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Surprising Similarities in Cognitive Footprint of Scientism and Irrational Beliefs

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Scientism is a belief that science is superior to any other human endeavor, capable of solving all human problems and that scientists are always knowledgeable and ethical. As this view is extreme and somewhat dogmatic, we tested whether it draws from the same information processing style as beliefs traditionally deemed irrational. This is especially interesting since scientistic and irrational beliefs are incompatible content-wise and thus negatively related. In Study 1 (N = 1003, representative for Serbia) scientistic beliefs were more frequent than anti-scientific beliefs and, expectedly, correlated negatively with conspiracist, paranormal, and pseudoscientific beliefs. Study 2 (online community sample; 186 scientists, 147 laypeople) showed that uncritical trust in science positively correlated to need for closure and uncertainty intolerance, while uncritical trust in scientists negatively correlated with cognitive reflection and cognitive abilities. This indeed indicates a superficial informational processing style typically observed in people prone to irrational beliefs. All reported relationships, however, need to be independently replicated. This apparent paradox illustrates that science could be used as a heuristic, and it highlights the need to cultivate a more realistic view of the science process through formal education and media.

Key words: scientistic beliefs, trust in science, irrational beliefs, thinking styles, information processing

Trusting science and scientists entails a degree of *faith*. This faith manifests in believing that scientific methodologies and procedures are robust enough to yield reliable knowledge, and in assuming that scientists are knowledgeable, responsible and honest when conducting specific studies. Trusting science and scientists is, of course, a reasonable decision considering the principle of division of labor: scientists are doing their role, and we rely on them to do it competently, akin to entrusting a baker to ensure our morning bagel is safe to consume (Hendriks et al., 2016; Zagzebski, 2012). In the end, trust in science is of great

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importance for contemporary societies, as distrusting science can compromise societal progress and both individual and collective safety. Research has shown that distrust in science correlates with lower adherence to health measures in the pandemic, such as mask-wearing and vaccination (Hromatko et al., 2021; Plohl & Musil, 2021), thus hindering initiatives to mitigate the spread, and potentially endangering lives of numerous people. Climate change denial has also been linked to a decreased willingness to adopt behaviors that could help reduce the effects of climate change (Huber et al., 2022; Liu et al., 2022; Spence et al., 2011). Due to these reasons, it is uncommon and even unreasonable to view trust in science and scientists as formally irrational. Nevertheless, we argue there are reasons to do so for the extreme view in which we grant science the powers it does not have, or ascribe to scientists the virtues they do not possess – the form of s*cientistic beliefs*.

Scientism entails an uncritical view of science, a view that attributes to science abilities beyond its reach, such as the capacity to solve *all* human problems, achieve *absolute* truth, or even *establish moral principles* (van Woudenberg et al., 2018), as well as unwillingness to accept science's fallibility, limitations, or potential dangers (Haack, 2012). It also manifests as viewing scientists as impartial and honest, motivated solely by the pursuit of truth and never by prestige or financial gain (Lukić & Žeželj, 2023a). We label this kind of trust in science and scientists uncritical because they do not reflect how science and the scientific world actually functions. Scientific knowledge is probabilistic and tentative – i.e. subject to revision or rejection (Rescher, 1999, p. 30). Scientific results, differing in precision and reliability, need to be constantly questioned and supported by new evidence to become more precise and reliable. Additionally, as science is a human endeavor, scientists are not immune to deliberate or accidental errors in their research (Ioannidis, 2005; Romero, 2019).

Taking for granted everything that science and scientists say represents a heuristic of a sort – it decreases our cognitive effort and saves us time in checking every piece of information we encounter. It has been shown that people rate the same arguments as stronger when they are attributed to scientists rather than to laypeople, even if the arguments are weak (Lukić & Žeželj, 2023b). People also deem explanations better when containing unrelated information that only signals scientific rigor (e.g., scientific formulae, Eriksson, 2012; brain scans, McCabe & Castel, 2008). Trust in science can also serve non-cognitive purposes: stress, existential anxiety, and mortality salience increase trust in science similarly as they increase religiousness (Farias et al., 2013).

In this stage of measuring scientism, science is typically conceptualized as a singular construct (Astley & Francis, 2010; Farias et al., 2013; Nadelson et al., 2014). However, one must bear in mind that there are disparities in how specific scientific fields and scientific specializations are perceived. Scientists from some disciplines are regarded as more competent or ethical than others (Gligorić et al., 2022, 2024), so a more granulated assessment would also make sense. Separating uncritical trust in science in general and scientists as actors, however, is very important as one can imagine them being relatively independent. To adequately understand public opinion, it is important to study both poles of trust (from uncritical distrust to uncritical trust), towards both science and its representatives – the scientists.

While the prevalence of antiscientific beliefs is thoroughly studied (Gauchat, 2012), the data on uncritical trust in science is lacking. In this paper, we document the prevalence

of scientistic beliefs, i.e., uncritical trust in science and scientists in the general population. Furthermore, we analyze how uncritical trust in science and scientists are related to typical representatives of science skepticism – irrational beliefs such as belief in conspiracy theories, the paranormal, and pseudoscience (Study1). Having in mind what we discussed about trust in science as a heuristic, negative relationships with these constructs are to be expected. It is less clear, still, how scientism should be related to more basic information processing styles, either self-report-based (need for closure, uncertainty intolerance, and experiential/rational cognitive style) or competence-based (cognitive reflection and general cognitive ability) (Study 2).

The Prevalence of Scientistic Beliefs

Some authors argue that scientism entered the general public through formal science education (Gasparatou, 2017) as well as popular science writing (De Ridder, 2014). Even though we know that public trust in science globally is moderately high (Cologna et al., 2024), there have been no attempts so far to disentangle trust in science from scientistic beliefs, leaving the prevalence of scientistic beliefs in the general population unknown. Previous research indeed showed that not only are scientistic views common among students and online community samples but they are even more popular than anti-scientific views (Lukić & Žeželj, 2023a).

Additionally, while more educated people tend to trust science more (e.g., Nadelson et al., 2014), it is not clear whether this is also reflected in the endorsement of scientism, especially whether scientists or laypeople endorse scientism more strongly. Laypeople may be more inclined toward scientistic beliefs due to a limited understanding of the scientific process, often resulting in an oversimplified view of scientific discovery. However, scientists might also be more prone to scientism, as it aligns closely with their professional identity and may serve as a response to perceived threats, such as the decline of public trust in science (Gauchat, 2012).

The Cognitive Footprint of Irrational and Scientistic Beliefs

In the psychological literature, conspiracist, paranormal, and pseudoscientific beliefs are typically labeled irrational, unwarranted, or epistemically suspect beliefs. Although the label “irrational” is indeed value-laden, it is widely used in the psychological literature to indicate reliance on a faulty evidence base and violation of basic ontological assumptions about how the world works (Teovanović et al., 2024). One key feature of irrational thinking is the defiance of scientific principles. Having that in mind, such beliefs should be incompatible with trust in science (e.g., Fasce & Pico, 2019), and, by the same token, negatively related to its extreme, uncritical form, i.e. scientistic beliefs. On the other hand, however, if we view scientistic beliefs as unwarranted, one may also reasonably regard them as a subtle form of irrational beliefs.

There is ample evidence that irrational beliefs are related to superficial data processing (Šrol, 2022). To mention just a few examples, people who believe in conspiracy theories are shown to be higher in need for cognitive closure (Marchlewska et al., 2018) and less tolerant to uncertainty (Maftei & Holman, 2022). Belief in conspiracy theories (e.g., Teovanović et al., 2021), paranormal beliefs (e.g., Ståhl & van Prooijen, 2018), as well as religious beliefs (e.g., Pennycook et al., 2015), are also typically negatively related to cognitive reflection. Similarly, conspiracism and belief in the paranormal positively relate to experiential thinking style (i.e., intuitive, fast,

habitual, automatic responding) (Lasikiewicz, 2016; Swami et al., 2014), while conspiracism also negatively relates to rational thinking style (i.e., slow, deliberate, effortful) (Swami et al., 2014). Finally, general cognitive ability is usually negatively related to irrational beliefs (Čavojová et al., 2020; Jastrzębski & Chuderski, 2022).

On the other hand, similar cognitive correlates of scientistic beliefs are largely unknown. To our knowledge, there is a single study that found positive relations between scientistic beliefs and need for closure and need for cognition (Korte et al., 2016), and virtually no studies exploring their relationship with proneness to cognitive reflection and general cognitive ability. Uncritical trust in science may provide closure and exclude alternative interpretations just as irrational beliefs do (e.g., conspiracy theories). Also, similarly to irrational beliefs, science provides answers that alleviate feelings of uncertainty over important issues such as natural catastrophes or pandemics. However, some relationships between scientistic beliefs and cognitive variables may not be as apparent as in the case of irrational beliefs, due to general cognitive ability being related to both trust in science (Ståhl & van Prooijen, 2018) and other cognitive variables [e.g., to CRT (Otero et al., 2022)] or thinking styles (Alaybek et al., 2021). For example, individuals with stronger cognitive abilities tend to trust science more and prefer rational thinking. Therefore, with cognitive abilities being equal, individuals endorsing a rational thinking style might exhibit cautiousness and a diminished inclination towards scientistic beliefs.

Overview of the Studies

In the first study, we a) map scientistic beliefs in the general population and b) test whether they are negatively related to paranormal, conspiracist, and pseudoscientific beliefs. In the second study, we add more nuance to understanding scientistic beliefs by a) comparing the endorsement of scientistic beliefs among scientists and laypeople, and b) testing whether, despite their opposing content, scientistic beliefs share a cognitive footprint with irrational beliefs and could be tracked to a similar information processing style – i.e. to higher need for cognitive closure, less tolerance to uncertainty, and less cognitive reflection.

Study 1
Prevalence of Scientistic Beliefs and Their Relationship to Irrational Beliefs

Hypotheses

We expected scientistic beliefs to be negatively related to conspiracy mentality (H1.1), superstitiousness (H1.2), extrasensory beliefs (H1.3), and pseudoscientific beliefs (H1.4).

Sample

A professional research agency recruited a probabilistic sample of N = 1003 (50% women, 50% men, M_{AGE} = 48.4 (SD_{AGE} = 17.02)), designed to be representative of the general population in Serbia between 18 and 75 years of age. Data were collected online for respondents up to 54 years old (approximately 60%) and face-to-face for older participants (around 40%). 15% of respondents have received no education or completed only elementary school, 60% completed high school, and 25% completed university college or received a Bachelor's degree or higher. For recruitment details consult study protocol by Knežević et al. (2023). This sample allowed for the detection of a correlation of .08 with the typically reported power of .80, at the .05 alpha level.

Procedure

Data used for this study is part of a larger study on a nationally representative sample of Serbia (for full procedure see Knežević et al., 2023). The study received ethical approval from the ethical committees of the Faculty of Philosophy, University of Belgrade (#935/1), Faculty of Special Education and Rehabilitation, University of Belgrade (#139/1), and Faculty of Media and Communications, Singidunum University (#228). The participants were treated following the Declaration of Helsinki.

Variables and Instruments

To measure *uncritical trust in science and scientists* we used Scientistic Beliefs Questionnaire (Lukić & Žeželj, 2023a). The full questionnaire measures *Uncritical trust in science* with 12 topics and *Uncritical trust in scientists* with 8 topics. For measuring scientistic beliefs in the representative sample, due to the limited timeframe of the testing session, we chose three topics from each subscale, aiming for maximal discriminatory power and reliability of the measure. Each topic represents a short Thurstone scale containing five options ranked from extremely antiscientific to extremely scientistic. An example of a topic within the Uncritical trust in scientists would be "Veracity", where the extremely antiscientific claim is "Scientists most often mislead the public about the things they are researching through the media.", and extremely scientistic would be "What scientists tell the media is always the full truth about the things they are researching". The questionnaire was developed through five stages of validation including different experts (psychometricians and philosophers), raters, cognitive interviews with laypeople, and a pilot study. The total scores were calculated as a mean of extreme (2 points) and subtle (1 point) scientistic answers to each topic in the respective subscale. The complete questionnaire is available at https://osf.io/tznk5/?view_only=497daa31c9aa47e695de27b6f87ee1ee. The reliability of the Uncritical trust in science subscale was α = .54, and of the Uncritical trust in scientists was α = .68.

To measure *conspiracy mentality*, we used a five-item *Conspiracy Mentality Questionnaire* (CMQ, α = .78, example item: *Events that superficially seem to lack a connection are often the result of secret activities*, Bruder et al., 2013, for Serbian validity study see Lukić et al., 2019; Milošević-Đorđević et al., 2021) expressing general conspiracist ideas. For measuring *superstitiousness*, we used five items with the highest loadings from the *Superstition scale* (α = .71, e.g., *I never walk underneath a ladder, even if I have to walk a longer distance*, Žeželj et al., 2009). *Extrasensory beliefs* were measured through six items with the highest loadings from the *Extra-sensory Perception Belief Scale* (α = .86, e.g., *I believe that is not a coincidence when the very person I am thinking about calls me*, Branković, 2019). *Pseudoscientific beliefs* were represented by a 10-item general magical beliefs factor of the *Magical Beliefs About Food and Health Scale* (α = .78, e.g., *An incorrect diet makes food rot in the body*, Lindeman et al., 2000; Petrović & Žeželj, 2024). In all instruments – CMQ, Superstition scale, Extra-Sensory Perception Scale, and Magical Beliefs About Food and Health Scale – the respondents rated their agreement on a five-point Likert scale (1 – *Completely disagree*, 5 – *Completely agree*).

Results

Scientistic views (extreme and subtle scientistic answers combined) appear to be more frequent than antiscientific views in the general adult Serbian population. Across topics,

scientistic views ranged from 22.3% to 38.7%, while antiscientific views (extreme and subtle antiscientific) ranged from 13.1% to 25.6% (Table 1). A balanced view of science was the most frequently chosen answer for all six topics.

Confirmatory factor analysis showed that the two-factor solution (i.e., separate but correlated Uncritical trust in science and Uncritical trust in scientists) had a satisfactory fit (χ^2 = 24.892, *df* = 8, *p* < .001; CFI = .997, TLI = .956, NFI = .966, GFI = .992, RMSEA = .046 (90% CI .026 - .067)). For reference, the competing single-factor model had suboptimal fit indices (χ^2 = 118.903, *df* = 9, *p* < .001; CFI = .848, TLI = .747, NFI = .839, GFI = .959, RMSEA = .110 (90% CI .093 - .128)).

As expected, Uncritical trust in science was negatively correlated with conspiracy mentality (H1.1), magical health beliefs (H1.3), and extrasensory beliefs (H1.4), but not with superstitiousness (H1.2), yielding the strongest correlation with conspiracy mentality (Table 2). Uncritical trust in scientists correlated negatively with all variables (H1.1, H2.1, H3.1, H4.1), most strongly with magical health beliefs, and the least strongly with superstitiousness. The results support three of our

Table 1 *Prevalence of scientistic beliefs*

Topic	Extreme scientism	Subtle scientism	Balanced view	Subtle anti-science	Extreme anti-science
The relation of science with other ways of gaining knowledge (e.g., philosophy, law, ethics, art)	8.5%	30.2%	48.4%	11.0%	2.1%
The ability of science to answer big philosophical questions (e.g., the purpose of life)	4.4%	17.9%	56.7%	13.4%	7.6%
The ability of science to solve humanity's problems (e.g., natural disasters, diseases, war, crime)	7.2%	28.4%	45.6%	14.6%	4.2%
The truthfulness of scientists' claims	4.0%	22.6%	47.8%	21.4%	4.2%
Scientists' adherence to ethical principles	8.6%	19.9%	47.0%	19.0%	5.4%
Impartially in scientists' work	8.7%	24.2%	42.7%	18.2%	6.3%

Table 2 *Correlations between scientistic beliefs and irrational beliefs*

	Conspiracy mentality	Superstitiousness	Magical health beliefs	Extrasensory beliefs
Uncritical trust in science	-.20***	-.05	-.15***	-.17***
Uncritical trust in scientists	-.17***	-.11***	-.25***	-.20***

Note. * *p* < .05; ** *p* < .01; *** *p* < .001

hypotheses, but only partially H2.1, as superstitiousness was negatively related only to Uncritical trust in scientists. Weaker associations between scientistic beliefs and superstitiousness could be due to measuring superstitiousness with behaviors rather than beliefs, as in other variables. A full table of intercorrelations of variables, their descriptives, and reliabilities is given in Online Supplement A. Considering the large sample size, one should not interpret all significant correlations as substantial, and they still have to prove their robustness to assume they have practical applications.

To explore potential confounds, we tested correlations of scientistic beliefs with a set of measured demographic variables (Table 3), with particular interest in their relationship with education. We found a single significant, albeit weak correlation between gender and Uncritical trust in science (males have higher scores), while all others were nonsignificant.

We additionally assessed the predictive power of irrational beliefs for scientistic beliefs through structural equation modeling (SEM) (Figure 1). This confirmatory approach to model validation facilitates the simultaneous analysis of the effects of multiple independent latent variables on multiple dependent latent variables, while accounting for both estimation and measurement errors, thus providing a more precise understanding of the relationships between the variables in the model (Byrne, 2012). Both irrational beliefs and scientistic beliefs were modeled as latent variables – the items from their respective questionnaires were their indicators. The predictors (irrational beliefs) and criterion variables (uncritical trust in science and uncritical trust in scientists) were permitted to covary.

Table 3 *Correlations between scientistic beliefs and demographic variables*

	Age	Gender	Education
Uncritical trust in science	.05	-.06*	-.01
Uncritical trust in scientists	.00	-.04	.03

Note. * $p < .05$; ** $p < .01$; *** $p < .001$

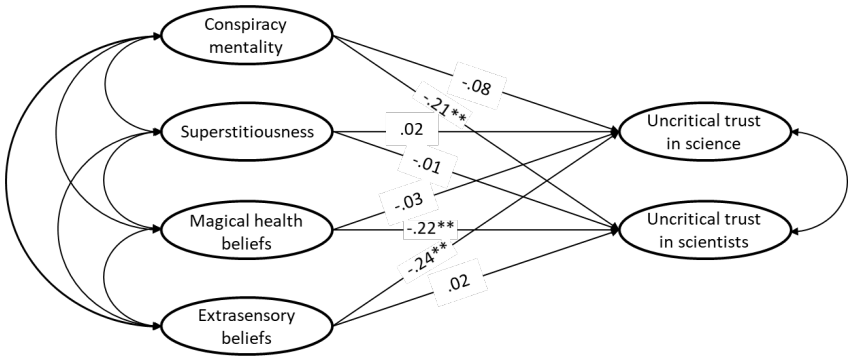

Figure 1 The SEM model of predictors of scientistic beliefs.

The model fitted the data acceptably well ($\chi^2(449) = 1669.121$, $p < .001$, CFI = 0.86, TLI = 0.84, RMSEA = 0.05, SRMR = 0.06). Results indicated that among the predictors, Extrasensory beliefs ($\beta = -0.24$, $p < .001$) emerged as the only significant predictor of Uncritical trust in science, explaining 9% of its variance. For Uncritical trust in scientists, Conspiracy mentality ($\beta = -0.21$, $p < .001$) and Magical health beliefs ($\beta = -0.22$, $p < .001$) were both significant predictors, collectively explaining 12% of the variance.

In general, the results corroborate that scientistic beliefs are negatively related to beliefs traditionally viewed as irrational. In the next study, we explored if, despite this fact, scientistic beliefs share the same information processing style with irrational beliefs. Drawing from the results of the general population, we also strategically compare scientistic beliefs in two subpopulations: scientists and laypeople.

Study 2
Cognitive Footprint of Scientistic Beliefs

Hypotheses

We started by formulating two competing hypotheses: a) scientists will be more inclined to accept scientistic beliefs, simply because the general public has less trust in science (H2.1a), and b) scientists will be less inclined to accept scientific beliefs, due to their experience with the scientific process and a better understanding of it (H2.1b).

Next, we expected that uncritical trust in science and uncritical trust in scientists would positively correlate with the Need for closure (H2.2), Uncertainty intolerance (H2.3), Cognitive reflection (H2.4), and Rational thinking style (H2.5) on one hand, and negatively with Experiential thinking style (H2.6) on the other. However, upon controlling for cognitive abilities, we expected that uncritical trust in science and scientists would yield a positive correlation with Experiential thinking style (H2.7a), and negative correlations with Cognitive reflection (H2.7b) and Rational thinking style (H2.7c), while the preexisting correlations with Need for closure and Uncertainty intolerance would remain positive (H2.7d, H2.7e). We tested all hypotheses on the full sample, as well as on subsamples of scientists and laypeople separately. All these analyses were preregistered at https://aspredicted.org/7S1_3BS.

Sample

We gathered a total of $N = 333$ Serbian participants divided into two subsamples: a subsample of laypeople (people who are not affiliated with science in any way, regardless of their professional status and educational level, $n = 147$, 96 women, 50 men, 1 undeclared, $M_{AGE} = 41.91$, $SD_{AGE} = 12.74$) and a subsample of scientists (i.e., people working as scientists, $n = 186$, 135 women, 50 men, 1 undeclared, $M_{AGE} = 40.32$, $SD_{AGE} = 10.00$). The preregistered sample size allowed us to detect correlations of $r = .23$ or stronger (80% power and $p = .05$).

Procedure

We recruited the participants via snowballing, emails, and social networks. To recruit a sufficient number of scientists, we advertised the study in specialized science-related Facebook groups. To diversify the sample, we gathered emails from university and institute employees coming from different scientific disciplines (e.g., biology, physics, chemistry, pharmacy, history, archaeology, economics, etc.) and directly contacted them. Laypeople were recruited via Facebook groups not related to science topics. To ensure we correctly identified the two subsamples, the questionnaire con-

tained questions about scientific affiliation or employment ("Have you ever been employed in a scientific organization as a professor, scientist, or a researcher?" and "If yes, what title have you held?"). Participants who answered positively on the first question and were able to provide a meaningful answer to the second one were assigned to the "scientists" group, whilst participants who answered negatively on the first question and did not respond to the second one were assigned to the "laypeople (non-scientists)" group. The ethical committee of the Faculty of Philosophy, University of Belgrade approved the study design (#2021-100) and the participants were treated in line with the Declaration of Helsinki.

Variables and Instruments

To measure *uncritical trust in science and scientists* we used the complete Scientistic Beliefs Questionnaire (Lukić & Žeželj, 2023a) measuring *Uncritical trust in science* with 12 topics and *Uncritical trust in scientists* with 8 topics.

To measure the *need for closure* we used the *Brief Need for Closure Scale* (Roets & van Hiel, 2011). This questionnaire contains 15 items (e.g., *When I have made a decision, I feel relieved*) with a 6-point Likert scale for expressing agreement attached (1 – *Completely disagree*, 6 – *Completely agree*).

We measured *uncertainty intolerance* with an 11-item *Intolerance of Uncertainty Scale* (e.g., *Unforeseen events upset me greatly*, Freeston et al., 1994; Mihić et al., 2014) with a 5-point Likert scale attached (1 – *Completely disagree*, 5 – *Completely agree*).

To assess *thinking styles,* we used a 10-item *Rational Experiential Inventory* (REI; Pacini & Epstein, 1999), with five items for measuring rational thinking style, and five for experiential thinking style, accompanied by a 5-point Likert scale for agreeing (1 – *Completely disagree,* 5 – *Completely agree)*.

To measure *cognitive reflection,* we used an 8-item numeric version of the *Cognitive Reflection Test* (CRT; Damnjanović et al., 2019). The task for the participants was to answer simple questions (e.g., *Jerry received both the 15th highest and the 15th lowest mark in the class. How many students are there in the class?*) by entering a number.

To measure *cognitive ability*, we used a *Verbal Analogies Test* with 31 items (Živanović, 2019). In this test, each item contains a sample pair (e.g., *Sun : yellow*) and five possible options of which participants should choose the correct one (e.g., *grass : green*). Participants had 5 minutes to complete as many analogies as they could. Each participant's score was calculated as the number of correct answers.

Results

We used a *t*-test to compare the scientistic views of scientists and laypeople (H2.1a,b). The results showed no significant differences between scientists and laypeople on the Uncritical trust in science subscale (t (331) = -1.25, p = .214, M_{SCI} = .45, M_{LAY} = .49, Cohen's d = .13), while there were significant, albeit small differences on Uncritical trust in scientists subscale in favor of scientists (t (331) = 2.48, p = .014, M_{SCI} = .50, M_{LAY} = .41, Cohen's d = .26). Frequencies of answers for each topic for comparative view between scientists and laypeople are given in Online Supplement B.

Descriptive statistics of the scores for each of the continuous variables used in the study are given in Online Supplement C. We then performed a correlational analysis for both subsamples (Table 4). Due to the small differences between scientists and laypeople in Uncritical trust in scientists, and no significant differences in Uncritical trust in science, we proceeded to perform correlational analysis in the total sample as well (Online Supplement D).

Table 4 *Correlations between variables within subsamples – Scientists above the diagonal, Laypeople under the diagonal*

	1	2	3	4	5	6	7	8
1 Uncritical trust in science	(.74)	.41**	.16*	.18*	.07	-.09	-.07	-.06
2 Uncritical trust in scientists	.34**	(.71)	.06	-.09	.18*	-.03	-.16*	-.24**
3 Need for closure	.07	.03	(.85)	.58**	-.29**	.02	-.19*	-.09
4 Uncertainty intolerance	.13	.01	.56**	(.89)	-.43**	.03	-.12	.01
5 REI rational style	.05	.07	-.36**	-.34**	(.73)	-.01	.10	.17*
6 REI experiential style	-.21*	-.25**	-.17*	-.05	.01	(.78)	-.11	.02
7 Cognitive Reflection Test	.01	-.13	-.22**	-.17*	.36**	-.16	(.80)	.27**
8 Cognitive abilities	.07	-.16	-.16	-.02	.19*	-.09	.45**	(.86)

Note. Cronbach's *α* for the total sample are on the diagonal.
* $p < .05$; ** $p < .01$; *** $p < .001$

As expected, zero-order correlations showed that uncritical trust in science was positively related to need for closure (H2.2) and uncertainty intolerance (H2.3), and negatively with experiential thinking style (H2.6) in the total sample. However, uncritical trust in science also correlated with the need for closure and uncertainty tolerance in the subsample of scientists, but not in the subsample of laypeople. On the other hand, uncritical trust in science was negatively related to the experiential thinking style (H2.5) among laypeople, but not in scientist group. To account for Type I error, we performed Holm-Bonferroni's correction for multiple comparisons for the 12 correlations we hypothesized (2 subscores x 6 cognitive variables).

As predicted, uncritical trust in scientists was positively correlated with rational (H2.5) and negatively with experiential thinking style (H2.6) in the total sample. Contrary to our expectations, it also negatively correlated with both cognitive reflection (H2.4) and cognitive abilities. Uncritical trust in scientists was positively related to rational thinking style only among scientists, and negatively related to the experiential thinking style only in the laypeople's group. Finally, both cognitive reflection and cognitive abilities yielded a negative correlation with uncritical trust in scientists in the subsample of scientists, but not in the subsample of laypeople. Holm-Bonferroni correction for multiple comparisons suggested that only the correlation between uncritical trust in scientists and cognitive abilities in the subsample of scientists, experiential thinking style in the subsample of laypeople, and cognitive abilities, uncertainty tolerance, and rational thinking style in the total sample could be considered robust.

To test hypotheses H2.7a-e, we performed hierarchical regression analysis with interaction effects for each cognitive variable and cognitive abilities. We kept Uncritical trust in science and Uncritical trust in scientists as criterion variables and introduced cognitive abilities in the first block, separate cognitive variables (need for closure, uncertainty tolerance, rational thinking style, experiential thinking style, cognitive reflection) in the second, and their interactions in the third block of predictors. The analyses yielded only one significant interaction effect (Table 5): in the subsample of scientists, the effect of rational thinking style on uncritical trust in scientists lessened with the increase of cognitive abilities. This significant relationship, however, is one of the 30 interactions we tested and may be a case of inflation of statistical significance. Thus, hypotheses H2.7a-e were not corroborated.

Table 5 *The results of hierarchical regression analyses*

	Total				Scientists				Laypeople			
	Uncritical trust in science		Uncritical trust in scientists		Uncritical trust in science		Uncritical trust in scientists		Uncritical trust in science		Uncritical trust in scientists	
	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2
Cognitive ability	.01	.00	-.17**	.03**	-.04	.00	-.23**	.06***	.01	.09	-.15	.03
Need for closure	.13*	.02*	.02	.00	.16*	.03	.04	.00	.01	.07	.00	.00
Interaction	.00	.00	.03	.00	.01	.00	.04	.00	.00	-.06	-.03	.00
Cognitive ability	-.01	.00	-.17**	.03**	-.06	.00	-.24***	.06***	.01	.08	-.17*	.03
Uncertainty intolerance	.15**	.03**	-.06	.00	.19*	.03*	-.11	.01	.02	.10	.03	.00
Interaction	-.06	.00	.05	.00	-.08	.01	.06	.00	.00	-.07	.07	.00
Cognitive ability	-.02	.00	-.20***	.03**	.00	-.05	-.23**	.06*	.01	.06	-.18*	.03
REI rational	.05	.00	.19***	.04	.01	.08	.23*	.05**	.00	.04	.10	.01
Interaction	-.05	.00	-.08	.01	.00	-.05	-.15***	.02***	.00	-.02	.01	.00
Cognitive ability	-.01	.00	-.17**	.03**	-.05	.00	-.24***	.06***	.06	.01	-.17*	.03
REI experiential	-.14**	.02**	-.12*	.02*	-.10	.01	-.02	.00	-.19*	.04*	-.24**	.07***
Interaction	.05	.00	.07	.01	.06	.00	-.02	.00	.04	.00	.09	.01
Cognitive ability	.01	.00	-.14*	.03**	-.02	.00	-.22**	.06***	.08	.01	-.13	.03
CRT	-.05	.00	-.07	.00	-.05	.00	-.11	.01	-.03	.00	-.07	.00
Interaction	-.05	.00	-.01	.00	-.09	.01	.04	.00	.01	.00	.01	.00

Note. Cronbach's α for the total sample are on the diagonal.
* $p < .05$; ** $p < .01$; *** $p < .001$

Discussion

The results of the two studies combined contribute to the knowledge about public understanding of science. First, we demonstrated that a significant portion of the general population holds scientistic beliefs. Although the balanced view of science was the most frequent, scientistic beliefs were more prevalent in comparison to anti-scientific beliefs. While previous studies showed trust in science to be very high (for a general review see Hendriks et al., 2016; for Serbia specifically see Žeželj et al., 2023), they typically fail to disentangle a balanced view of science from an uncritical trust in science.

Scarce previous studies suggest there are more respondents who endorse scientistic beliefs than those who reject them (Konnemann et al., 2016, on a sample of German high schoolers) used Likert-type scales that cannot unequivocally show if somebody supports scientistic views or just refuses antiscientific views. Our methodological choice (i.e., Thurstone-type scale) gave us a more granular view of the different ways people trust or distrust science and scientists and allowed us to interpret the results in absolute terms. To make sure the zero point indeed reflected a balanced view, and that two scientistic answers indeed reflect uncritical trust in science or scientists, the scale was pretested and assessed by experts (see Lukić & Žeželj, 2023a). Such precise measurement could be important keeping in mind that there is initial evidence scientism is related to the endorsement of a range of discriminatory policies towards science-skeptics, including the denial of health care, for example (Lukić & Žeželj, in press).

Our results show no difference between scientists and laypeople in terms of uncritical trust in science, and a slight advantage in terms of uncritical trust in scientists in the scientist group compared to laypeople. Although we preregistered two competing hypotheses about the potential differences between the subsamples, we did expect to observe differences, which essentially did not happen. It remains compelling to investigate why scientists continue to hold scientistic views despite their extensive scientific education. We suggest that one possible explanation lies in the nature of specialized knowledge. This specialization may result in a lack of familiarity with the functioning of scientific practices outside one's field, thereby fostering an idealized image of science, even when shortcomings within one's discipline are apparent. Furthermore, an important consideration is the extent to which university curricula, particularly in the natural sciences, include philosophy of science, which could serve to rectify these idealized perceptions.

As we expected, scientistic beliefs proved to be negatively related to what is traditionally viewed as epistemically suspect or irrational beliefs, such as belief in conspiracy theories, paranormal beliefs, and pseudoscience. These results complement the previous findings, which observed a negative relationship between trust in science and belief in conspiracy theories (Vranić et al., 2022; Fasce & Pico, 2019), belief in the paranormal (Williams et al., 2022; Fasce & Pico, 2019), and pseudoscience (Fasce & Pico, 2019) by adding uncritical trust in science and scientists.

Despite their negative correlation observed in Study 1, Study 2 showed that scientistic beliefs and irrational beliefs share a common cognitive footprint, which could be seen as paradoxical. Namely, we observed significant positive correlations between uncritical trust in science on the one hand and the need for closure (there was already initial evidence for this in Korte et al., 2016) and uncertainty intolerance on the other, similarly to irrational beliefs. This information processing style – a

tendency for reaching quick answers, preserving beliefs despite the evidence, and general avoidance of uncertainty – is driving people to ascribe unreasonable power to the scientific method. Our findings open the possibility that scientistic beliefs [again, similar to irrational beliefs, especially conspiracy theories (Grzesiak-Feldman, 2013; Krüppel et al., 2023)] serve an anxiety-reducing function. This was already suggested by Farias et al. (2013) in their experimental study in which trust in science increased in stressful situations. Somewhat at odds with this set of results, we found that the preference for the rational thinking style was positively related to uncritical trust in scientists, while the preference for the experiential thinking style related negatively to both uncritical trust in science and scientists. In other words, the more one relies on intuition, the less one uncritically trusts science and scientists. This can purely stem from the fact that people with stronger intuitive thinking tend to generally distrust science (Lasikiewicz, 2016; Swami et al., 2014), but it deserves to be disentangled further. However, not only did uncritical trust in science and uncritical trust in scientists not yield a positive correlation with cognitive reflexivity and cognitive abilities, but uncritical trust in scientists correlated negatively with cognitive reflection and cognitive ability. This suggests that data processing abilities could serve as a buffer against these types of extreme beliefs, i.e. that they decrease uncritical trust in scientists directly, rather than indirectly by moderating the effects as we initially assumed. Arguably, people prone to uncritically trusting scientists tend to simplify the thinking and knowledge processes to reach reliable knowledge quickly through shortcuts.

Taken together, our results show the opposite-direction relationships between scientistic beliefs and self-reported (REI) and ability-based measures of thinking styles (CRT), while we expected them to be in the same direction. When interpreting this, one must keep in mind that self-reported measures allow participants to present themselves in a certain way that might or might not be accurate, whilst this is less true for the ability-based measures. For example, a person who highly values rational thinking could choose high scores for rational thinking in the self-report thinking style measures, but could at the same time make intuitive errors, i.e. score lower on CRT.

Limitations and Future Research

This is, to our knowledge, the first paper that reported the prevalence of scientistic beliefs in the general public and found that they were quite widespread. Having in mind that in a recent study which compared 68 countries Serbia was slightly below average in trust in science (Cologna et al., 2024), there is no reason to assume the social context especially fosters scientism. Nevertheless, we would strongly encourage similar studies in other countries. This would allow further search for factors underlying potential differences, such as the quality of science education.

While we opted to study uncritical trust in science and scientists in general, future research could look for differences between separate science domains, such as between natural or social sciences, or even more specific disciplines, such as physics, chemistry, psychology, economics, etc.

Although it seems that educational level, gender, and age do not confound the relationship between scientistic and irrational beliefs, other mechanisms behind these relationships could be tested, such as trust in scientific institutions or political orientation. We also suggest including more types of irrational beliefs and further exploring their relationship with scientistic beliefs. Unlike the sample in Study 1,

both samples of scientists and laypeople in Study 2 were convenience samples, meaning the conclusions about the difference in the strength of scientistic beliefs cannot be extrapolated to the whole population of either scientists or laypeople. Since it is challenging to collect a representative sample of scientists (i.e., acquiring accurate demographic data for sampling), a matched sampling could clarify some of the ambiguities.

Study 2 provided only partial support for our hypotheses, as the effects were not consistent across the subsamples. Moreover, corrections for multiple comparisons suggest that only correlations in the total sample could be considered robust and replicable. Thus, future studies should try replicating our findings on more diverse samples. However, the evidence provided in this paper may inspire further examination of the relationship between different measures of informational processing style/cognitive biases and scientistic beliefs. They may explore in more detail the differences between performance-based and self-reported measures of information processing styles we observed in this study, as well as the differences between correlates of uncritical trust in science and uncritical trust in scientists. Additionally, future studies may target specific cognitive biases and see whether they expectedly relate to scientistic beliefs. The likely candidates could be "synthetic" bias (as opposed to naturalness bias, Meier & Lappas, 2016) – favoring synthetic products over natural ones even though they have identical chemical features, confirmation bias (Wason, 1960), or base rate neglect (De Neys & Glumicic, 2007), redesigned in such a way as to bias science enthusiasts. For example, base rate neglect tasks could employ scientists and science facts contrasted with pseudoscientists and pseudoscientific claims. Future studies could also relate scientistic beliefs to proneness to overestimate the validity of scientific explanations when they are supplemented with pseudo-informative infographics (Tal & Wansink, 2016), formulae (Eriksson, 2012), or neuropsychological explanations (Weisberg et al., 2008). Other moderators of the effects besides cognitive abilities could also be studied more systematically, such as scientific knowledge, educational background, or media diet. Finally, research could move beyond correlational data by experimentally testing the hypothesized causal relationships between cognitive variables and scientistic beliefs.

Conclusion

Across two studies we observe that uncritical trust in science and scientists is quite widespread. To understand their "irrational" part, we first show they are negatively related to conspiracist, pseudoscientific, and paranormal beliefs, but then demonstrate they, similarly to those beliefs, tend to be typical for people high in need for closure, unable to tolerate uncertainty and with less cognitive reflexivity. This apparently paradoxical finding suggests a need for a less biased view of the irrationality of (dis)trust, as the two opposing sides appear to be more similar in their cognitive footprint than previously assumed. These preliminary results could inspire further research into the psychological aspects of both trust and distrust in science and scientists, whether in terms of cognitive or emotional functioning, personality traits, or contextual influences, ultimately leading to a deeper understanding of both concepts.

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