

Abstract

Despite the undeniable scientific consensus regarding the human impact on climate change (CC), research shows that public opinion varies, while digital media abound with information often contradicting scientific findings. In this study, I explore Croatian citizens' acceptance of anthropogenic CC and their perception of the scientific consensus from the dual-process perspective. Specifically, the primary focus of the study is on the predictive role of actively open-minded thinking (AOT) and science trust as its potential mediator. Additionally, the predictive effects of cognitive reflection and the mediating roles of political and general media trust are explored. Data were collected on a nationally representative sample based on age and gender quotas (N = 1528). The findings reveal that while a majority of citizens accept the reality of anthropogenic CC, many still perceive significant disagreement among scientists on the issue. In the tested structural equation models, AOT emerged as a significant positive predictor of acceptance of anthropogenic CC and a rather weak positive predictor of the scientific consensus on the issue. AOT also positively predicted trust in science and scientists, which partially mediated its effect on acceptance of anthropogenic CC, while there was little evidence for its mediation effect on the perception of scientific consensus. Additionally, media and science trust exhibited positive relationships, while political trust showed a negative relationship with the acceptance of anthropogenic CC. Overall, the findings highlight the importance of a tendency to think with an actively open mind and trust in science and scientists for the acceptance of anthropogenic CC.

Keywords: *climate change, actively open-minded thinking (AOT), cognitive reflection, science trust, Croatia*

Introduction

Climate change (CC) is a critical and urgent global challenge, posing significant risks to ecosystems, economies, and human societies. The overwhelming scientific consensus is that human activities have been the primary cause of changes in the Earth's climate since the mid-19th century, often referred to as anthropogenic climate change (Lynas et al., 2021; Myers et al., 2021). Despite the robust scientific evidence, public opinion on CC varies, and widespread misinformation in media has contributed to a gap between scientific understanding and public perception (e.g., see Lewandowsky et al., 2017). The persistence of CC scepticism and varying levels of public trust in science highlights the complexity of communicating climate science to the general public (e.g., Cologna et al., 2024). Namely, public trust in science, scientists, and other institutions responsible for communicating climate-related information, such as political institutions and the media, play a relevant role when considering public attitudes, beliefs, and risk perceptions regarding CC and support for environmental policies (Bogert et al., 2024; Fairbrother, 2017; Fawzi et al., 2021; Kulin & Johansson Sevä, 2021; Strömbäck et al., 2020; Tsfati et al., 2022).

However, even in areas where scientific consensus is unequivocal, such as CC, factors like scientific misconduct, alongside various conspiratorial narratives readily spread online, may erode confidence in scientific findings and foster scepticism. This is particularly concerning in regions like Croatia, which, as part of southern Europe and the Mediterranean region, is projected to be severely affected by CC, facing increased temperatures, more frequent and intense heatwaves, and a higher risk of droughts (European Environment Agency, 2017; Vitali Čepo, 2021).

Analytic Thinking, Trust, and Climate Change Beliefs from the Dual-Process Perspective

Understanding the beliefs of Croatian citizens regarding anthropogenic CC is critical for developing effective policies and interventions to mitigate and adapt to climate impacts. However, climate change beliefs are influenced by many psychological and societal factors and can be approached from many different perspectives and tested within different theoretical models. In this study, I set out to examine the beliefs of Croatian citizens towards CC, specifically their beliefs about the anthropogenic causes of CC and the scientific consensus on the issue from the dual-process perspective. I primarily focus on the propensity for actively open-minded thinking but also explore effects of cognitive reflection—the two indicators of analytic thinking that have been shown relevant when investigating rational judgments and decisions. Specifically, research has shown that individuals prone to analytic thinking, indexed by the Actively Open-Minded Thinking (AOT) Scale and Cognitive Reflection Test (CRT) are less prone to a wide range of epistemologically unfounded beliefs, such as paranormal and superstitious beliefs, various unscientific beliefs (e.g., rejection of evolutionary theory and climate change, acceptance of alternative and complementary medicine), so-called pseudo-profound bullshit, conspiratorial beliefs, and believing fake news (e.g., Binnendyk & Pennycook, 2022; Bronstein et al., 2019; Bowes et al., 2023; Mirhoseini et al., 2023; Pennycook et al., 2015c; Pennycook et al., 2020; for a review see Pennycook et al., 2015a; Stanovich et al., 2016).

Within the dual-process framework, thinking and reasoning critically about a complex issue such as CC is an example of judgment under uncertainty (Pennycook, 2023). Within this framework, the AOT and CRT as indicators of individual differences in analytical thinking have proven particularly valuable in investigating variations in rationality and the quality of thinking and decision-making. According to the *three-stage dual-process model* (Pennycook, 2023; Pennycook et al., 2015b; see also Stanovich, 2011; Stano-

vich et al., 2016), reasoning errors can occur at any stage of reasoning, either due to faulty intuitions or unsuccessful engagement of analytic reasoning. When it comes to the failure to engage in analytical reasoning, there are two pathways of cognitive miserliness. The first one is failing to recognise the need to engage in analytical reasoning. The second one is engaging in analytical thinking upon detecting a conflict, but not to an extent that facilitates accuracy (cognitive decoupling). Instead, it is applied merely to rationalise the intuitive response (see also, e.g., Cushman, 2020; Mercier & Sperber, 2017, for a discussion on the rational function of rationalisation). Theoretically, the CRT and AOT could tap tendencies towards cognitive miserliness at different levels of processing.

Actively open-minded thinking, measured by the AOT scale, is a disposition pertaining not only to the amount of thinking but also to its quality and direction (Baron, 2019; Baron et al., 2023), and it may serve a protective function against various biases and errors in judgment, particularly overconfidence and biases favouring one's own side. It represents a broad thinking disposition, encompassing reflectiveness, an active inclination to seek out and weigh new evidence (including the perspectives of others) against own preferred or prevailing opinions, and a willingness to update beliefs when faced with new or contradictory evidence (Baron, 2019; Baron et al., 2015; Haran et al., 2013; Stanovich et al., 2016). Hence, AOT as a cognitive style is open because it involves treating information and evidence fairly, as well as active because it requires an intentional search for alternatives (Baron, 2019).

Furthermore, AOT serves as a latent prescriptive norm for "good thinking", indicating how to approach and process information and evidence, evaluate their quality, and assess the credibility of sources (Baron, 2019; Baron et al., 2023). In this way, AOT provides standards for evaluating the reasoning of others, particularly the trustworthiness and reliability of sources that present themselves as authorities on the issue (Baron, 2019; Baron et al., 2023; see also Cohen et al., 2022). Thus, AOT is not just sceptical thinking; it includes recognising situations where trust in others (e.g., experts) is justified by seeking out cues that individuals or organisations who are able to provide information also adhere to principles of open-minded thinking. This means individuals do not always have to investigate every piece of information themselves, especially in areas where they lack knowledge or expertise, if they know that credible experts have already done so (Baron, 2019).

In other words, AOT pertains to the principles of sound reasoning and decision making (Baron, 2019; Baron et al., 2023; Pennycook et al., 2020). According to Stanovich and Toplak (2023), AOT should capture the analytical processes of cognitive decoupling and decontextualisation required in hypothetical reasoning. Consequently, individuals prone to AOT are more adept at fairly evaluating evidence, situations, and source trustworthiness. Thus, in addition to self-directed, evidence-based reasoning and belief formation, AOT encompasses evaluating the reasoning of others against the standards of "good thinking", including the credibility and expertise of different sources.

Thus, in the context of reasoning about climate change, exposed to vast amounts of information and misinformation from different sources, individuals high in AOT would be more likely to critically assess evidence and recognise more credible sources of information.

On the other hand, cognitive reflection, measured with the Cognitive Reflection Test (CRT), is the ability and disposition to override a predominant intuitive but incorrect response and engage in further reflection, leading to the correct response (Frederick, 2005). The CRT is thus often viewed as a promising measure of overcoming cognitive miserliness (Stanovich et al., 2016). A key characteristic of the CRT, according to Baron (Baron, 2019; Baron et al., 2023), is a stable disposition towards allocating time to careful deliberation (i.e., the amount of thinking), to which he refers as the reflectiveness/impulsivity tendency (but see De Neys, 2014; Bago & De Neys, 2020, for a discussion of logical intuitions and Stanovich, 2018 for a discussion on mindware). In the context of reasoning about climate change, ability and tendency to engage in deliberative reasoning could be particularly relevant when misinformation is present.

Current Study

The objective of this study was to explore Croatian citizens' views on anthropogenic climate change and the scientific consensus on the issue from a dual-process perspective. Specifically, the study focuses on the predictive role of analytic thinking—primarily AOT—and trust in science and scientists as its potential mediator.

Drawing from the presented theoretical and empirical foundations, several hypotheses can be proposed.

Given that the CRT and AOT have been linked to a wide range of beliefs and behaviours in everyday life, individuals who exhibit higher levels of analytic thinking would be more likely to accept the anthropogenic causes of CC and the scientific consensus on the issue, as they may be better equipped to navigate (mis)information and arrive at evidence-based conclusions. Thus, the first hypothesis was that the AOT would positively predict acceptance of anthropogenic CC (H1a) and scientific consensus on the issue (H1b). Also, the CRT would positively predict acceptance of anthropogenic CC (H2a) and scientific consensus on the issue (H2b).

More importantly, since scientific research can provide most reliable systematic evidence on the causes of CC, individuals higher in AOT would more easily identify credible sources regarding CC and, in turn, place greater trust in them (H3).

Furthermore, since the scientific consensus on the issue of anthropogenic CC is unequivocal, which scientists have been consistently messaging, trust in science and scientists would be positively associated with the acceptance of anthropogenic CC (H4a) and of the scientific consensus (H4b).

And finally, in addition to its direct effect, the hypothesis was that the AOT would indirectly—via science trust—predict acceptance of anthropogenic CC (H5a) and scientific consensus (H5b). Additionally, I explore the indirect effect of the CRT, via science trust.

Regarding the other two dimensions of institutional trust, I adopted an exploratory approach. General media trust, trust in science and scientists, and political trust were entered simultaneously in the SEM with freed covariances, as these three dimensions of institutional trust are intertwined yet distinct. While they collectively shape individuals' perceptions of institutional credibility and the flow of information in society, each dimension represents a unique source of trust with potentially different implications for belief formation and information processing (see, e.g., de Zúñiga et al., 2019; Fawzi et al., 2021; Ladd, 2012; Nisbet et al., 2015; Pechar et al., 2018; Shehata & Strömbäck, 2021; Tsfati & Cappella, 2003; Tsfati et al., 2022; Verboord et al., 2023).

The issue of anthropogenic CC is not politicised in Croatian public discourse, and the vast majority of political actors do not abuse it in their political agendas. Instead, they typically nominally acknowledge it while prioritising many other issues as the most pressing national challenges. Furthermore, political trust in Croatia has been at low levels (e.g., Franc et al., 2020; Maglić, 2023b). Thus, I explore whether a higher level of political trust would predict acceptance of anthropogenic CC and scientific consensus.

Most (mainstream) media in Croatia is, for the most part, reliably reporting the anthropogenic CC evidence and scientific consensus, although various fringe media outlets abound with misinformation, including CC (Broz, 2024). Also, Croatian citizens perceive that they are exposed to disinformation and fake news close to the average European citizen (European Commission, Secretariat-General, 2023, p. 35). By using a general media trust measure, I explore whether a higher level of media trust would predict acceptance of anthropogenic CC and scientific consensus.

Additionally, I explore the indirect effects of the AOT and CRT, via political trust and media trust, on acceptance of anthropogenic CC and scientific consensus.

Method

Participants and Procedure

The participants were recruited into the study through Talk Online Panel with the goal of obtaining a quota representative sample regarding sex, age, and place of residence of adult citizens of the Republic of Croatia (> 18 years; for more details see Maglič, 2023a). The data were collected in December 2021 and January 2022 with the approval of ethics committees of the Department of Psychology at the Faculty of Humanities and Social Sciences, University of Zagreb, and the Institute of Social Sciences Ivo Pilar.

Of 1584 participants whose data were available in the initial cleaned dataset (for details see Maglič, 2023a), I used the data from 1528 ($M_{age} = 47$, median = 48, $SD_{age} = 15.23$, range: 18-85; 52% females) individuals who responded to all the relevant items.

Measures

Climate Change Beliefs

Climate change beliefs were measured with five items—four items relate to the *causes of CC*, and the final one relates to the *perception of scientific consensus on anthropogenic CC* (see Figure 1 and <https://osf.io/2yndf/>). The response scale ranged from 1 (*do not agree at all*) to 6 (*completely agree*), and the items were recoded such that higher scores indicate a more proscience position. A unidimensional CFA model of the beliefs regarding the causes of CC (four items) was tested, and it displayed a very good fit (robust RMSEA = .039, 90% CI [0, .080], robust CFI = .997, SRMR = .013) and acceptable reliability ($\omega = .75$; for further details, see <https://osf.io/2yndf/>).

Measures of Analytic Thinking

The dispositional tendency to think with an actively open mind about evidence was measured with an eight-item version of the Actively Open-Minded Thinking (AOT) Scale (items taken from Baron, 2019; Baron et al., 2015; Haran et al., 2013; Bronstein et al., 2019). The response scale ranged from 1 (*do not agree at all*) to 6 (*completely agree*), and the items were recoded such that higher scores indicate higher levels of the measured concept. In this study, a unidimensional CFA model of the open-minded thinking disposition was tested, with freed covariances for the items reversed in the direction of less openness (i.e., closed-mindedness). The overall CFA model displayed a very good fit (robust RMSEA = .057, 90% CI [.045, .069], robust CFI = .964, SRMR = .035), although the scale exhibited a lower level of reliability ($\omega = .65$; for further details, see <https://osf.io/2yndf/>).

As a performance-based measure of the ability and disposition to engage in analytic thinking, an eight-item version of the Cognitive Reflection Test (CRT) was used, based on the three original items (Frederick, 2005) and items taken from the research by Primi et al. (2016), Toplak et al. (2014), Thomson and Oppenheimer (2016), and Oldrati et al. (2016). The correct answers were coded as 1, while incorrect (both intuitive and all other) responses were coded as 0. In this study, a unitary latent factor of cognitive reflection was extracted with the overall CFA model displaying a very good fit (scaled RMSEA = .045, 90% CI [.035, .055], scaled CFI = .989, SRMR = .045) and reliability ($\omega = .81$; for further details, see <https://osf.io/2yndf/>).

Institutional Trust

Trust in political institutions was measured by asking the participants whether they trusted: the Croatian government; politicians; the Croatian parliament ($\omega = .90$; for further details, see <https://osf.io/2yndf/>).

Trust in science and scientists was measured by simply asking the participants whether they trusted science and scientists.

General media trust was measured by simply asking the participants whether they trusted the media.

The response scale for all the institutional trust items ranged from 0 (*do not trust at all*) to 6 (*trust completely*), and all the responses were coded such that higher scores indicate higher levels of the measured concept.

Control Variables

Sociopolitical orientation was measured with a single item—the participant's self-placement on a continuum ranging from (1) *very left/liberal* to (7) *very right/conservative*.

Religiosity was also measured using a single-item measure taken from the European Social Survey (2018): "*Regardless of whether you belong to a particular religion, how religious would you say you are?*" (0 = *not at all religious*; 10 = *very religious*).

Sociodemographic variables, specifically age, sex, educational level, income, and size of place of residence, were also entered as control factors in the analyses.

Analytic Strategy

All analyses were performed in *R* (available at <https://osf.io/2yndf/>), dominantly using packages *lavaan* (Rosseel, 2012), *semTools* (Jorgensen et al., 2022), *psych* (Revelle, 2023), *ggplot2* (Wickham, 2016), and *semPlot* (Epskamp, 2022).

Hypotheses testing was based on structural equation modelling. In the first, base SEM model, the CRT and AOT were tested as predictors of anthropogenic CC beliefs and the perception of scientific consensus on anthropogenic CC, with sociodemographic variables, religiosity, and sociopolitical orientation included as control variables. Next, to test the indirect effects of the AOT via science trust and explore other mediation effects, the SEM mediation model was constructed (with sociodemographic variables, religiosity, and sociopolitical orientation included as controls).

Results

Firstly, basic descriptive statistics and the (model-implied) correlations of all variables are presented, followed by results from testing the two SEM models.

Descriptive statistics and intercorrelations of all variables are shown in Table 1, and participant agreement with each CC statement in Figure 1. Citizens mostly agreed that the average global temperature has been continuously rising since the Industrial Revolution, that human activity is the primary cause of global warming, and that human-caused CC will increase the frequency of hurricanes, floods, and droughts, and they somewhat disagree that all recent CC is primarily caused by the Sun. Yet, they, on average, somewhat agreed that there is significant disagreement among scientists about whether CC is primarily caused by human activities (for the frequency distribution of the responses to each item, see Figure 1). Additionally,

Croatian citizens, on average, expressed relatively low levels of trust in political institutions and general media trust, and relatively high in science and scientists (Table 1).

Figure 1
Participant agreement with CC statements—four regarding anthropogenic CC beliefs and one regarding the perception of scientific consensus on the issue

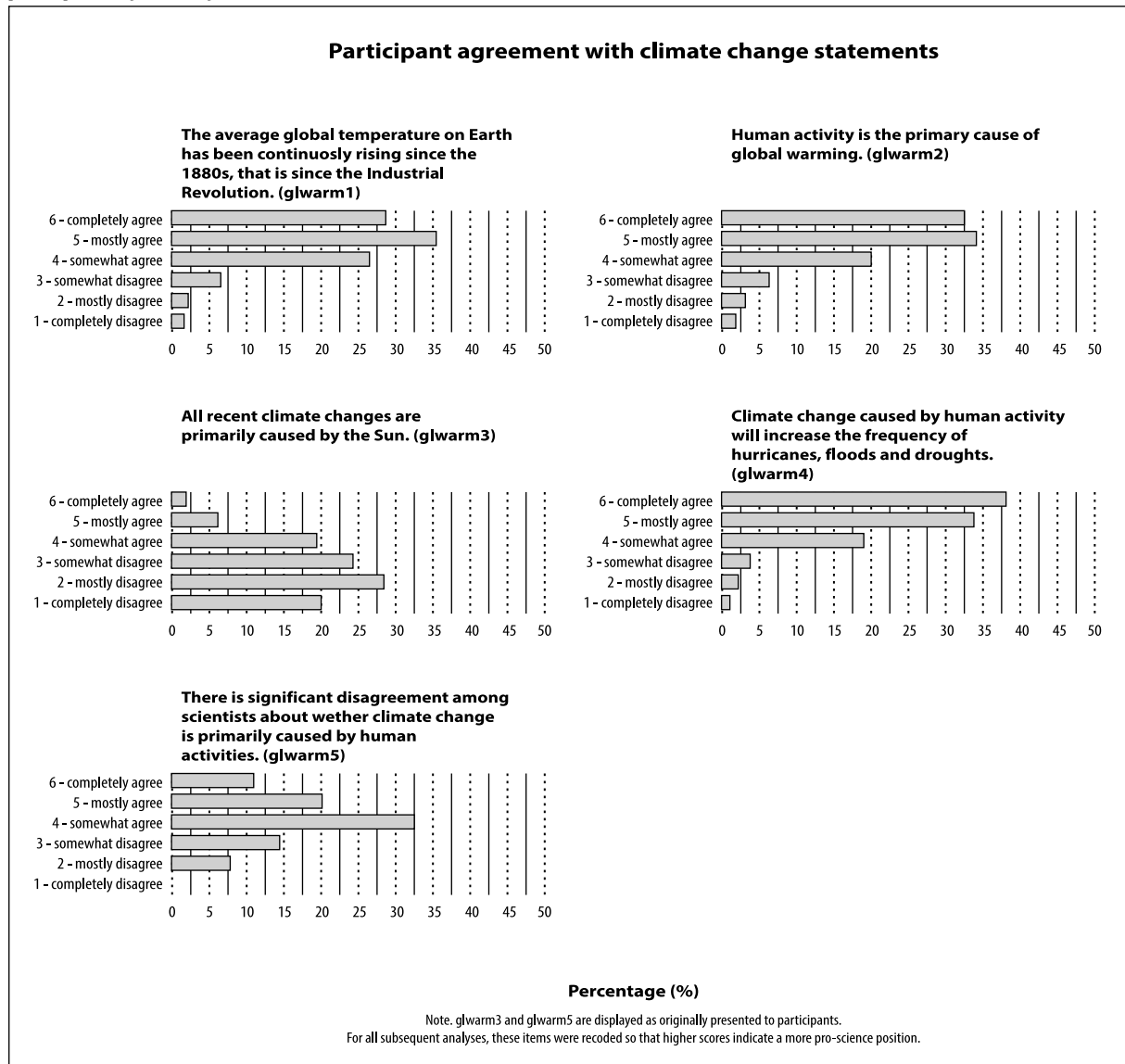


Table 1
Descriptive data and model-implied correlations between all variables

	M	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
(1) GL_warm	-	-	1																				
(2) glwarm1	4.78	1.08	.72	1																			
(3) glwarm2	4.82	1.18	.72	.52	1																		
(4) glwarm3 (R)	4.32	1.25	.80	.58	.58	1																	
(5) glwarm4	4.98	1.09	.36	.26	.26	.29	1																
(6) glwarm5 (R)	3.25	1.41	.19*	.14	.14	.16	.07	1															
(7) AOT	-	-	.26*	.19	.19	.21	.09	.14*	1														
(8) CRT	-	-	.02	.01	.01	.02	.01	.13*	.38*	1													
(9) science and scientists	4.2	1.42	.30*	.22	.22	.24	.11	.13*	.32*	.19*	1												
(10) polit_TR	-	-	-.05	-.04	-.04	-.04	-.02	.02	-.02	.02	.31*	1											
(11) politicians	0.75	1.08	-.04	-.03	-.03	-.03	-.01	.01	-.02	.02	.23	.76	1										
(12) government	1.28	1.48	-.04	-.03	-.03	-.04	-.02	.01	-.02	.02	.27	.88	.67	1									
(13) parliament	1.13	1.31	-.05	-.03	-.03	-.04	-.02	.01	-.02	.02	.28	.91	.69	.80	1								
(14) media	1.7	1.39	.15*	.11	.11	.12	.05	.08*	.01	.01	.34*	.47*	.35	.41	.42	1							
(15) PolitID	3.45	1.3	-.19*	-.14	-.14	-.15	-.07	-.08*	-.22*	-.08*	-.15*	.19*	.15	.17	.18	-.16*	1						
(16) religiosity	4.67	3.02	-.10*	-.07	-.07	-.08	-.04	-.13*	-.27*	-.19*	-.14*	.18*	.13	.15	.16	-.03	.43*	1					
(17) sex	1.48	0.5	-.08*	-.06	-.06	-.07	-.03	.01	.05	.30*	<.01	.05	.04	.05	.05	.01	.09*	-.13*	1				
(18) age	47.39	15.23	-.02	-.02	-.02	-.02	-.01	-.03	.02	-.05	.12*	.08*	.06	.07	.07	.13*	-.10*	-.07*	.12*	1			
(19) education	4.78	1.04	.08*	.05	.05	.06	.03	.07*	.19*	.22*	.17*	.02	.02	.02	.02	.02	-.08*	-.01*	-.06	-.01	1		
(20) income	3.86	1.69	.06*	.04	.04	.05	.02	.06*	.15*	.17*	.09*	.02	.02	.02	.02	-.03	.02	-.01	.22*	-.02	.38*	1	
(21) citysize	3.47	1.47	.03	.02	.02	.03	.01	.07*	.09*	.05	.06*	-.03	-.02	-.03	-.03	.03	-.12*	-.10*	-.02	.03	.16*	.12*	1

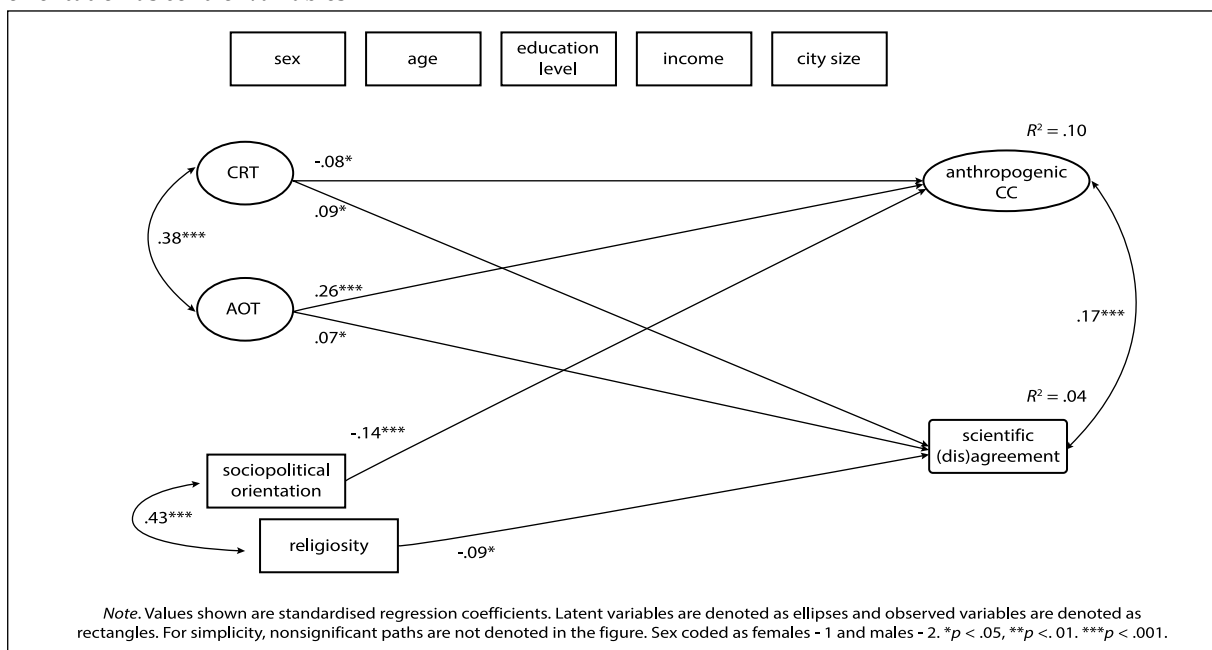
Note. Note. glwarm1-glwarm4 = anthropogenic causes of CC items; glwarm5 = perception of scientific consensus; polit_TR = trust in political institutions; PolitID = sociopolitical orientation, sex coded as females=1 and males=2, citysize = size of place of residence. (R) denotes a reverse-coded item. All $|r| \geq .07$ significant at $p < .05$ and denoted with *. For observed indicators (glwarm1—glwarm4, politicians, government, parliament), correlations were constrained by factor loadings, preventing standard error estimation using the robust WLSMV estimator. Consequently, p-values for these correlations were not computed.

In the next step, using structural equation modelling, the CRT and AOT were tested as predictors of anthropogenic CC beliefs and the perception of scientific consensus on anthropogenic CC, with sociodemographic variables, religiosity, and sociopolitical orientation included as control variables. This base model¹ exhibited an acceptable fit (scaled RMSEA = .042, 90% CI [.040, .045], scaled CFI = .913, SRMR = .044). The AOT emerged as the strongest positive predictor of the acceptance of anthropogenic CC, yet a rather weak positive predictor of the perception of the scientific consensus on CC (Figure 2). The effects of the CRT, over and above the effects of the AOT, were generally rather weak and interestingly in the opposite direction of what was expected in the case of the perception of the scientific consensus (Figure 2).

Among the control variables, sociopolitical orientation exhibited a statistically significant negative relationship with the acceptance of anthropogenic CC, with left/liberal-leaning individuals being more inclined to accept anthropogenic CC. Religiosity exhibited a statistically significant (though weak) negative relationship with the perception of the scientific (dis)agreement, with more religious individuals being somewhat more likely to believe in the lack of scientific consensus on anthropogenic CC. Basic sociodemographic characteristics did not exhibit statistically significant relationships with either of the outcome variables.

Figure 2

Structural equation model of the CRT and AOT predicting anthropogenic CC beliefs and the perception of scientific consensus on anthropogenic CC, with sociodemographic variables, religiosity, and sociopolitical orientation as control variables



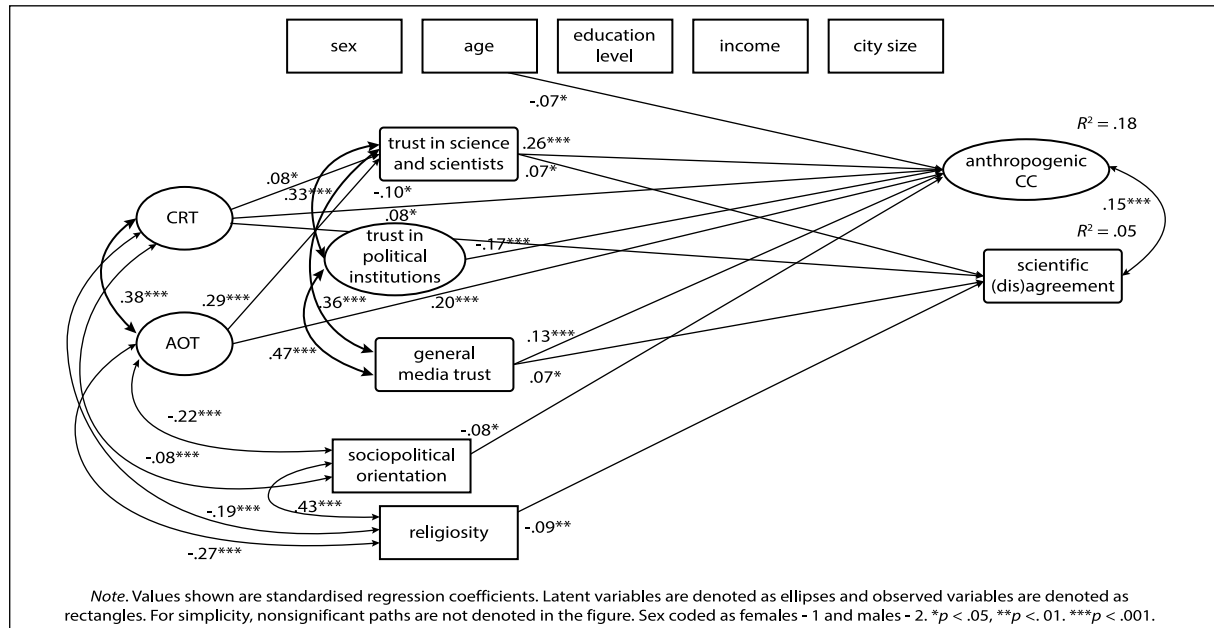
In the next model, the mediating role of different dimensions of institutional trust was tested (Figure 3). The model² achieved an adequate fit (scaled RMSEA = .037, 90% CI [.035, .040], scaled CFI = .917, SRMR = .041) and overall explained 18% of the variance in anthropogenic CC beliefs and only a negligible portion (5%) of the variance in perceptions of scientific (dis)agreement on the issue. The results demonstrate that the effect of the AOT on the acceptance of anthropogenic CC was partially mediated by higher science trust (25% of the total effect, with 71% attributed to the direct effect), while the effects of the CRT were generally relatively weak, and interestingly in the opposite direction of what was expected in the case

¹ The robust WLSMV (weighted least squares means and variance adjusted) method of diagonally weighted least squares was used to estimate the parameters, suitable for modelling categorical or ordinal data (Beauducel & Herzberg, 2006; Li, 2016).

² The robust WLSMV (weighted least squares means and variance adjusted) method of diagonally weighted least squares was used to estimate the parameters, suitable for modelling categorical or ordinal data (Beauducel & Herzberg, 2006; Li, 2016).

Figure 3

Structural equation modelling of political trust, trust in science and scientists, and general media trust as mediators of the relationship of the AOT and CRT with anthropogenic CC beliefs and the perception of scientific consensus on anthropogenic CC



of the perception of the scientific consensus (Figure 3 and Table 2).

Beyond their mediating roles, science and media trust exhibited positive relationships, while political trust showed a negative relationship with the acceptance of anthropogenic CC (Figure 3). The relationships of science trust and media trust on the perception of scientific consensus on anthropogenic CC also were statistically significant and positive (though rather weak) (Figure 3).

Table 2

Estimation of indirect and total effects

Estimation of indirect and total effects	<i>b</i>	<i>SE</i>	<i>z</i> -value	<i>p</i>	β
AOT → science → anthropogenic CC	0.09	0.01	6.36	< .001	.07
AOT → political → anthropogenic CC	0.01	0.01	0.99	.324	.01
AOT → media → anthropogenic CC	0.001	0.01	0.27	.791	.001
Total AOT effect on acceptance of anthropogenic CC	0.34	0.05	7.58	< .001	.28
AOT → science → scientific disagreement	0.04	0.02	2.36	.018	.02
AOT → political → scientific disagreement	0.001	0.003	0.44	.659	.001
AOT → media → scientific disagreement on CC	0.001	0.005	0.27	.791	.001
Total AOT effect on scientific disagreement on CC	0.16	0.07	2.28	.023	.07
CRT → science → anthropogenic CC	0.02	0.01	2.42	.015	.02
CRT → political → anthropogenic CC	-0.01	0.01	-0.93	.355	-.01
CRT → media → anthropogenic CC	< 0.001	0.004	0.08	.938	< .001
Total CRT effect on acceptance of anthropogenic CC	-0.08	0.04	-2.05	.040	-.08
CRT → science → scientific disagreement	0.01	0.01	1.72	.085	.01
CRT → political → scientific disagreement	-0.001	0.002	-0.44	.663	-.001
CRT → media → scientific disagreement	< 0.001	0.004	0.08	.938	< .001
Total CRT effect on scientific disagreement on CC	0.15	0.06	2.37	.018	.09

Among the control variables, sociopolitical orientation exhibited as a statistically significant negative (though rather weak) relationship with the acceptance of anthropogenic CC, while religiosity exhibited a statistically significant (though weak) negative relationship with the perception of the scientific consensus on CC (Figure 3). Basic sociodemographic characteristics (except for age in the case of anthropogenic CC beliefs) did not exhibit statistically significant relationships with either of the outcome variables (Figure 3).

Discussion

The good thing is, as the results of this study suggest, that Croatian citizens do seem to acknowledge that human activity is the primary cause of recent CC. Cumulatively, just over 88% of them agree to some degree that human activity is the primary cause of global warming. Moreover, more than 90% agree that human-caused CC will increase the frequency of hurricanes, floods, and droughts and that the average global temperature has been continuously rising since the Industrial Revolution. Additionally, almost 73% of them disagree that all recent CC is primarily caused by the Sun (see Figure 1 and <https://osf.io/2yndf/>). These findings, combined with other data suggesting that Croatian citizens generally perceive CC as a serious problem (e.g., European Commission, 2019, 2021; Pavlović et al., in press), are encouraging.

On the other hand, we can observe the results from a different angle—around 10% of citizens are sceptical to some extent about human influence on CC. Also, other findings suggest that (Cik, 2021; Pavlović et al., in press) Croatian citizens (similar to the average European citizen) are uncertain about the anthropogenic causes of CC versus the natural processes, when the two are pitted against each other. Moreover, the results of this study show that 63% of them perceive that there is significant disagreement among scientists on the issue of anthropogenic CC, highlighting a potential gap in public understanding of scientific consensus. As noted in the introduction and evidenced by relatively weak (to medium, see Funder & Ozer, 2019; Gignac & Szodorai, 2016) associations with political orientation and religiosity, it is fortunate that the issue of CC is not greatly politicised in Croatian public discourse³. However, as already noted, Croatian citizens do not live in a vacuum; they are exposed to vast amounts of information and misinformation, both locally and globally. Thus, under certain circumstances, CC could become an ideologically divisive issue, for example, by framing it as an issue of economic growth versus care for the environment.

Furthermore, although Croatian citizens take issues of CC and environmental care seriously (e.g., Pavlović et al., in press), other findings show that other societal concerns often take precedence, such as economy, healthcare, poverty, crime, and alike (e.g., Cik, 2021). This suggests that they may fail to see the interconnectedness and complexity of these issues or the far-reaching consequences of CC. Additionally, research also indicates that Croatian citizens express relatively low personal responsibility for mitigating CC (Pavlović et al., in press). In interpreting these findings, institutional trust should also be considered. While Croatian citizens express relatively high trust in science and scientists (see also Tonković et al., 2023; Verboord et al., 2023), research consistently shows low levels of trust in political institutions (e.g., Franc et al., 2020; Maglić, 2023b). Given that CC mitigation requires coordinated structural changes, it is unreasonable to expect it to be tackled effectively solely at the national level, let alone at the individual level (e.g., reducing personal carbon footprints, recycling). In this context, political distrust could pose a significant obstacle—if political institutions lack credibility, citizens may be less willing to support or comply with climate policies and may even resist them, perceiving them as unfair, ineffective, or motivated by ulterior interests.

³ Especially compared to the effect of political orientation on anthropogenic CC beliefs typically observed on participants from the USA (e.g., Drummond & Fischhoff, 2017; Pennycook et al., 2020, 2023).

Concerning the role of analytical thinking, the main findings of the present research highlight the importance of an AOT disposition for understanding beliefs about the causes of CC.

The results of the first tested model (nominally) confirmed three out of the four hypotheses. Specifically, the AOT was shown to be a positive predictor of acceptance of anthropogenic CC (H1a) and the perception of scientific consensus on the issue (H1b), although the effect on the latter was rather weak. The effect of the CRT was also weak and in line with the expectation in the case of the perception of scientific consensus on anthropogenic CC (H2b). However, in the case of acceptance of anthropogenic CC, the CRT exhibited a weak predictive effect but *in the opposite direction* than what was hypothesised (H2a).

Here, it is important to note several things. Firstly, the two outcome measures differ in the number of manifest variables used to measure them. Specifically, acceptance of anthropogenic CC is measured using a four-item scale, whereas perception of scientific consensus on anthropogenic CC is assessed using a single-item measure. Although it is not uncommon that single-item measures are used to tap CC beliefs (e.g., Drummond & Fischhoff, 2017; Pennycook et al., 2020, 2023), this may have contributed to the observed differences in the predictive effects of the AOT on the two outcome variables. Also, the relationship of the two outcome variables could be tested within different models, such as the Gateway Belief Model (see Van der Linden, 2021), which postulates perceived consensus on CC as an antecedent of CC beliefs (and support for public action).

Furthermore, as mentioned in the introduction, both the CRT and AOT, as indicators of analytic thinking, have been shown to predict lower susceptibility to a wide range of epistemologically unfounded beliefs. The two measures—a performance-based and a self-assessment measure—although moderately to strongly correlated (e.g., Bronstein et al., 2019; Haran et al., 2013; Pennycook et al., 2022)—could also be capturing different aspects of analytic reasoning. Namely, the established difference in the predictive effect of the AOT and CRT could be due to the AOT tapping not only the quantity, but also the quality of thinking, while the CRT capturing (in addition to cognitive capacity) a reflectiveness/impulsivity disposition (Baron, 2019; Baron et al., 2015, 2023; see also Erceg et al., 2020; and Bago & De Neys, 2020; Raelison et al., 2020 for a discussion of logical intuitions).

Regarding the weak predictive effect of the CRT on acceptance of anthropogenic CC, which is in the opposite direction of what was hypothesised (H2a), this does not imply that cognitive reflection inherently reduces acceptance of anthropogenic CC. Instead, it might reflect its complex relationship with the AOT and their shared variance. Namely, the CRT shows negligible bivariate correlation with acceptance of anthropogenic CC (Table 1), but when the CRT and AOT are entered together in the model (Figure 2), the CRT becomes a negative (albeit weak) predictor of anthropogenic CC, and a positive (albeit weak) predictor of the perception of scientific consensus. This suggests a potential suppressor effect⁴, which should be explored in future research more fully.

Furthermore, the AOT was expected to positively predict trust in science and scientists and, by extension, CC beliefs, which was tested in the mediation model. Given that the AOT reflects principles of sound reasoning and decision-making (Baron, 2019; Baron et al., 2023; Pennycook et al., 2020), individuals with higher AOT tendencies should be more adept at fairly evaluating evidence and assessing the trustworthiness of information sources. In line with H3, the results show that individuals higher in AOT place greater trust in science and scientists (possibly because they could more easily identify more credible sources regarding a scientific issue). At the same time, in line with H4a, science trust is confirmed as a positive predictor of the acceptance of anthropogenic CC but a rather weak positive predictor of the perception of scientific con-

⁴ Additional analyses (<https://osf.io/2yndf/>) showed that when the CRT is entered in the model as the sole predictor, its predictive effects on the acceptance of anthropogenic CC are negligible, while its effect on the perception of scientific consensus is positive. When only the AOT is entered in the model as the sole predictor of the two outcomes, its predictive effects on the two outcomes are positive, albeit weaker in the case of the perception of scientific consensus.

sensus (H4b). Thus, higher trust in science and scientists, who have been in the vast majority consistently messaging overwhelming evidence of anthropogenic CC, is positively associated with the acceptance of anthropogenic CC (see for example Bogert et al., 2024), yet weakly with the perception of scientific consensus.

Finally, consistent with H5a, the results confirmed that science trust partially mediated the effect of the AOT on acceptance of anthropogenic CC (see also Cohen et al., 2022). However, the indirect effect of the AOT via science trust, although statistically significant, was negligible (H5b) and the total effect was rather weak. In addition to the already mentioned limitation of using a single-item measure as the outcome variable of the perception of scientific consensus, it is important to note further limitations. Specifically, the item on scientific consensus itself was not completely explicit about which scientists, i.e., the precise fields scientists who disagree belong to, which could have led the respondents to interpret the item differently. Also, science trust was measured with a single item that conflates trust in science with trust in scientists, which may have also introduced noise. Otherwise, the weak predictive effects of the AOT might be (partially) due to individuals high in AOT expect scientists, especially from different domains, to disagree as part of the usual scientific process, i.e., may value scientific disagreement (to an extent) as normative. This perspective could lead them to underestimate the degree of consensus on CC, even when it exists. For these individuals, the perceived consensus among scientists, possibly from different scientific domains, might signal dogmatism rather than robust agreement, attenuating the predictive power of the AOT.

Regarding the exploratory part of the study related to the role of two other dimensions of institutional trust, the results showed that media trust is a positive independent predictor of both acceptance of anthropogenic CC and the perception of scientific consensus. This effect was similar to that of science trust, although weaker in the case of acceptance of anthropogenic CC. Again, using a single-item measure in the case of media trust is far from optimal since different media sources vary in their credibility which should be addressed in future research.

Research generally suggests a positive relationship between political trust and CC concern, as well as support for various climate and environmental policies (e.g., Ejaz et al., 2024; Fairbrother et al., 2021; Kulin & Johansson Sevä, 2021; see also Fairbrother et al., 2019). In this study, however, political trust, though not related to anthropogenic CC belief on a bivariate level (Table 1), was predictive of lower acceptance of anthropogenic CC in the mediation model (Figure 3). This might suggest a potential suppressor effect⁵, which should again be explored in future research more fully. But overall, the results show that the three dimensions are related to each other, sharing a common variance, but differentially predict CC beliefs. When controlling for this shared institutional variance, political trust reveals a negative relationship with the acceptance of anthropogenic CC. In this context, individuals who show higher levels of political trust are more likely to disagree that anthropogenic CC is happening. One can only speculate why this might be the case in the Croatian context. A right-wing coalition (in differing compositions) led by the HDZ has been governing Croatia since 2016. Although the government nominally acknowledges anthropogenic CC, it often promotes narratives tied to national, conservative, and nationalistic interests, thus implicitly downplaying the climate crisis as a global challenge, secondary to domestic issues (or even as an agenda imposed by external actors, e.g., the European Union). Consequently, for citizens who trust these institutions, this may contribute to CC scepticism. This is, clearly, just one tentative possibility, which could be further explored by testing whether ideological alignment moderates the relationship between political trust and CC scepticism (see also Fairbrother et al., 2019 for an interaction effect of political trust CC beliefs on a climate policy support).

Finally, additional limitations of this study should be explicitly mentioned and considered when

⁵ Additional analyses (<https://osf.io/2yndf/>) showed that when political trust is entered in the model as the sole predictor, its predictive effects on the two outcome variables are negligible. However, when either of the two other dimensions of institutional trust were entered in the model alongside political trust as predictors of the two outcomes, the predictive effect of political trust on acceptance of anthropogenic CC became negative.

interpreting the results. Firstly, the study carries all the limitations of a correlational cross-sectional design, which does not allow for causal conclusions about the observed relationships. Secondly, within the dual-process framework, other measures of cognitive sophistication, such as cognitive abilities, different cognitive styles, scientific reasoning and scientific literacy, conspiracy beliefs, and other measures of contaminated mindware (see Rizeq et al., 2021) and their interplay could play a significant role when considering CC beliefs. Additionally, as mentioned, one of the outcome variables, i.e., perception of scientific consensus, and constructs of media and science trust, were measured using single-item measures, which may not fully capture their complexity and multidimensionality and might even introduce noise due to lack of specificity.

Conclusion

A substantial majority of Croatian citizens accept that human activities are the primary cause of recent CC. At the same time, 63% of individuals still believe, to some extent, there is significant disagreement among scientists on this issue.

In the tested SEM models, the AOT emerged as one of the strongest positive predictors of pro-scientific beliefs towards CC, highlighting its role in fostering evidence-based beliefs. The AOT also predicted science trust, which partially mediated its effect on CC beliefs. However, the effects of the AOT on perceiving the scientific consensus on anthropogenic CC were rather weak with little evidence of mediation via trust in science and scientists. In contrast, the CRT showed weak and less consistent effects on CC beliefs compared to the AOT.

Science trust exhibited a positive relationship with pro-scientific CC beliefs. Media trust showed a modest positive relationship, while political trust was negatively linked to the acceptance of anthropogenic CC. The relationships between each of the three dimensions of institutional trust and the perception of scientific consensus on anthropogenic CC were very small to negligible.

Acknowledgments

This research was carried out as part of the project “DISINFO KLIMA”, funded by European Union programme NextGeneration EU (01/108-73/23_2519-6) and based on data collected within a doctoral dissertation supported by the Excellence Scholarship from the Faculty of Humanities and Social Sciences, University of Zagreb.

References

- Bago, B., & De Neys, W. (2020). Advancing the specification of dual process models of higher cognition: A critical test of the hybrid model view. *Thinking & Reasoning, 26*(1), 1–30. <https://doi.org/10.1080/13546783.2018.1552194>
- Baron, J. (2019). Actively open-minded thinking in politics. *Cognition, 188*, 8–18. <https://doi.org/10.1016/j.cognition.2018.10.004>
- Baron, J., Isler, O., & Yilmaz, O. (2023). Actively open-minded thinking and the political effects of its absence. U: V. C., Ottati I C., Stern (ur.), *Divided: Open-mindedness and dogmatism in a polarized world* (str. 162–182). Oxford University Press. <https://doi.org/10.1093/oso/9780197655467.001.0001>
- Baron, J., Scott, S., Fincher, K., & Metz, S. E. (2015). Why does the Cognitive Reflection Test (sometimes) predict utilitarian moral judgment (and other things)? *Journal of Applied Research in Memory and Cognition, 4*(3), 265–284. <https://doi.org/10.1016/j.jarmac.2014.09.003>
- Beauducel, A., & Herzberg, P. Y. (2006). On the performance of maximum likelihood versus means and variance adjusted weighted least squares estimation in CFA. *Structural Equation Modeling, 13*(2), 186–203. https://doi.org/10.1207/s15328007sem1302_2
- Binnendyk, J., & Pennycook, G. (2022). Intuition, reason, and conspiracy beliefs. *Current Opinion in Psychology, 47*, 101387. <https://doi.org/10.1016/j.copsyc.2022.101387>
- Bogert, J. M., Buczny, J., Harvey, J. A., & Eilers, J. (2024). The effect of trust in science and media use on public belief in anthropogenic climate change: A meta-analysis. *Environmental Communication, 18*(4), 484–509. <https://doi.org/10.1080/17524032.2023.2280749>
- Bowes, S. M., Costello, T. H., & Tasimi, A. (2023). The conspiratorial mind: A meta-analytic review of motivational and personological correlates. *Psychological Bulletin, 149*(5–6), 259–293. <https://doi.org/10.1037/bul0000392>
- Bronstein, M. V., Pennycook, G., Bear, A., Rand, D. G., & Cannon, T. D. (2019). Belief in fake news is associated with delusionality, dogmatism, religious fundamentalism, and reduced analytic thinking. *Journal of Applied Research in Memory and Cognition, 8*(1), 108–117. <https://doi.org/10.1016/j.jarmac.2018.09.005>
- Broz, T. (2024). *Fabricating doubt and persecuting science: Analysis of misinformation about the climate crisis in Croatia*. Faktograf. Faktograf – Association for an Informed Public. <https://faktograf.hr/wp-content/uploads/2024/04/faktograf-analysis-of-misinformation.pdf>
- Cik, T. (2021). *Izgubljeno desetljeće: Stavovi i mišljenja o zaštiti okoliša, klimatskim promjenama i energetske tranziciji u Republici Hrvatskoj: Izveštaj u sklopu projekta: METAR do bolje klime (Mreža za edukaciju, tranziciju, adaptaciju i razvoj)*. Projektni partneri projekta METAR do bolje klime <http://id-prints.knjiznica.idi.hr/1043/1/Izgubljeno%20desetlje%C4%87e.pdf>
- Cohen, A. S., Lutzke, L., Otten, C. D., & Árvai, J. (2022). I think, therefore I act: The influence of critical reasoning ability on trust and behavior during the COVID-19 pandemic. *Risk Analysis, 42*, 1073–1085. <https://doi.org/10.1111/risa.13833>
- Cologna, V., Kotcher, J., Mede, N. G., Besley, J., Maibach, E. W., & Oreskes, N. (2024). Trust in climate science and climate scientists: A narrative review. *PLOS Climate, 3*(5), e0000400. <https://doi.org/10.1371/journal.pclm.0000400>
- Cushman, F. (2020). Rationalization is rational. *Behavioral and Brain Sciences, 43*, e28. <https://doi.org/10.1017/S0140525X19001730>
- De Neys, W. (2014). Conflict detection, dual processes, and logical intuitions: Some clarifications. *Thinking & Reasoning, 20*(2), 169–187. <https://doi.org/10.1080/13546783.2013.854725>
- de Zúñiga, H. G., Ardèvol-Abreu, A., Diehl, T., Patiño, M. G., & Liu, J. H. (2019). Trust in institutional actors

- across 22 countries. Examining political, science, and media trust around the world. *Revista Latina de Comunicación Social*, (74), 237–262. <https://nuevaepoca.revistalatinacs.org/index.php/revista/article/view/279>
- Drummond, C. & Fischhoff, B. (2017). Individuals with greater science literacy and education have more polarized beliefs on controversial science topics. *Proceedings of the National Academy of Sciences*, 114(36), 9587–9592. <https://doi.org/10.1073/pnas.1704882114>
- Ejaz, W., Altay, S., Fletcher, R., & Nielsen, R. K. (2024). Trust is key: Determinants of false beliefs about climate change in eight countries. *New Media & Society*. <https://doi.org/10.1177/14614448241250302>
- Epskamp, S. (2022). *semPlot: Path diagrams and visual analysis of various SEM packages' output*. [R package version 1.1.6]. <https://CRAN.R-project.org/package=semPlot>
- Erceg, N., Galić, Z., & Ružojčić, M. (2020). A reflection on cognitive reflection–testing convergent/divergent validity of two measures of cognitive reflection. *Judgment and Decision Making*, 15(5), 741–755. <https://doi.org/10.1017/S1930297500007907>
- European Commission (2019). *Special Eurobarometer 490/Wave EB91.3: Climate change*. London, UK: Kantar. Prepared at the request of the European Commission. Retrieved December 29, 2022, from https://climate.ec.europa.eu/system/files/2019-09/report_summary_2019_en.pdf
- European Commission (2021). *Special Eurobarometer 513/Wave EB95.1: Climate change*. London, UK: Kantar. Prepared at the request of the European Commission. Retrieved December 29, 2022, from <https://webgate.ec.europa.eu/ebsm/api/public/deliverable/download?doc=true&deliverableId=75838>
- European Commission, Secretariat-General (2023). *Democracy: report*. Publications Office of the European Union. <https://data.europa.eu/doi/10.2792/455273>
- European Environment Agency (2017). *Climate change, impacts and vulnerability in Europe 2016: An indicator-based report* (EEA Report No. 1/2017). European Environment Agency. <https://www.eea.europa.eu/publications/climate-change-impacts-and-vulnerability-2016>
- European Social Survey (2020). *ESS10 Source Questionnaire HR*. London: ESS ERIC Headquarters c/o City, University of London. Retrieved December 29, 2022, from https://stessrelpubprodwe.blob.core.windows.net/data/round10/fieldwork/croatia/ESS10_questionnaires_HR.pdf
- Fairbrother, M. (2017). Environmental attitudes and the politics of distrust. *Sociology Compass*, 11(5), e12482. <https://doi.org/10.1111/soc4.12482>
- Fairbrother, M., Arrhenius, G., Bykvist, K., & Campbell, T. (2021). Governing for future generations: How political trust shapes attitudes towards climate and debt policies. *Frontiers in Political Science*, 3, 656053. <https://doi.org/10.3389/fpos.2021.656053>
- Fairbrother, M., Sevä, I. J., & Kulin, J. (2019). Political trust and the relationship between climate change beliefs and support for fossil fuel taxes: Evidence from a survey of 23 European countries. *Global Environmental Change*, 59, 102003. <https://doi.org/10.1016/j.gloenvcha.2019.102003>
- Fawzi, N., Steindl, N., Obermaier, M., Prochazka, F., Arlt, D., Blöbaum, B., ... & Ziegele, M. (2021). Concepts, causes and consequences of trust in news media—a literature review and framework. *Annals of the International Communication Association*, 45(2), 154–174. <https://doi.org/10.1080/23808985.2021.1960181>
- Franc, R., Maglić, M., & Sučić, I. (2020). Političko (ne)povjerenje kao odrednica glasanja i sklonosti protestnim oblicima političkog sudjelovanja [Political (dis) trust as a determinant of voting and protest participation]. *Revija za sociologiju*, 50(3), 381–406. <https://doi.org/10.5613/rzs.50.3.3>
- Frederick, S. (2005). Cognitive reflection and decision making. *Journal of Economic Perspectives*, 19(4), 25–42. <https://doi.org/10.1257/089533005775196732>
- Funder, D. C., & Ozer, D. J. (2019). Evaluating Effect Size in Psychological Research: Sense and Nonsense. *Advances in Methods and Practices in Psychological Science*, 2, 156–168. <https://doi.org/10.1037/adv0000001>

org/10.1177/2515245919847202

- Gignac, G. E., & Szodorai, E. T. (2016). Effect size guidelines for individual differences researchers. *Personality and Individual Differences, 102*, 74–78. <https://doi.org/10.1016/j.paid.2016.06.069>
- Haidt, J. (2012). *The righteous mind: Why good people are divided by politics and religion*. Pantheon Books.
- Haran, U., Ritov, I. i Mellers, B. A. (2013). The role of actively open-minded thinking in information acquisition, accuracy, and calibration. *Judgment and Decision Making, 8*(3), 188–201. <http://doi.org/10.1017/S1930297500005921>
- Jorgensen, T. D., Pornprasertmanit, S., Schoemann, A. M., & Rosseel, Y. (2022). *semTools: Useful tools for structural equation modeling*. [R package version 0.5-6]. <https://CRAN.R-project.org/package=semTools>
- Ladd, J. M. (2012).** *Why Americans hate the media and how it matters*. Princeton University Press
- Lewandowsky, S., Ecker, U. K., & Cook, J. (2017). Beyond misinformation: Understanding and coping with the “post-truth” era. *Journal of applied research in memory and cognition, 6*(4), 353–369. <https://doi.org/10.1016/j.jarmac.2017.07.008>
- Li, C. H. (2016). Confirmatory factor analysis with ordinal data: Comparing robust maximum likelihood and diagonally weighted least squares. *Behavior Research Methods, 48*(3), 936–949. <https://doi.org/10.3758/s13428-015-0619-7>
- Lynas, M., Houlton, B. Z., & Perry, S. (2021). Greater than 99% consensus on human caused climate change in the peer-reviewed scientific literature. *Environmental Research Letters, 16*(11), 114005. <https://doi.org/10.1088/1748-9326/ac2966>
- Maglić, M. (2023a). *Analitičko rasuđivanje i uvjerenja koja proizvode polarizaciju* [Analytical reasoning and socially polarizing beliefs] (Doctoral dissertation, University of Zagreb. Faculty of Humanities and Social Sciences. Department of Psychology). <https://doi.org/10.17234/diss.2023.102859>
- Maglić, M. (2023b). Trust issues and Suspicious Minds? Political Distrust as a Determinant of Endorsement of Conspiracy Theories: Evidence from Multiple International Datasets. *Proceedings of the XXIX scientific conference Empirical studies in psychology*. Institute of Psychology, Laboratory for Experimental Psychology, Faculty of Philosophy, University of Belgrade. http://empirijskaistrazivanja.org/wp-content/uploads/2023/09/EIP23_proceedings.pdf
- Mercier, H. i Sperber, D. (2017). *The enigma of reason*. Harvard University Press.
- Mirhoseini, M., Early, S., El Shamy, N., & Hassanein, K. (2023). Actively open-minded thinking is key to combating fake news: A multimethod study. *Information & Management, 60*(3), 103761. <https://doi.org/10.1016/j.im.2023.103761>
- Myers, K. F., Doran, P. T., Cook, J., Kotcher, J. E., & Myers, T. A. (2021). Consensus revisited: Quantifying scientific agreement on climate change and climate expertise among Earth scientists 10 years later. *Environmental Research Letters, 16*(10), <https://doi.org/10.1088/1748-9326/ac2774>
- Kulin, J., & Johansson Sevä, I. (2021). Who do you trust? How trust in partial and impartial government institutions influences climate policy attitudes. *Climate Policy, 21*(1), 33–46. <https://doi.org/10.1080/14693062.2020.1792822>
- Nisbet, E. C., Cooper, K. E., & Garrett, R. K. (2015). The partisan brain: How dissonant science messages lead conservatives and liberals to (dis) trust science. *The ANNALS of the American Academy of Political and Social Science, 658*(1), 36–66. <https://doi.org/10.1177/0002716214555474>
- Oldrati, V., Patricelli, J., Colombo, B., & Antonietti, A. (2016). The role of dorsolateral prefrontal cortex in inhibition mechanism: A study on cognitive reflection test and similar tasks through neuromodulation. *Neuropsychologia, 91*, 499–508. <https://doi.org/10.1016/j.neuropsychologia.2016.09.010>
- Pavlović, T., Maglić, M., & Franc, R. (in press). Differences between major Croatian regions in climate change attitudes. In *Mediterranean Issues, Book 5*. Zagreb: Institute of Social Sciences Ivo Pilar, VERN University, the Scientific Council for Anthropological Research, Croatian Academy of Sciences and Arts

- (HAZU). <https://www.mic-vis.eu/Conference/BookOfPapers>
- Pennycook, G.** (2023). A framework for understanding reasoning errors: From fake news to climate change and beyond. *Advances in Experimental Social Psychology*, *67*, 131–208. <https://doi.org/10.1016/bs.aesp.2022.11.003>
- Pennycook, G., Bago, B., & McPhetres, J. (2023). Science beliefs, political ideology, and cognitive sophistication. *Journal of Experimental Psychology: General*, *152*(1), 80–97. <https://doi.org/10.1037/xge0001267>
- Pennycook, G., Cheyne, J. A., Koehler, D. J., & Fugelsang, J. A. (2020). On the belief that beliefs should change according to evidence: Implications for conspiratorial, moral, paranormal, political, religious, and science beliefs. *Judgment and Decision Making*, *15*(4), 476–498. <https://doi.org/10.1017/S1930297500007439>
- Pennycook, G., Fugelsang, J. A., & Koehler, D. J. (2015a). Everyday consequences of analytic thinking. *Current Directions in Psychological Science*, *24*(6), 425–432. <https://doi.org/10.1177/0963721415604610>
- Pennycook, G., Fugelsang, J. A., & Koehler, D. J. (2015b). What makes us think? A three-stage dual-process model of analytic engagement. *Cognitive Psychology*, *80*, 34–72. <http://dx.doi.org/10.1016/j.cogpsych.2015.05.001>
- Pennycook, G., Cheyne, J. A., Barr, N., Koehler, D. J., & Fugelsang, J. A. (2015c). On the reception and detection of pseudo-profound bullshit. *Judgment and Decision Making*, *10*(6), 549–563. <https://doi.org/10.1017/S1930297500006999>
- Pechar, E., Bernauer, T., & Mayer, F. (2018). Beyond political ideology: The impact of attitudes towards government and corporations on trust in science. *Science Communication*, *40*(3), 291–313. <https://doi.org/10.1177/1075547018763970>
- Primi, C., Morsanyi, K., Chiesi, F., Donati, M. A., & Hamilton, J. (2016). The development and testing of a new version of the cognitive reflection test applying item response theory (IRT). *Journal of Behavioral Decision Making*. *29*(5), 453–469. <https://doi.org/10.1002/bdm.1883>
- Raoelison, M., Thompson, V. A., & De Neys, W. (2020). The smart intuitor: Cognitive capacity predicts intuitive rather than deliberate thinking. *Cognition*, *204*, 104381. <https://doi.org/10.1016/j.cognition.2020.104381>
- Revelle, W. (2023). *psych: Procedures for Personality and Psychological Research* [R package version 2.3.3]. Northwestern University, Evanston, Illinois, USA. <https://CRAN.R-project.org/package=psych>
- Rizeq, J., Flora, D. B., & Toplak, M. E. (2021). An examination of the underlying dimensional structure of three domains of contaminated mindware: Paranormal beliefs, conspiracy beliefs, and anti-science attitudes. *Thinking & Reasoning*, *27*(2), 187–211. <https://doi.org/10.1080/13546783.2020.1759688>
- Rosseel, Y. (2012). lavaan: An R Package for Structural Equation Modeling. *Journal of Statistical Software*, *48*(2), 1–36. <https://doi.org/10.18637/jss.v048.i02>
- Shehata, A., & Strömbäck, J. (2022). Media use and societal perceptions: The dual role of media trust. *Media and Communication*, *10*(3), 146–157. <https://doi.org/10.17645/mac.v10i3.5449>
- Stanovich, K. E. (2011). *Rationality and the reflective mind*. Oxford University Press
- Stanovich, K. E. (2018). Miserliness in human cognition: The interaction of detection, override, and mindware. *Thinking & Reasoning*, *24*(4), 423–444. <https://doi.org/10.1080/13546783.2018.1459314>
- Stanovich, K. E. & Toplak, M. E. (2023). Actively open-minded thinking and its measurement. *Journal of Intelligence*, *11*(2), 27. <https://doi.org/10.3390/jintelligence11020027>
- Stanovich, K. E., West, R. F. i Toplak, M. E. (2016). *The rationality quotient: Toward a test of rational thinking*. MIT Press.
- Strömbäck, J., Tsfati, Y., Boomgaarden, H., Damstra, A., Lindgren, E., Vliegenthart, R., & Lindholm, T. (2020). News media trust and its impact on media use: Toward a framework for future research. *Annals of*

- the International Communication Association*, 44(2), 139–156. <https://doi.org/10.1080/23808985.2020.1755338>
- Tonković, M., Vranić, A., & Blanuša, N. (2023). Bihevioralni korelati teorija zavjere o COVID-u 19. U: N. Blanuša i A. Brakus (Eds.), *COVID-19 dezinformacije i teorije zavjera u Hrvatskoj* (pp. 137–152). Gong.
- Thomson, K. S. & Oppenheimer, D. M. (2016). Investigating an alternate form of the cognitive reflection test. *Judgment and Decision Making*, 11(1), 99–113. <https://doi.org/10.1017/S1930297500007622>
- Toplak, M. E., West, R. F., & Stanovich, K. E. (2014). Assessing miserly information processing: An expansion of the Cognitive Reflection Test. *Thinking & Reasoning*, 20(2), 147–168. <http://dx.doi.org/10.1080/13546783.2013.844729>
- Tsfati, Y., & Cappella, J. N. (2003). Do people watch what they do not trust? Exploring the association between news media skepticism and exposure. *Communication research*, 30(5), 504–529. <https://doi.org/10.1177/0093650203253371>
- Tsfati, Y., Strömbäck, J., Lindgren, E., Damstra, A., Boomgaarden, H. G., & Vliegenthart, R. (2022). Going beyond general media trust: An analysis of topical media trust, its antecedents and effects on issue (mis) perceptions. *International Journal of Public Opinion Research*, 34(2), edac010. <https://doi.org/10.1093/ijpor/edac010>
- Van der Linden, S. (2021). The Gateway Belief Model (GBM): A review and research agenda for communicating the scientific consensus on climate change. *Current Opinion in Psychology*, 42, 7–12. <https://doi.org/10.1016/j.copsyc.2021.01.005>
- Verboord, M., Janssen, S., Kristensen, N. N., & Marquart, F. (2023). Institutional trust and media use in times of cultural backlash: A cross-national study in nine European countries. *The International Journal of Press/Politics*. <https://doi.org/10.1177/19401612231187568>
- Vitali Čepo, D. (2021). *Klimatske promjene u Hrvatskoj*. CO2go-Priče za klimatsku akciju. <https://www.znanost-klima.org/wp-content/uploads/2021/12/Klimatske-promjene-u-Hrvatskoj.pdf>
- Wickham, H. (2016). *ggplot2: Elegant Graphics for Data Analysis* (2nd ed.). New York, NY: Springer-Verlag. <https://ggplot2.tidyverse.org/>