

Pseudoscience as media effect

Alexandre Schiele

Abstract

The popularity of the anti-vax movement in the United States and elsewhere is the cause of new lethal epidemics of diseases that are fully preventable by modern medicine [Benecke and DeYoung, 2019]. Creationism creeps into science classrooms with the aim of undermining the teaching of evolution through legal obligations or school boards' decisions to present both sides of a debate largely foreign to the scientific community [Taylor, 2017]. And one simply has to turn on the TV and watch so-called science channels to be bombarded with aliens, ghosts, cryptids and miracles as though they are undisputable facts [Prothero, 2012]. Deprecated by its detractors, scientific proof is assimilated to become one opinion among others, if not a mere speculation. Worse, scientific data that challenge partisan positions or economic interests are dismissed as 'junk science' and their proponents as 'shills' [Oreskes and Conway, 2010]. By echoing such statements, some members of the media, often willing accomplices in conflating denial and scepticism, amplify manufactured controversies and cast growing doubt upon scientific credibility.

Keywords

Public perception of science and technology; Representations of science and technology; Science and media

DOI

<https://doi.org/10.22323/2.19020101>

Submitted: 10th April 2020

Accepted: 10th April 2020

Published: 4th May 2020

This paper assesses the prevalence of pseudoscience in contemporary societies, with a focus on English-speaking societies, and the role of the media in this prevalence, as well as discusses the nature of pseudoscience itself. It does not cast judgment, nor does it propose solutions, its only purpose is to shed light on an issue which the author believes is directly (though negatively) relevant to science communication and its ongoing improvement.

The 1970s: a turning point

How can we reconcile the fact that our societies and cultures grow, on the one hand, every day more technoscientific and, on the other, more ambivalent towards science and scientists and, necessarily, their authority [Bauer, Pansegrau and Shukla, 2019]? To answer this question, one must go back to the 1970s and 1980s

and the first postwar mass media pseudoscientific wave. Until then, although present here and there, pseudoscience was largely confined to the fringes of mass media or to fiction, the separation between the real and the fictional remaining clearly demarcated. Yet, on 5 January 1973, when there were only three main channels on U.S. television (ABC, CBS and NBC), NBC broadcast *In Search of Ancient Astronauts*, the first pseudoscientific documentary shown on U.S. television,¹ which was a 1970 German documentary² based on the bestselling *Erinnerungen an die Zukunft (Memories from the Future)* [1968] — translated as *Chariots of the Gods* — and dubbed, reformatted and adapted for U.S. audiences. In his pseudoscientific bestseller, the Swiss Erich von Däniken proposed, from a reinterpretation of founding myths and sacred texts in the light of the possibilities opened by the Space Age, that extraterrestrials had influenced the development of human societies in the remote past. The ratings of the broadcast were such that NBC produced two more documentaries on the same theme (*In Search of Ancient Mysteries*, broadcast on 31 January 1974,³ and *The Outer Space Connection* in February 1975⁴) before giving the go-ahead to a TV documentary series, *In Search of . . .*,⁵ exclusively covering fringe topics from ghosts to the Bermuda Triangle.

Those three documentaries were narrated by Rod Serling, who was expected to reprise his role for *In Search of . . .*, if not for his premature death, which led to Leonard Nimoy being cast instead. Both were closely associated with the then minor genres of fantasy and science fiction — Serling as the narrator of *The Twilight Zone* (1959–1964) and Nimoy as *Star Trek*'s Spock (1966–1969) — and owed their fame to their 1970s reruns [Beeler, 2010; Geraghty, 2010]. And it must be stressed that the U.S. public had for decades already been exposed to those themes through comics, pulps and B movies [Stoczkowski, 1999]. The documentaries were all produced by Alan Landsburg, who had previously left his mark on award-winning science TV documentaries, a genre he helped create [Colker, 2014], lending them credibility (statements became plausible and assumptions believable), without providing the public with the necessary tools to evaluate their scientific validity. In short, a half-century ago, celebrity was already being disputed to expertise, while the demarcation between the real and the fictional was being deliberately blurred. The programs were widely broadcast and rebroadcast internationally, and many would-be imitators sought to capitalize on their success.⁶ They were helped by the transition to cable, which rapidly multiplied the number of channels, the content of which could be tailored to specific audiences. That format has since become dominant.

¹Harald Reinl (director), *In Search of Ancient Aliens*, Los Angeles: Alan Landsburg Productions, 1973.

²Harald Reinl (director), *Erinnerungen an die Zukunft*, Berlin: Terra Film, 1970.

³Fred Warshofsky (director), *In Search of Ancient Mysteries*, Los Angeles: Alan Landsburg Productions, 1974.

⁴Fred Warshofsky (director), *The Outer Space Connection*, Los Angeles: Alan Landsburg Productions, 1975.

⁵Alan Landsburg (producer), *In Search of . . .*, Los Angeles: Alan Landsburg Productions, 1977–1982.

⁶Anonymous, 'Paranormal Documentaries from the 1970s', *IMDb*, August 2019, <https://www.imdb.com/list/ls048487992/> (accessed 20 November 2019) [IMDb, 2019].

The 2010s: a new pseudoscientific and conspiracist wave

The 2010s brought an explosion of pseudoscience content on U.S. television. Nearly every Friday night⁷ for over 10 years, History Channel has asserted and continues to assert to more than a million zealous viewers⁸ that aliens have influenced the course of human history in remote times and that the powers that be deliberately hide this truth. In 2017, *Ancient Aliens*, then in its 12th season, was the fourth most watched TV series among adults aged 18–49 years in the United States, while no science show ranked among the top 25 [Welch, 2017]. No pseudoscience TV series had enjoyed such high ratings since *In Search of...* In the third season (2011), the hitherto hypothesis of alien intervention was upgraded to an undisputable fact. Repetition has its limits, so the series expanded its focus to an ever-wider range of increasingly weirder topics, from the most obscure to the most trending, the only evidence for which was their purported, though patently tenuous, link to aliens. The ratings were such that most channels sought to capitalize on the success of *Ancient Aliens* by creating pseudoscience series of their own, including the Travel Channel.⁹

In the months, weeks and days that preceded 21 December 2012, a date on which pseudoscientific and fundamentalist movements predicted a planetary alignment that would cause catastrophes, increasingly apocalyptic TV documentaries saturated the airwaves [Pfeiffer, 2012]. On 27 May in the same year, and again on 26 May the following year, Animal Planet broadcast two mockumentaries in which fake scientists revealed the existence of mermaids and of a conspiracy to hide it, while barely hinting that they were mockumentaries, each time with record-breaking ratings [De Morales, 2013]. On 4 August 2013 and again on 15 August the following year, Discovery Channel, on the occasion of its yearly and popular *Shark Week*, imitated its sister channel by broadcasting mockumentaries built around the same tropes, this time featuring the prehistoric Megalodon, again barely hinting that they were mockumentaries [Yahr, 2018]. In 2014, U.S. audiences were exposed to over a hundred hours of pseudoscience content each week [Colavito, 2015].

Since 2015, more than 3 million viewers have tuned in to each new episode of *The Curse of Oak Island* [Rejent, 2019], a reality television series now in its seventh season. It is centered on a simple plot: follow treasure hunters hunting for the legendary treasure of Oak Island, Nova Scotia, Canada, where it is believed to be buried and protected by a highly sophisticated system since the 18th century. Finding nothing, the series increasingly resorted to fantasy to preserve its ratings (Captain Kidd's treasure, the Holy Grail, the Ark of the Covenant, a Roman colony, Shakespeare's original manuscripts and so on), allocating airtime to increasingly eccentric individuals [Maher, 2019]. In 2018, the Canadian Broadcasting Corporation aired on its flagship science program a documentary on the Solutrean hypothesis, which holds that the first colonizers of North America were Europeans, although it is considered fringe by the scientific community and mainly promoted by white supremacists who see in it the scientific vindication of the illegitimacy of the First Nations [Raff, 2018]. Pseudoscience documentaries, far from being

⁷On Saturday night since spring 2020.

⁸Down to around 700 000 since autumn 2019, which might explain why it was bumped to another timeslot. Yet, pseudoscience programming continues unabated.

⁹*Expedition Unknown* was first broadcast in January 2015 and is now in its eighth season. Its ratings were such that its producers decided to move it to Discovery Channel, the network's flagship, from its fifth season onward.

marginal, result from deliberate programming decisions aimed to attract high ratings: the same year, Discovery, Inc., in addition to its already copious pseudoscience programming on its various channels, allocated a whole channel (Destination America) to pseudoscience documentaries.¹⁰ Of course, prevalence should not be conflated with popularity or acceptance, although there is an implied overlap.

The scientist: a scripted character

The role played by the producers, who are rarely aware of the current state of science, should under no circumstances be minimized: they allocate airtime, judge relevance and, therefore, grant visibility, all the while filtering, formatting and adapting statements according to the norms of media discourse, including success and profitability criteria [Bourdieu, 1996]. And nothing whips up ratings more than controversy, even manufactured controversy, especially as U.S. media have been under no obligation to present all sides to a debate since 1987.¹¹ Thus, scientists, as any other interviewees, have become scripted characters in a media system in which they rarely master the rules or the settings in which their statements will be used [Babou, 2004]. Their on-screen appearances and statements only make sense within the scripts of the shows they contribute to, but also endorse and legitimize by their mere on-screen appearances. Scientists who have become recurrent guests show after show and season after season, regardless of the topic, have consciously chosen to become the subject of the media system.¹² And that factor is even more evident in pseudoscience shows.

In other words, scientists and experts have lost much of the public authority that the successes of the atomic bomb and the space race had bestowed upon them. Long gone are the days when scientists, and even more so nuclear physicists, were invited to share their opinions on a wide range of topics by low-profile interviewers [Babou, 2004]. In 1994, the pseudoscience documentary *The Mystery of the Sphinx*, broadcast by NBC and presented by famous actor Charlton Heston, was awarded a News & Documentary Emmy Award by the U.S. media community over the objections of the academic community [Associated Press, 1992].

The most extreme case to date is without doubt the 2009 Climategate manufactroversy. It was first cooked up by the internet global warming denialist fringe, then reformulated within the norms of media discourse by the tabloid press before making front-page news in major outlets for weeks. Climate scientists came to be subjected to unrelenting attacks and insults before being summoned by the media to justify themselves in front of the public. This sequence of events played an unmistakable part in the failure of the Copenhagen Climate Conference, and such was the intent of its originators [McKie, 2019].

Today, this pipeline, which goes from the fringes of the internet to mainstream media, largely catalyzed by the clickbait phenomenon (ad revenues being linked to the number of clicks), amplifies and legitimizes the presence of pseudoscience in the public sphere [Colavito, 2019].

¹⁰Undoubtedly a case of unintended irony.

¹¹In re: Complaint of Syracuse Peach Council against Television Station WTVH Syracuse, New York, 2 FCC Rcd 5043 (1987).

¹²An abundant literature exists on the issue of 'science media personalities'.

**No correlation
between schooling
and
pseudoscience**

Since 2016, the U.S.-based Chapman University has conducted surveys on the paranormal beliefs of the U.S. population. According to its latest survey [2018], 58% believed in ghosts, 57% that a high-technology civilization existed in the remote past, 41% that aliens have influenced the development of ancient human societies, 35% that aliens are among us, 26% that it is possible to move objects with the power of the mind, 21% in Bigfoot, and 17% in mediums and fortune-tellers. If a quarter declares 'no beliefs', more than 60% entertain 'multiple' beliefs. Even more significantly, the numbers of those who profess one or more beliefs rose between 2016 and 2018, and two categories grew by nearly 15%: the belief that a high-technology civilization existed in the remote past, and the belief that aliens have influenced the development of ancient human societies. In other words, pseudohistory merges with pseudoscience. Should we conclude that a large segment of the population is uneducated, lacks critical judgment and has not assimilated the basics of the scientific method, which, until now, only formal education has been shown to foster?¹³

The member nations of the Organisation for Economic Co-operation and Development, such as the United States, rank among the world's richest, freest and, more significantly for us, most educated. The overwhelming majority of their adults have graduated from high school (79%) and a growing proportion hold university diplomas (37% overall; 44% for 25–34-year-olds), and those numbers increase with each succeeding generation. In the United States, these numbers are higher (91%, 46% and 48%), and in Canada the highest (91%, 51% and 61%) [National Center for Education Statistics, 2019]. Those numbers prove that laying the blame for the growing popularity of pseudoscience upon a presumed general illiteracy or a failure to think critically is not merely fallacious, but occults the complexity of the current state of pseudoscience. To echo today Charles Mackay's [1841] 'extraordinary popular delusions and the madness of crowds' or Martin Gardner's [1957] 'fads and fallacies' and 'human credulity' would be simplistic, and yet Michael Shermer, President of the Skeptics Society and a main figure in the U.S. debunking movement, did just that when he candidly wondered in 1997, 'why people believe weird things', before asserting that '[their] normal thinking [must have] gone wrong in some way' [1997, p. 45]. The inescapable conclusion is that there is no correlation between schooling and the prevalence of pseudoscience.

**Pseudoscience: a
mass media
communication
issue**

Few are those who engage with pseudoscience, and more often than not those who do limit themselves to subjecting claims they dismiss as pseudoscientific to denunciation or ridicule, without feeling the need to justify themselves [e.g. Switek, 2013]. For example, Gardner [1957, p. 248] merely invoked his own authority as a mathematician to dismiss the [1948] and [1953] Kinsey reports on human sexuality, which today are celebrated as pioneering works of sexology. To intelligently engage pseudoscience is a long-term yet rarely gratifying exercise, and few heed the call,¹⁴ while the majority of scientists simply opt to ignore it. In general, the very expression 'pseudoscience' serves to devalue statements rather than to classify a category of discourse in circulation within society. Yet, in order to take up the

¹³G. Bachelard [1938] was the first to introduce the concept of 'epistemological rupture' to account for the moment an individual moves beyond 'common sense' towards 'science-based thinking'.

¹⁴See, among others, the works of Jason Colavito (<http://www.jasoncolavito.com>), Andy White (<https://www.andywhiteanthropology.com>), Brian Dunning (<https://skeptoid.com>) and Kenneth Feder [2017].

challenge of the increasing prevalence of pseudoscience, it is important to understand both the origin and present state of pseudoscience as an analytical category.

Often, the terms 'antiscience' and 'pseudoscience' are used interchangeably, even though they express distinct, yet overlapping, concepts [e.g. Lamberts and Grant, 2016]. Science, antiscience and pseudoscience emerged simultaneously, and it is in relation to the definition of science that antiscience and pseudoscience should be defined.¹⁵

Science is a five-dimension system involving:

1. an *ontological postulate* founded on the rejection of all explanations or justifications calling upon tradition, common sense or the supernatural
2. a *method* founded on the formulation of falsifiable hypotheses that specify the conditions of their falsification, and obtaining and interpreting results in the light of those conditions and subject to peer review
3. a *systematized body of knowledge* established by the consensus of the scientific community and consisting of the observations obtained and reproduced by the application of this method and of theories that not only explain the observed facts and their relations to one another but also predict new observations by specifying the conditions of those observations
4. an *institution* structured around its own rules, procedures and actors governing the selection and the relations of its actors, on the one hand, and the evaluation of their research and publications in all their scientific dimensions, on the other
5. a *social construct* that always seeks to embody completeness even though it is in a state of constant yet gradual development, the form it embodies at any given moment being only transitory.¹⁶

A position that would reject all those dimensions would unquestionably be antiscientific. Such a position is today rare, although it was historically the first reaction to the challenge posed by emerging scientific rationality. In other words, antiscience and science constitute two poles of a continuum, and it is only by thinking in terms of that continuum that the falsifiable yet still untestable mathematical models of theoretical physics and more established theories without practical applications retain all their scientific legitimacy [Castelvecchi, 2015]. Pseudoscience (such as homeopathy and the theory of intelligent design), in contrast to antiscience and science, lays claim to scientific-ness and mimes the scientific process without being scientific by relying on jargon derived from scientific language, unfalsifiable hypotheses, non-reproducible conclusions, and an imitation of the institutional rules of science. Pseudoscience stages a simulacrum of science that overemphasizes its own exterior signs. Paradoxically, the

¹⁵For example, alchemy can be defined as a protoscience, because it produced new discoveries before the emergence of the scientific method and of chemistry, which is its outgrowth. On the other hand, when alchemy continues to be promoted as a legitimate field of research parallel to chemistry, it is a pseudoscience.

¹⁶It is neither the place nor the time to enter the debate between Merton [1973]'s 'ideal science' and Latour [1987]'s 'science in practice'.

marginalization of antiscience and the challenge of pseudoscience bear witness to the legitimacy and centrality of science in modern society.

As Gardner pointed out, pseudoscientists, notwithstanding their ignorance of science and of the field in which they attempt to make their mark, do not reject the authority of either science or the scientific community, but the authority of their detractors, while equating themselves with the great scientists persecuted yesterday but celebrated today. In other words, pseudoscientists seek the recognition of the scientific community [1957, pp. 12–14], and it is out of spite that they then turn to the general public. However, in doing so, pseudoscientists become *communicators*. Likewise, scientists who devote a significant part of their professional activities to science communication — such as Sir David Attenborough, a biologist by training — cease to be scientists within the frame of their communication activities, since they are subject to the conditions and rules of media production. In fact, most of those dismissed as engaging in pseudoscience do not themselves claim any scientific expertise and are first and foremost pseudoscience communicators. Overall, the public's first contact with pseudoscience is through the mainstream media, which consciously lends it greater visibility and reach. In other words, the prevalence of pseudoscience today is inseparable from the pervasiveness of the media. This is the only logical conclusion.

Conclusion

Technoscience has become a major actor in the transformation of society, and its impact is more decisive than ever. In the past decade, particularly, we have seen an acceleration of the convergence of consumer communication technologies and, in parallel, the acceleration of the spread of pseudoscience in all walks of life. If, during the 19th century, and even in the wake of World War II, the persistence of beliefs and superstitions could be attributed to endemic undereducation, today the situation is reversed: contemporary societies have all made access to education a priority. This is why to continue to impute the prevalence of pseudoscience to a deficit of scientific knowledge, as too many still do, expresses a profound ignorance of the present situation. Even worse, such a stand occludes more than it enlightens the reality of the progression of pseudoscience in highly educated societies. All the evidence suggests that this movement is linked to the autonomization of the media,¹⁷ which is itself catalyzed by technoscientific advances.¹⁸

The 2010s involved an explosion in the numbers of TV series and documentaries laying claim to scientific-ness while sharply departing from the consensus of the

¹⁷Media autonomization is the process by which the media develop their own rules for the selection, ranking and coverage of any topic, including science topics, thereby removing it from the rules of its original sphere.

¹⁸In a future reflection, the hypothesis that the counterintuitive 'reality' constructed by science today (such as the laws of quantum mechanics) clashes with the physical world as perceived by our five senses should be further investigated. The world as described by science has long diverged from the world experienced daily, while the ever-growing body of knowledge necessary to make sense of even a single domain limits its mastery to specialists in the particular domain, and yet it is far from certain that they themselves can. In this spirit, we can ask whether, by some surprising reversal, pseudoscience reconnects what has become disjointed. Aliens have become so commonplace in popular culture that an eventual official announcement of their existence would seem to be confirmation of their existence. And are not astrophysicists actively searching for habitable and potentially inhabited exoplanets? As ghosts, cryptids and other phantasmagorical beings, that is another story...

scientific community (*America Unearthed, Decoded, Forbidden History, Search for the Lost Giants* and so on). Some members of the media deliberately blur the demarcation between pseudoscience and science by employing the same format, which by its play on the plausible orients the public towards seeing the plausible as the probable. The best illustration of this is the deliberate broadcasting of mockumentaries by science channels in between their normal programming and making mockumentaries that are indistinguishable from their science documentaries. If the mockumentaries regularly draw the subsequent though limited and barely visible ire of experts, the public, in the act of watching, is left to its own devices to distinguish the probable from the improbable. The fact that the U.S. media are no longer subjected to the obligation to present a balanced coverage reinforces this difficulty in distinguishing between the two.

The pseudoscience turn on U.S. television began in the 1970s, at the very moment the media altered its relationship with scientists. From the scientists' central presence, in front of which the media adopted a low profile, they have become scripted characters in the service of the narrative of the show, the rules and script of which scientists remain largely unaware, and are often selected by ratings-driven media less for their expertise than for their media visibility. The same goes for the presenters of pseudoscience documentaries, who in the beginning were recruited from the then minor genres of fantasy and science fiction TV series in choices that contributed to the blurring of the demarcation between the real and the fictitious.

There is a clear parallel with the 'fake news' phenomenon and the rise of extremisms of all kinds, and it can be surmised that a single dynamic is in play: a proliferation of information in which the true, the false and the fallacious simultaneously coexist while escaping traditional filters (limited sources, gatekeepers, opinion leaders, group consumption, social interactions) [Lazarsfeld, Berelson and Gaudet, 1944], propagated by a diversity of channels (print, radio, television, internet, social media), and that therefore are not only readily available to any agent or organization prone to taking advantage of them but also open to anyone's interpretation. In the hall of mirrors that is the digital space, validated, invalidated, manipulated and even deceptive information is constantly relayed and reactivated, illusion and reality simultaneously coexist, and every scrap of information is a hyperlink, which, by linking to other supporting scraps of information-cum-hyperlinks, poses to anyone the risk of being trapped within an echo chamber [Oreskes and Conway, 2010].

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Author

Alexandre Schiele is a postdoctoral researcher at the Hebrew University of Jerusalem. He holds a Ph.D. in Communication science (Sorbonne Paris Cité, 2017) and another in Political science (University of Quebec at Montreal, 2018). He pursues his research in two distinct directions. On the one hand, he studies science communication in the media, and has contributed to the project 'Mapping the new communication landscape in Canada' (2017–2018). On the other hand, he studies classical and contemporary Chinese political thought. Among his latest publications, of note is: 'Étude du dispositif du Monde diplomatique: la couverture de l'évolution de la conjoncture chinoise entre 1975 et 1992 (2018).

E-mail: alexandre.schiele@mail.huji.ac.il.

How to cite

Schiele, A. (2020). 'Pseudoscience as media effect'. *JCOM* 19 (02), L01. <https://doi.org/10.22323/2.19020101>.



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