Received: 19 December 2023 | Accepted: 25 July 2024

DOI: 10.1111/theo.12554

ORIGINAL ARTICLE

On epistemic black holes: How self-sealing belief systems develop and evolve

Maarten Boudry[1] | **Steije Hofhuis**[2]

[1]Department of Philosophy and Moral Sciences, Ghent University, Ghent, Belgium

[2]Research Area Migration and Diversity, Berlin Social Science Center (WZB), Berlin, Germany

Correspondence
Maarten Boudry, Department of Philosophy and Moral Sciences (UGent), Ghent University, Ghent, Belgium.
Email: maartenboudry@gmail.com

Funding information
Fonds Wetenschappelijk Onderzoek

Abstract

Many pseudosciences, conspiracy theories and other unfounded belief systems have a self-sealing nature, being equipped with defence mechanisms and immunizing strategies that protect them against counterevidence and criticism. In this article, we discuss the existence of 'epistemic black holes', belief systems which posit intelligent agents that are deliberately evading detection and thus sabotaging any investigation into their existence. These belief systems have the remarkable feature that they predict an absence of evidence in their favour, and even the discovery of counterevidence. The most obvious instances of such epistemic black holes are unfounded conspiracy theories, but examples crop up in other domains as well. We outline the development and cultural evolution of epistemic black holes, drawing from a number of case studies. Most importantly, because of their self-sealing character and resilience to counterevidence, epistemic black holes suffer from a recurring problem of arbitrariness and proliferating alternatives. Shedding light on how epistemic black holes function can help to inoculate people against their enduring allure.

KEYWORDS

agency, belief systems, conspiracy theories, cultural evolution, epistemology, Freudian psychoanalysis, witchcraft beliefs

1 | INTRODUCTION

'To believe passionately in the palpably not true', wrote the American essayist Herbert L. Mencken, 'is the chief occupation of mankind' (Mencken, 2012, p. 616). Mencken was clearly overstating his case, as most of our everyday beliefs about the world are at least approximately accurate, but his despairing sentiment is understandable and shared by many today. Here is a sample of some extremely implausible and unfounded beliefs that are endorsed by

In memory of Dan Dennett (1942–2024), a wellspring of memes worth spreading.

many apparently sane and rational people even in the age of modern science: The Moon landing never happened but was staged in a Hollywood studio; extraterrestrial visitors have abducted people in their sleep to conduct sexual experiments; every young woman harbours an unconscious desire to possess a penis, which is later transformed into a wish to have a baby; the 9/11 attacks were an inside job carried out by the Bush administration; all living creatures were created in their present form a couple of thousand years ago; Hillary Clinton and her ilk are running a child sex-trafficking ring from the Pizzeria Comet Ping Pong in Washington; the vaccines against COVID-19 contain nano-tech microchips invented by Bill Gates in a plan for mind control and world domination; the world is run by a super-race of extraterrestrial lizards beings that have the power to adopt human shape; and the Earth is a flat disc surrounded by a wall of ice known as 'Antarctica'.

Why do people (profess to) believe such bizarre things? Over the past decades, psychologists, cognitive scientists and sociologists have greatly enriched our understanding of human irrationality and its causes (Kahneman, 2011; Mercier, 2020; Pinker, 2021). Some of these explanations include the following: We are prone to motivated reasoning (Kunda, 1990), my-side bias and political partisanship (Mercier, 2022) and identity-protective cognition (Kahan, 2017). We are susceptible to a host of reasoning errors, biases and other cognitive foibles (Kahneman, 2011). We are led astray by evolved intuitions that work in ecologically valid contexts but fail outside of them (Blancke & De Smedt, 2013; Pinker, 2010; Todd & Gigerenzer, 2012).

In order to understand why people believe weird things, however, we also have to look at the cultural evolution of *belief systems*. Beliefs are cultural representations that are transmitted from one individual to the next and that are constantly undergoing a process of variation and selection (Dennett, 2017; Lewens, 2015; Mesoudi, 2011; Richerson & Boyd, 2005; Sperber, 1996). Previous research on the cultural evolution of belief systems has shown that pseudosciences, conspiracy theories and other unfounded belief systems often have a self-sealing nature, being equipped with certain defence mechanisms and immunizing strategies that protect them against counterevidence and criticism (Boudry & Braeckman, 2012). Rather than being 'palpably untrue', as Mencken would have it, such belief systems are often extremely resilient in the face of contrary evidence, because they are embedded in broader networks of belief (Dawson, 1999; Dennett, 2006; Friesen et al., 2015; Law, 2011; Popper, 1963/2002). This helps to explain why human societies are susceptible to what the World Health Organization (WHO) calls 'infodemics' (Zarocostas, 2020), outbreaks of misinformation and misbelief.

In this article, we explore a particularly striking category of such self-sealing belief systems. We call them 'epistemic black holes', because they exert an exceptionally strong attraction on unwitting believers, and because it is very difficult to escape from them once you have fallen into their orbit. What these belief systems have in common is that they posit a form of intentional agency (either a single agent or a consortium of different agents working together) that deliberately attempts to evade detection and sabotage our investigation into its/their existence. The most straightforward examples of epistemic black holes are unfounded conspiracy theories about historical events, but they crop up in other domains as well. By exploring such self-sealing belief systems in a range of different domains, we gain a better insight into their enduring appeal and their cultural development.

Here is an outline of the article. First, we present the conceptual outline of epistemic black holes (Section 2.1) and compare our framework to existing approaches (Section 2.2). Next, we show that epistemic black holes can be found in a range of different domains, starting with conspiracy theories about historical events (Section 3.1). We then outline epistemic black holes in the domain of supernatural belief: After briefly discussing the tradition of 'divine hiddenness' in theism (Section 3.2.1), we develop the case study of witchcraft beliefs in early modern Europe (Section 3.2.2). Finally, we look at a surprising example of an epistemic black hole in the history of psychology: Freudian psychoanalysis and its notion of the 'unconscious'. In Section 4,

we make some observations about the cultural dynamics and development of epistemic black holes. In particular, owing to their self-insulating nature, they suffer from arbitrariness and a proliferation of alternatives. As a result, they are liable to schisms and internal disarray (Section 4.1) and often evolve to reflect changing cultural environments (Section 4.2).

2 | EPISTEMIC BLACK HOLES

2.1 | Definition

If we want to explain the world, we often have to invoke the existence of 'unobservables', invisible entities and processes that are not directly observable by human senses. In some of our explanations, we also invoke the actions of *agents*: intelligent entities capable of harbouring intentions, developing plans or forming desires (Dennett, 1987). Some belief systems conjoin these elements in a way that gives rise to a special epistemological situation: They posit some form of hidden intelligent agency that is deliberately trying to evade detection and thus to thwart any investigation into its existence or actions. As we see, some such beliefs involve different agents working in consort, whereas others postulate just one unified agent scheming behind the scenes.

Even though invisible agents with deceptive intentions definitely exist, belief systems involving such agents threaten to create what can be termed an *epistemic black hole*, into which unwary truth-seekers may be drawn, and from which it is very difficult to escape again (Boudry, 2023). We borrow the analogy between belief systems and black holes from the philosopher Stephen Law, who talked about 'a bubble of belief that, while seductively easy to enter, can then be almost impossible to think your way out of again.' (Law, 2011, p. 9). In our proposal the metaphor is meant to capture three observations:

1. People may gradually 'fall into' such a belief system by means of arguments and inferences that are ostensibly reasonable (or at least not obviously irrational), and there is no clearly defined point beyond which the refusal to give up the belief system becomes irrational. Rescuing a hypothesis from refutation with auxiliary assumptions is often perfectly rational (Poth & Dolega, 2023), even in science (Lakatos, 1968), but the difference is that epistemic black holes can engender such rescuing auxiliaries with remarkable facility, in a way that flows naturally from the core belief (see Section 4.1).
2. Once people have endorsed such a belief system, for whatever reason, it may be very hard to shake them out of their conviction. Belief perseverance is a well-established phenomenon in psychology, but epistemic black holes are unusually powerful vehicles for such belief perseverance (Friesen et al., 2015). Because of the structure of the belief system, believers can explain away any absent evidence, counterevidence or intellectual challenge they are confronted with.
3. Epistemic black holes need not be designed by clever human agents to be self-sealing and hard to escape from. Instead, they may naturally arise when people contemplate the hypothesis of invisible agents with certain characteristics. Epistemic black holes may result not only from intelligent design but also from 'blind' cultural design, arising from a process of variation and selection (Boudry & Hofhuis, 2018; Dennett, 2006, 2017).

2.2 | Theoretical framework

Before we move on to our three case studies, we want to point out some similarities and differences with existing approaches to belief systems. Our account of epistemic black holes should

be situated within cultural-evolutionary approaches to beliefs and belief systems (Henrich, 2015; Kelly & De Block, 2022; Lewens, 2015; Norenzayan, 2013; Richerson & Boyd, 2005; Wilson, 2003). In particular, our metaphor of gravitational attraction is reminiscent of Dan Sperber's model of *cultural attractors* (Boudry et al., 2015; Sperber, 1996). According to Sperber, beliefs and other cultural representations tend to converge around certain identifiable 'attractors' in the space of all possible representations. In Sperber's epidemiology of representations, the location of these cultural attractors is mostly (though not exclusively) determined by universal and innate features of the human mind. Certain types of representations recur across cultural environments because they resonate with human intuitions, cognitive biases and psychological tendencies and hence are more readily distributed and disseminated. Epistemic black holes can be regarded as exceptionally strong cases of such cultural attractors: They are belief systems equipped with a self-sealing logic that render them extremely alluring and hard to resist.

By adopting a belief-centred perspective, our approach also draws from memetic approaches to culture, following Richard Dawkins' concept of a meme as a unit of cultural information (Boudry & Hofhuis, 2018; Blackmore, 2000; Dawkins, 1976; Dennett, 2017; Schlaile et al., 2023). Belief systems can be regarded as cultural products that evolve through a process of variation and selection and that exhibit 'free-floating rationales' (Dennett, 1995, pp. 78, 164–165) of their own that do not always align with those of their human hosts. In some cases, systems of misbeliefs can be regarded as 'parasitical' (Boudry & Hofhuis, 2018) in the sense that they end up subverting human interests and harming human societies, exploiting our psychological weaknesses and protecting themselves against external attacks (Norman, 2021; Van der Linden, 2023).

Finally, our notion of epistemic black holes also shares some similarities to C. Thi Nguyen's (2020) recent work on *echo chambers* of false beliefs and how these are protected by 'disagreement-reinforcement mechanisms'. In this process, believers are led to expect the expression of external challenges and contrary beliefs, which thereby reinforce the original belief in the echo chamber. The main difference is that Nguyen's account deals with certain epistemic communities and how they are organised to shield believers from external challenges (see also Begby, 2021), while our account outlines the internal rationale of certain belief systems in their own right. 'Disagreement-reinforcing mechanisms' can be seen as shrewd strategies that are deliberately designed by some gurus or cult leaders to shield their followers from hostile criticism, while the mechanisms we describe follow seamlessly from the belief system itself and need not be devised by intelligent designers having such 'defensive' purposes in mind (Boudry & Braeckman, 2012).

3 | CASE STUDIES

3.1 | Unfounded conspiracy theories

If one defines a 'conspiracy theory' simply as an explanation of history (or recent events) that centres around a secret plot, usually with nefarious intentions, then it should be clear that not all conspiracy theories are unfounded or false.[1] Indeed, the pages of history are replete with well-documented conspiracies (e.g., the Watergate scandal, the murder of Julius Caesar, the October Revolution, the Moscow show trials), and there may be others that we have yet to unveil. But this is not how the term 'conspiracy theory' is ordinarily used (Douglas et al., 2022;

[1]In recent years, a number of philosophers have challenged the notion that 'conspiracy theories' (defined in this broad and neutral sense) suffer from some sort of general deficiency, arguing that every conspiracy theory should be evaluated on its own merits. For a defence of this 'particularist' approach, see Buenting and Taylor (2010), Dentith (2018, 2019) and Pigden (1995). For a defence of more 'generalist' positions, see Harris (2018), Napolitano and Reuter (2021) and Stokes (2018).

Napolitano & Reuter, 2021). Instead, 'conspiracy theories' refer to a class of unfounded and unofficial theories that are held in the absence of good evidence. Examples include the belief that the Moon landing was staged in a Hollywood studio, that 9/11 was an inside job perpetrated by the Bush administration, that Lee Harvey Oswald was a patsy for a larger plot against John F. Kennedy (JFK) or that the Sandy Hook school shooting was staged with paid actors as part of a gun control campaign. It also includes broader conspiratorial worldviews that explain all or most historical events as resulting from the intentions of a small cadre of invisible actors, such as the Elders of Zion, the Rothschilds or the Illuminati (Byford, 2011; Pipes, 1999; Uscinski, 2018).

In our view, all these theories can be characterized as epistemic black holes. Even though some of them had some plausibility when initially proposed (such as the theory that Lee Harvey Oswald was just a patsy in a larger plot against JFK), proponents of this view have gradually fallen into an epistemic black hole from which it is very difficult to escape.

The attraction of such an epistemic black hole is easy to understand. If you postulate the existence of intelligent agents working behind the scenes to cover up the evidence for their existence, then you have some reason to expect an absence of evidence for your theory and even the discovery of (false) counterevidence. If the conspiracy is real, after all, the conspirators will try their best to throw you off the scent and sabotage your investigation (Clarke, 2002; Keeley, 1999). Depending on how powerful and smart the culprits are, it can therefore become very hard to definitively refute a conspiracy theory or to convince yourself that the conspiracy is a figment of your imagination. From a Bayesian point of view, it is often *rational* to protect your central hypothesis from disconfirmation by resorting to novel auxiliaries (Poth & Dolega, 2023). By their very nature, conspiracy theories have an 'elaborate support structure of auxiliary hypotheses' (Gershman, 2019, p. 22) that afford protection against virtually any conflicting evidence. Or as Napolitano calls it, unfounded conspiracy theories exhibit 'evidential self-insulation' (Napolitano, 2021).[2]

Indeed, from the internal perspective of believers, attempts by outsiders to refute the conspiracy are to be expected, because the conspirators and their accomplices want to cover up their tracks. When believers do inevitably encounter such challenges, this will often serve to reinforce the original belief system (Nguyen, 2020). By reasoning in such ways, it becomes possible to maintain conspiracy beliefs in the complete absence of any positive evidence, even in the face of strong counterevidence and dissent. This is not just because of some psychological defect on the part of conspiracy theorists (although these surely also play some role) but because of the very structure of the belief system within which they reason.

How do we distinguish legitimate hypotheses about conspiracies from epistemic black holes? In physics, the *event horizon* is defined as the boundary around a black hole beyond which not even light can escape. Although there is no equivalently clear-cut 'horizon' in the domain of conspiracy theorising, a tell-tale sign of epistemic black holes is that they have a tendency to grow larger and more elaborate over time. To explain away missing evidence or apparent counterevidence, conspiracy theorists are forced to either enlarge the circle of conspirators or attribute ever more power and cunning to them (Boudry, 2023; Clarke, 2002; Keeley, 1999; Shermer, 2022). In this way, an initially credible conspiracy hypothesis about a specific historical event (such as the murder of JFK) may degenerate into an epistemic black hole when people end up attributing superhuman powers and intelligence to some unseen conspirators working behind the scenes.

Perhaps the most infamous document in the history of conspiracy theories, which was used by the Nazis as a 'warrant for genocide' (Cohn, 1967), is the *Protocols of the Elders of Zion*. In

[2]In comparison with our approach, Napolitano's (Napolitano, 2021, p. 86) account of 'evidential insulation' places more emphasis on the psychological attitudes of believers. Indeed, her very definition of 'conspiracy theory' (in the pejorative sense) is not so much a certain type of theory or explanation but a particular 'way of holding a conspiratorial belief', namely one that is completely immune to counterevidence.

actual fact, the document is a forgery originating in 19th century Czarist Russia and had been exposed as such long before the Nazi party and assorted antisemitic movements throughout Europe started touting the document as evidence of a global conspiracy of international Jewry. Interestingly, when strong evidence of the forgery was unearthed, according to the historian Jovan Byford, 'many of the book's admirers simply dismissed [it] as a campaign by Jews to undermine the "leaked" document which exposes so clearly their sinister secret' (2011, p. 55). In a similar vein, according to Hannah Arendt, the story of a global Jewish conspiracy benefited from the built-in and self-sealing notion that the 'more consistently a discussion of the Jewish question was avoided by all parties and organs of public opinion', the more believers became convinced that 'Jews were the true representatives of the powers that be' (Arendt, 1951/2017, pp. 462–463).

Although such arguments appear blatantly question-begging, they make sense from the perspective of the conspiracy theory. After all, if the *Protocols* had been an authentic document and if the Elders of Zion as portrayed there really existed, we would *expect* them to dissimulate the evidence for their secret plans. Similarly, if the Jews really controlled all political parties behind the scenes, we would expect those parties to remain suspiciously silent on (or dismissive of) the 'Jewish question'. In the 1905 introduction to the *Protocols*, the reader is warned not to be fooled by the absence of witnesses to corroborate the reality of the organisation and their evil plans. In fact, such an absence of evidence is exactly what we should expect:

> were it possible to prove this world-wide conspiracy by means of letters or by declarations of witnesses, […] the "mysteries of iniquity," would by this very fact, be violated. To prove itself, it has to remain unmolested till the day of its incarnation in the "son of perdition" […]. (Nilus, 2009, p. iv)

Even today, a full century after having been debunked, the *Protocols* are still being regularly reprinted, disseminated and discussed as an authentic document, now predominantly in the Islamic world but also elsewhere.[3]

A similar self-sealing logic can be observed with many other popular conspiracy theories. When the 9/11 Commission, set up by the US Congress, published its final 585-page report in 2004, reviewing half a million documents and detailing the responsibility of Al Qaeda and the failures of US intelligence agencies in excruciating detail, conspiracy theorists were hardly impressed. After all, if the US government had itself staged the attack as a false flag operation, in order to create a pretext for invading Iraq and Afghanistan, we would *expect* them to fabricate a sham report full of false evidence and distortions.[4]

A more recent example shows that even when direct and first-hand contrary evidence manages to shake one believer out of his conviction, this will hardly persuade others. In right-wing conspiracy circles, there is a widespread belief that a cabal of Democrats including Hillary Clinton and Barack Obama are sexually molesting and trafficking children and that this sex-trafficking ring is run from the basement of the Pizzeria Comet Ping Pong in Washington, D.C. In December 2016, one member of a popular right-wing forum on Reddit, 28-year-old Edgar Welch, raided the pizzeria with an assault rifle to investigate the scene. When he failed to discover any abducted children, Welch surrendered to the police and apparently admitted that the sex-trafficking ring did not exist after all. But other believers on the same forum were not as easily persuaded and interpreted Welch's change of mind as evidence that he was an actor paid

[3]A list of contemporary imprints of the *Protocols*: bit.ly/3qU7W7a.

[4]It should be noted that the US government itself had also provided grist to the conspiracist mill by publishing an earlier report on 9/11 in 2002 (*Joint Inquiry into Intelligence Community Activities Before and After the Terrorist Attacks of September 11, 2001*), in which 28 pages relating to links with Saudi Arabia were redacted, fuelling suspicions of a cover-up. Even when these pages were declassified and released in 2016, however, this hardly put to rest the 9/11 Truth Movement, because surely, would we not expect the US government to admit to its own complicity?

by the Deep State to discredit conspiracy theorists, thus providing further evidence of the conspiracy (Nguyen, 2020, p. 8). And indeed, if you already believe that the government is willing and capable of staging elaborate false flag operations to discredit its enemies, this does not seem like a huge leap of reasoning.

Psychologists have found that one of the best predictors for belief in one given conspiracy theory is belief in different conspiracy theories. To explain this phenomenon, Goertzel (1994) has proposed that conspiracy thinking forms a 'monological belief system', in which all conspiracy theories reinforce each other, sometimes even mutually contradictory beliefs. But this approach underestimates the internal logic of conspiracy theories, and it also fails to explain why different conspiracy theories cluster along partisan lines (Enders et al., 2021). If you already believe that some agent or organisation has massively deceived us about one historical event, it becomes more reasonable to accuse that agent (but not necessarily others) of similar deception. For instance, if you already believe that the US government has pulled off one major false flag operation (e.g., the 9/11 attacks), it becomes more plausible to suspect more false flag operations when another terrorist attack occurs.

3.2 | Religion and supernatural black holes

3.2.1 | Divine hiddenness

The realm of religion and supernatural belief offers a wide array of unobservable 'occluded agents' (Robertson, 2016) that are residing beyond the visible universe and may be interfering with the evidence for their own existence, thus potentially opening up an epistemic black hole. Most obviously, important strands within the world religions of Islam and Christianity conceive of God as secretly working behind the scenes, even covering up the evidence for his own existence. In the Bible, for instance, God is sometimes portrayed as deliberately hiding from human beings, as in this complaint from the Book of Isaiah: 'Truly, thou art a God who hidest thyself' (Isaiah 45:15). Similar ideas can be found in the Quran, where God tells the faithful that he sometimes deliberately hides his actions to test the strength of their faith.[5] Many Christians believe that, after creating the universe, God has retired from the world. This conception of God, which is known as *deus absconditus* or the problem of divine hiddenness (Schellenberg, 2006), is a recurring theme in the Christian tradition (Philipse, 2012, pp. 302–309). God is not just invisible to the human senses but remains elusive even to those who actively seek him. Events that are apparently at odds with the notion of a hidden divine plan are often explained away by arguing that 'God moves in mysterious ways' (Boudry & De Smedt, 2011).

Theologians and ordinary believers have developed different justifications for divine hiddenness, the most dominant being that it is a test of faith (Schellenberg, 2006). If God revealed himself for all the world to see, it would be too easy to believe in his existence. A related response is that God wants to give us morally significant free will and that revealing himself in any manifest way would take away that freedom (Swinburne, 2004). Whatever the rationale for divine hiddenness, what it comes down to is a form of divine deception (Nieminen et al., 2017). God *could* clearly reveal himself to us and proffer evidence for his existence, but for whatever reason he is concealing himself and even covering up his tracks.

An extreme example of such divine deception, developed by some young-earth creationists, is that the apparent geological and fossil evidence for evolution and for an old earth was

[5]See, for example, 'We alternate these days of victory and defeat among people so that Allah may reveal the true believers, choose martyrs from among you […] Do you think you will enter Paradise without Allah proving which of you truly struggled for His cause and patiently endured?' (Quran 3:137–140).

actually fabricated by God to test our faith or by the devil to lure us into disbelief (e.g., Ham & Cardno, 1987; Morris, 1963). According to the Omphalos hypothesis by a 19th-century theologian Philip Gosse (1857), it was God himself who gave the world a perfect appearance of old age when he created it, including fossil remains of animals that never existed and even fake light travelling from non-existent distant stars.

Even if there may be good independent grounds for believing in the existence of a deity, the combined features of omnipotence and an intention to engage in deliberate deception can be regarded as an epistemic black hole: Once you adopt this hypothesis, nothing can possibly conflict with it.[6] However, the concept of divine deception and its related justifications remains controversial. Even though it appears in some strands of Christianity and Islam, mainstream traditions claim that God left the evidence for his existence all around us, at least for those who are willing to see (Philipse, 2012). In this conception, God *does* want to be known by his creatures and is actually revealing himself to us, although perhaps not in incontrovertible ways that could settle religious disputes once and for all (Boudry & De Smedt, 2011). For the purposes of this article, we therefore want to turn our attention to a more specific and historical case study of an epistemic black hole centred around different supernatural beings: witches.

3.2.2 | The cumulative concept of witchcraft

In early modern Europe, there was a widespread belief among Christian communities that 'witches' were living in their midst, fellow human beings who were in league with the Devil and who used magical powers to destroy harvests, spread illness or cause other mayhem. In many versions of the belief system, there was a literal 'conspiracy' in the form of a witches' sabbath, nightly gatherings in which witches from all across the region consorted with each other and worshipped the Devil, concocting evil plans to wreak havoc in human communities. Satan constantly tried to seduce people into this sinister alliance, especially through sexual intercourse. Estimates vary, but probably up to 50,000 or 60,000 people, accused of practising witchcraft, have been executed in total (Goodare, 2016; Hofhuis, 2022; Levack, 2016).

Even at the time, there was already pervasive scepticism about the guilt of the executed, as well as about the existence of this diabolical sect in the first place. However, the witchcraft doctrine was ingeniously adapted to fend off such criticisms. It was thought to be an essential feature of the witchcraft conspiracy that the Devil, his demons and witches were continually hiding the evidence of their malfeasance. The crucial crimes, such as using harmful magic and sabbath attendance, normally all happened while nobody was watching: 'Much is hidden, below the surface, and secret', one contemporary wrote (Hofhuis, 2022). Demons were fallen angels, so they still possessed many supernatural powers to create illusions for deceiving people (Goodare, 2016; Levack, 2016). During witchcraft investigations, this implied that any counterevidence could always be interpreted as the trickery of demons, and any conceivable event could be interpreted as further confirmation that persecutors were onto the witchcraft network.

For instance, husbands of the accused women often protested that their wives could not have attended any sabbaths in the night, because they had seen them sleeping next to them in their beds. But here the witch-hunters retorted that demons must have created an illusion that made it look as if the wives were decently sleeping at home, while their actual bodies were elsewhere (Hofhuis, 2022, p. 157; Remy, 2014, pp. 43–44). The interrogation of suspected witnesses

[6]In the light of these features, a number of authors have pointed out the epistemological similarities between theism and conspiracy theories (Edis, 2019; Keeley, 2007). Strictly speaking, of course, monotheism cannot be regarded as a conspiracy theory because, by definition, God is a unified and single agent who has none to conspire with. Indeed, as Keeley (2007) has argued, God has 'no need to conspire with anybody to bring about Providence according to His wishes' (Keeley, 2007, p. 140), because he is by definition all-powerful and all-knowing. Only fallible humans need to collaborate with others to carry out elaborate and complex forms of deception.

also displays the logic of 'heads I win, tails you lose'. If physical torments—often used in witch trials—made suspects confess quickly, it showed that they were guilty. But if they did not confess right away, this was often explained as the work of demons cleverly assisting the suspects in their ability to withstand torture, thus also indicating guilt (Krause, 2015, p. 26; Roper, 2004, p. 47). If the accused responded emotionally, it was deemed very suspicious. But if they did not respond emotionally *enough*, it was equally suspicious, as it suggested an evil personality or, again, demonic support. Probably most dubious of all were the people who disapproved of witch-hunts and were unwilling to cooperate. Were these individuals not witches themselves, or at least the victims of demonic delusion? (Hofhuis, 2022, p. 159)

Past historians have often argued that witch persecutions were a shrewd tool used to achieve some hidden end, like oppressing women, destroying traditional peasant culture, making money or subjugating the poor. However, over the past decades, most experts have concluded that many witch persecutions were more likely driven forward by genuine panics about the alleged dangers of witchcraft. As Julian Goodare says, 'a witchcraft accusation was not "really" about something else; it was really about witchcraft'(Goodare, 2016, p. 385).

As people gradually absorbed this belief system, discovering even more 'evidence' for the existence of witchcraft, it became difficult not to see unusual misfortune in the light of witchcraft and not to interpret further events as additional confirmation. As the 16th century physician and Dutch-German witch-hunt sceptic Johan Weyer put it, 'Assuredly, in matters admitting of little certitude, the less cautious would not then be slipping from one single error into a thousand ones, as though trapped in an inextricable labyrinth from which no way of escape, no end, can be seen' (Weyer, 1998, p. 522). It is hard to think of a more eloquent description of what an epistemic black hole looks like.

3.3 | Freudian psychoanalysis

A final and surprising example of an epistemic black hole can be found in Freudian psychoanalysis (Cioffi, 1998; Farrell, 1996). In Freud's original version of the theory, the psychoanalytic 'unconscious' is portrayed as an intelligent entity capable of pursuing intentional goals, chief among them the desire to remain hidden and to actively resist investigation by the therapist. In Freud's most famous works, such as *The Interpretation of Dreams* and *The Psychopathology of Everyday Life* (Freud, 1953; Freud et al., 1960), we are presented with reams of examples in which the unconscious employs clever disguises to deceive the conscious subject, such as symbolism, denials, inversions, and word plays. In *The Psychoanalytic Movement*, the sociologist Ernest Gellner called Freud's psychoanalytic unconscious 'The Trickster', an intentional agent that 'can and does interfere with the behavioural evidence about its own existence and activities' (Gellner, 1985, p. 142). Just as with many conspiracy theories about historical events, the intentions of the conspirator can be seen as sinister and nefarious. In Freud's view, the unconscious harbours forbidden desires and impulses related to sexual perversion and aggression, which would be shocking to the conscious subject and must therefore be kept secret.[7]

Because of its peculiar epistemology, Freudian psychoanalysis has the same self-sealing quality as popular conspiracy theories or the witchcraft belief system in early modern Europe, in which the absence of evidence or apparent counterevidence could always be interpreted in the theory's own terms. When Freud was unable to find traces of a pathological complex or unconscious desire to account for a patient's behaviour, he was undeterred and treated this as a

[7]In some versions of psychoanalysis, there is no longer a single and unified agent but rather a dynamic interaction between multiple mental systems, each of which is capable of intentional agency. In the *Interpretation of Dreams*, Freud describes the existence of an intentional 'censor mechanism' negotiating between the conscious and the unconscious. In Freud's later tripartite model of the mind, there is an interplay going on between three mental systems (ego, id and superego), all of whom engage in intentional strategies to achieve their goals, sometimes working at cross-purposes, sometimes collaborating or compromising.

token of unconscious resistance. As the unconscious was motivated to hide and disguise its dark secrets, it was not surprising to find an apparent lack of evidence. According to the same logic of deception, apparent refutations of the theory could be explained away with equal ease. In his clinical practice, Freud worked on the assumption that his patients harboured a secret and unconscious desire to disprove his own explanations, so as to avoid having to confront their own repressed desires. If a patient dismissed his psychoanalytic interpretations of their symptoms or dreams, he interpreted this as evidence of 'resistance' or 'denial', as predicted by the theory (Cioffi, 1998; Crews, 1986). If the patient ceded to Freud and accepted his latest explanation, of course this also counted in favour of the theory, namely as an instance of resistance overcome through therapeutic pressure.

According to Freud, unconscious resistance could even disguise itself in the form of manifest symptoms or dreams. For instance, when one of Freud's patients dreamt about being forced to spend the holidays with her mother-in-law, whom she despised, at face value, this seemed to belie Freud's contention that every dream is a manifestation of an unconscious wish-fulfilment. But as Freud himself explained, the apparent refutation was really a striking confirmation: 'The dream showed that I was wrong. *Thus it was her wish that I might be wrong, and her dream showed that wish fulfilled*' (Freud, 1953, p. 151).

Finally, Freud applied the same theoretical apparatus to his critics. As every one of us is under the spell of the unconscious forces described by psychoanalysis, it was not surprising that critics of psychoanalysis tried to attack his brainchild. As Freud explained:

> Psycho-analysis is seeking to bring to conscious recognition the things in mental life which are repressed; […] They [the critics] are therefore bound to call up the same resistance in him as in our patients; and that resistance finds it easy to disguise itself as an intellectual rejection and to bring up arguments like those which we ward off in our patients by means of the fundamental rule of psycho-analysis. (Freud, 1957, p. 39)

It is tempting to reject such circular reasoning as a personal quirk on Freud's part, but this 'resistance argument' has been wielded by many later psychoanalysts, against both patients and critics of psychoanalysis (Borch-Jacobsen & Shamdasani, 2011; Crews, 2017). That is because it is a central prediction of the theory and thus an entirely reasonable inference (from the perspective of a Freudian psychoanalyst) to make.

4 | THE DYNAMICS OF EPISTEMIC BLACK HOLES

4.1 | Arbitrariness and proliferating alternatives

Because of their self-sealing character, epistemic black holes are extremely resilient against external challenges in the form of counterevidence or sceptical questions. This strong resilience, however, comes at a steep cost: The belief system suffers from a problem of arbitrariness, in the sense that the available evidence is always congruent with many different versions, and there is often no rational way to adjudicate between them. Logically speaking, a theory is always 'underdetermined' by evidence, in the sense that one can always come up with alternatives that are logically compatible with the available evidence, no matter how much evidence is being gathered (Quine, 1951). But although this logical problem of *underdetermination by evidence* is widely accepted in the philosophy of science (Stanford, 2017), in scientific practice, there are multiple ways of rationally discriminating between rival theories (e.g. simplicity, fecundity and coherence). As a result, even if it is logically possible to rescue any theory from refutation, the rescue operations can become increasingly far-fetched and contrived, and they are rarely

defended in practice. In the long run, scientific theory development therefore tends to converge on a single 'winner' that is clearly superior to alternatives.

In the case of epistemic black holes, however, rescuing auxiliaries are always in plentiful supply for any alternative, which leads to a proliferation of arbitrary alternatives. For example, for any given historical event, it is always possible to develop multiple (unfounded) conspiracy theories involving different culprits, different objectives and different schemes.[8] An event like the 9/11 attacks could be (and has been) interpreted as an inside job by the Bush administration, or a plot by the Saudi government or Mossad (or 'the Jews' more generally) or by any group of agents that is sufficiently powerful to cover up its tracks and make it look like Al Qaeda orchestrated the attacks.[9] As for the murder of JFK, a 2013 Gallup poll asked respondents if they believed that Lee Harvey Oswald acted alone and, if not, who was really behind the plot (Swift, 2013). After half a century of conspiracy theorizing and hundreds of books and articles disputing the official version of events, the results still proffered a wide array of culprits: The Mafia (13%), the federal government (13%), the CIA (7%), Cuba and Fidel Castro (5%), JFK's own vice-president Lyndon Johnson (3%), the Soviet Union (3%), the Ku Klux Klan (3%), FBI director J. Edgar Hoover (1%) and various other actors. Following the logic of epistemic black holes, it is impossible to rule out the complicity of any of these potential culprits, provided that they have been careful enough to cover their tracks and falsely incriminate others.

A similar problem of arbitrariness also affects other parameters of the conspiracy theory, such as the method being used by the conspirators. Most 9/11 conspiracy theorists believe that the Twin Towers were not brought down by the impact of the planes, as the official version claims, but by some other means. As to the precise nature of the mechanism, there is a wide array of conflicting viewpoints: Some suspect a process of controlled demolition with conventional explosives, others suspect the use of exotic novel technologies like nano-thermite, while some even maintain that the objects hitting the Twin Towers and the Pentagon were not commercial planes at all, but could have been missiles, military planes or CGI (Computer-Generated Imagery) holograms (Aaronovitch, 2010).[10] It is impossible to definitively rule out any of these competing conspiracy hypotheses, because all of them are equally capable of accounting for the available evidence. As Harris (2018, p. 256) recently put it, 'any number of conspiratorial explanations will fit the data, and hence will be equally supported'.

In an analogous way, the history of psychoanalysis also illustrates the problem of theoretical arbitrariness. As Boudry and Buekens (2011) have argued, the conceptual core structure of psychoanalysis provides a sort of empty shell into which any number of rival theoretical notions can be inserted. In particular, while Freud's original theory centred around the Oedipus complex and the notion of infantile sexual desires, later theorists have developed the theory in widely divergent (and often incompatible) directions. Otto Rank's version of psychoanalysis reduces virtually every psychological complex to repressed birth trauma, Alfred Adler unearthed inferiority complexes everywhere, Melanie Klein introduced the notion of unconscious breast envy as a counterweight to penis envy, Carl Jung developed the theory of unconscious archetypes (anima, persona and shadow) and so forth (Macmillan, 1997).

In the absence of any evidential constraints for fixing the parameters of the 'unconscious', the psychoanalytic movement has often been beset by irresolvable theoretical disputes and schisms. In the words of Frederick Crews (1998, p. xxx), the epistemological structure of psychoanalysis renders the development of the psychoanalytic movement 'drastically centrifugal,

[8]We have recently demonstrated this point by developing an interactive and educational tool called the Conspiracy Generator, which can turn any new story or historical event into a conspiracy theory. See https://conspiracy-generation.streamlit.app/.

[9]In practice, of course, there may be *some* constraints on the answers to the *cui bono* question, as not anyone will have a plausible motive (Boudry, 2023).

[10]'Debunking the 9/11 Myths: The Airplanes', *Popular Mechanics*, 10 September, 2021. https://www.popularmechanics.com/military/a5654/debunking-911-myths-planes/.

spinning off ever more numerous, mutually excommunicating schools and cliques' (see also Gordin, 2012, p. 202).

The problem of arbitrariness can also be observed in the domain of religion and supernatural belief. If you assume that one or more powerful supernatural beings exist, but they are actively hiding and resisting your investigation, the identification of these supernatural creatures and their attributes becomes to a large extent arbitrary. In philosophy of religion, this is known as the 'problem of religious diversity' (Basinger, 2011). Many cultures have devised different belief systems about deities and other supernatural creatures, but these belief systems are often mutually contradictory, and there is no rational way to adjudicate between them (Philipse, 2012). In making his case for religious scepticism, Philo exposed this problem in David Hume's *Dialogues*:

> In such subjects, who can determine, where the truth; nay, who can conjecture where the probability lies, amidst a great number of hypotheses which may be proposed, and a still greater which may be imagined? […] And what shadow of an argument, continued Philo, can you produce, from your hypothesis, to prove the unity of the Deity? […] why may not several deities combine in contriving and framing a world? (Hume, 1998 [1779], p. 36)

Given that supernatural creatures are alleged to have powers that transcend those of human beings, or may even be omnipotent, it is impossible for mere mortals to find out.

In the early modern witch-hunts, the various misfortunes and disasters that occasioned witch-hunts could also be 'explained' in a variety of different ways, with different culprits and different mechanisms. In most cases, such explanations did not need to be mutually exclusive, as different witches and different magic spells could be perceived as contributing to the same result (such as an illness or natural disaster). However, the most vivid demonstration of the arbitrary nature of witchcraft beliefs is that sometimes those who had initiated or presided over the witch trials ended up on the stake themselves. The fact that sceptical arguments could always be disarmed was an attractive feature for witch-hunters as long as witchcraft accusations were targeting *others*. But due to the arbitrariness of witchcraft explanations, the accusatory dynamics could easily spiral out of control, also targeting people who initially contributed to the trials.

Consider the fate of the richest man of the German city of Trier and president of its university, Dietrich Flade. Initially, Flade had supported witch trials, and in his role as town bailiff, he even operated as a notably harsh witch-hunter himself. But at some point, the alleged witches began to name Flade as one of their accomplices, and within the witchcraft doctrine, it was difficult to counter that. Flade's friends brought forward that he could not possibly be a witch, as he had persecuted witches himself. But this defence failed to have much of an impact. After all, were witches not always ingeniously trying to pull the wool over people's eyes, for instance, by presenting themselves as witch-hunters? On 18 September 1589, Flade was first strangled and then burned in public in full view of almost the entire city population (Dillinger, 1999; Hofhuis, 2022).

In a similar vein—but in a less literal sense—believers in conspiracy theories and psychoanalysts also sometimes become 'victims' of the very same conspiratorial logic that they directed towards others. For instance, when the influential French conspiracy theorist Thierry Meyssan suggested that on 9/11, the Pentagon was hit by some sort of missile instead of a passenger plane, other 9/11 conspiracy theorists went on to argue that Meyssan himself was a Deep State agent who had infiltrated into conspiracist communities to sow doubt and discredit the conspiracy theory community (Sunstein & Vermeule, 2009, p. 223). Analogously, the different schools of psychoanalysis after Freud have often turned on one another, explaining dissent in theory-internal terms. As historians of the psychoanalytic movement have observed, Freud made a

habit of accusing renegade disciples of harbouring some repressed desire or unresolved complex that warranted further psychoanalytic treatment. This recurrent 'pathologization of dissent' (Borch-Jacobsen & Shamdasani, 2011, p. 85) in the history of the psychoanalytic movement was the only way to delegitimize alternative conceptions of psychoanalysis and thus to cover up the essential arbitrariness of the theory. Unsurprisingly, those renegade disciples returned the favour by directing this pathologizing logic at their former master (Borch-Jacobsen & Shamdasani, 2011; Sulloway, 1992).

In the case of the early modern witch persecutions, we saw that the witchcraft doctrine benefited from the arbitrariness of invoking demonic illusions to make any finding fit their narrative. Ironically, their staunchest opponents used exactly the same line of reasoning. Many contemporary critics of witch-hunting argued that the witch-hunters had themselves fallen prey to diabolical deception (Hofhuis, 2022, pp. 310–329). In their view, the Devil was the evil designer behind the whole witch-hunt system, as he was eager to bring about the human suffering of the witch trials, as well as making people ruin their souls by killing the innocent. This is also how we should read Johann Weyer's quote mentioned above about the 'inextricable labyrinth'. In his view, it was Satan who had created the illusory belief system from which no escape was possible: 'From long experience, that crafty old weaver knows how to weave such webs skillfully'(Weyer, 1998, p. 522).

The humanitarian goals of the witchcraft sceptics were laudable, but some of their arguments were as arbitrary as those of the witch-hunters. For instance, while witch-hunters argued that spitting up nails was evidence of witchcraft, a sceptic like Weyer alleged that demons put nails into innocent people's mouths to start a cycle of suspicion (Hofhuis, 2022, pp. 318–324). This arbitrariness could make things difficult for people at the time. The French literary scholar Marianne Closson remarks that 'great confusion reigned: how could one know the true nature of diabolical illusion? The lack of a firm answer to this question fueled the fear of being oneself a victim of the Devil's deceptions' (Closson, 2000, p. 32). Whether people considered something real or illusory could eventually just depend on what seemed most convenient or plausible. The 'trump card of demonology' is what Dillinger calls the idea of diabolical deception: It could be invoked to neutralise any ostensible phenomenon that appeared unfitting (Dillinger, 2018, p. 45).[11]

4.2 | Cultural and ideological determinants

As the parameters of an epistemic black hole can never be constrained by empirical evidence alone, the belief system is free to adapt to non-epistemic factors. In the case of unfounded conspiracy theories, this includes the political goals and ideological orientation of the theorists, as well as changing cultural environments. Conspiracy theories are useful instruments for political propaganda (Cassam, 2019; Harris, 2023) exactly because they are so versatile and malleable (Napolitano, 2024). They can target either powerful groups or marginalised minorities, be anti-establishment or pro-establishment and serve left-wing causes or right-wing causes. In the light of this, Nera et al. (2022) have recently called conspiracy theories 'opportunistic' in their attributions of power and influence to certain groups or agents.

A striking instance of the flexibility of conspiracy traditions over time is provided by the fate of antisemitic conspiracy theories during the past century. Prejudice and hostility against Jewish minorities has a long and sordid history in Christendom, dating back many centuries. Nonetheless, contemporary forms of conspiratorial antisemitism, which obsess over a world-spanning conspiracy of international Jewry, only emerged in the late 19th century (Arendt, 1951/2017; Pipes, 1999). By the early 20th century, antisemitic conspiracism gained ascendancy throughout

[11]Translated from the German original: 'Joker der Dämonologie'

the Western world, appearing in both leftist and right-wing versions, and documents like the *Protocols of the Elders of Zion* were widely read, discussed and taken seriously. In the 1940s, the right-wing conspiracy theory that an international network of Jewish leaders was plotting the destruction of Christianity and Western civilization culminated in the genocidal fanaticism of Nazi Germany.

After the Second World War, this tradition of modern conspiracy theories about small groups or secret societies preparing for world domination continued to flourish, but remarkably, the Jews abruptly disappeared from prominence (with the notable exception of Soviet Russia under Stalin). This had nothing to do with novel evidence but rather was due to the almost universal abhorrence of Nazism, which made attacks on Jews harder to sell to all but the most rabidly antisemitic audiences. Most conspiracy theorists, even the ones who had earlier promulgated antisemitic conspiracies, began to abandon or downplay the Jewish element and settled for other suitable culprits, while leaving the rest of the conspiracist playbook intact. New favourite targets in the post-war conspiracist literature included the Central Intelligence Agency (CIA) or Federal Bureau of Investigation (FBI), reflecting the ascent of the United States as the new global superpower, as well as new transnational organizations like the United Nations or the Bilderberg group, the latter being an ideal target owing to its notorious privacy and secrecy. In short, this shift from Jews to other perpetrators did not reflect any novel evidence but was driven by 'changing social and political circumstances' (Byford, 2011, p. 97).

Shifting beliefs about the perpetrators and crimes of diabolical witchcraft also reflect cultural and ideological determinants. When the age of European witch-hunting began in the Western Alps around the year 1430, the purported crime was not yet specifically associated with women. Yet, within a context of widespread misogyny and unequal power balances between the sexes, it is hardly surprising that women were soon disproportionately targeted (around 75%–80% of the victims were female). Women were widely viewed as more lustful, superstitious and irrational than men. So it made sense to think that it was relatively easier for the Devil to lure them into witchcraft through sexual intercourse and to make them abjure God (Rowlands, 2013). But the concept of witchcraft remained malleable enough to integrate other cultural and ideological trends. In the late 16th century, parts of Europe suffered from enormous economic distress, stimulating heightened aggression against allegedly corrupted elites who enriched themselves at the expense of others. Reflecting this trend, the witchcraft beliefs and subsequent trials increasingly began to focus on witches who were rich, male and powerful—the aforementioned Dietrich Flade is a case in point (Behringer, 2008, pp. 230–245; Dillinger, 1999; Hofhuis, 2022).

The history of psychoanalysis offers a similar example of how theoretical developments can reflect changing cultural environments rather than a changing evidence base. In the early days of psychoanalysis, Freud touted the concept of *penis envy* as one of the most important discoveries of psychoanalysis. In Freud's account, the development of the female psyche revolves around the unconscious desire to possess a penis. As the little girl discovers that her body lacks the prized appendage, she develops an unconscious desire to possess a penis and accuses others of thwarting that wish or having castrated her. In the most favourable cases, the desire for a penis is later substituted for a desire to have a baby. Penis envy, according to Freud, was not a peculiar desire occurring in some women but an unbending and universal law of female psychology.

In the second half of the 20th century, however, the doctrine of universal penis envy in women started to disappear from the psychoanalytic literature. It is unlikely that this theoretical change was driven by a changing evidence base, for Freud and his followers had 'confirmed' the existence of penis envy in numerous cases, and the method of investigation itself remained unaltered. 'When', as the philosopher Frank Cioffi rhetorically asked, 'did women stop wanting penises?' (Cioffi, 1998, p. 27). As in the case of the Jews disappearing from conspiracist literature, the notion of universal penis envy had just become ideologically unpalatable. Feminist

critiques exposed the sexist and misogynist prejudices of Freud's 'phallocentric' theory of the female psyche, and some feminist psychoanalysts like Melanie Klein and Karen Horney proposed alternative concepts like *breast envy* and *womb and vagina envy* (Sayers, 1987). But these were equally arbitrary concepts, epistemically on a par with penis envy, the original Oedipus complex, and indeed much else about psychoanalytical theory. Just as the prominence or the absence of 'the Jews' in conspiracy theories reflected the changing cultural fate of antisemitism, the specific content of psychoanalytic theory tended to reflect changing cultural sensibilities rather than changing evidence (Cioffi, 1998).

5 | GENERAL DISCUSSION

This article has analysed the warped epistemology and cultural dynamics of epistemic black holes, belief systems about deceitful invisible agents that are self-sealing and extremely resistant to external challenges. The most straightforward and most common examples of such epistemic black holes are unfounded conspiracy theories about historical events, but less obvious examples include Freudian psychoanalysis, as well as certain religious and supernatural belief systems, notably the cumulative concept of witchcraft in early modern Europe. By positing clever invisible agencies that purposefully evade detection, these belief systems are by their very nature resilient against external challenges. Because these belief systems exert such a strong attraction on unwitting believers, it may be difficult to escape from them once you have fallen into their orbit.

Our analysis of epistemic black holes is intended to complement (not supplant) psychological explanations of the universal appeal of certain misbeliefs, as well as more contingent historical and sociological accounts of their success in certain cultural environments. For instance, it is plausible that the human mind has evolved tendencies to overdetect conspiracies because of the pervasiveness of coalitional violence in our evolutionary history, and that this hair-trigger tendency explains belief in unfounded conspiracies today (van Prooijen & Van Vugt, 2018). However, the extreme resilience of conspiracy theories to counterevidence and criticism also helps to explain their perennial appeal and cross-cultural persistence, even after they have been decisively refuted. Likewise, belief in witches and other evil supernatural creatures occurs in a wide variety of cultures (Boyer, 2001), but the self-sealing nature of the specific cluster of beliefs that emerged in the early modern Europe helps explain its cultural success, as well as its remarkable virulence.

Our analysis of epistemic black holes helps to appreciate the fact that, although conspiracy theories may strike sceptics as bizarrely irrational and question-begging, they have an internal logic and appear eminently sensible from the perspective of believers who have accepted their major premises. The people who used to believe in the existence of witches, or those who still believe that 9/11 was an inside job, are not 'crazy' or 'mentally ill'. They have just fallen into a black hole. By appreciating this 'method in madness', our analysis also complements recent approaches related to the concept of 'mental immunity' (Norman, 2021). From this perspective, certain problematic belief systems disrupt the mind's *immune system*—its evolved ability to critically evaluate beliefs and discard implausible notions. From a belief-centric perspective, some ideas seem to reshape human minds in ways that make them more hospitable environments for themselves (the ideas).

To understand the appeal of systems of misbelief, we believe it is necessary to adopt such a belief-centred perspective informed by Darwinian principles of cultural evolution. Epistemic black holes are well-adapted to withstand counterevidence and criticism, but that does not mean that they were deliberately designed with that purpose in mind by intelligent authors. In the case of the European witch-hunts, as well as many contemporary conspiracy theories, belief systems may gradually evolve to become more resilient over time, after successive variations

and modifications. Epistemic black holes strike us as clever and well-designed, but their design may be a 'free-floating' one, unanchored in human intentions. Of course, this is not to say that human intentions never play a role. In the case of psychoanalysis, at least, we have a theory that was mostly designed by an individual author. Even Freud, however, may not have set out to design a theory that was perfectly immune to falsification. Rather, he ended up with such a theoretical edifice after many rounds of revisions and modifications and after he had discarded all the alternatives that were too vulnerable to counterevidence (Crews, 2017).

Based on our analysis of epistemic black holes, we have also tried to draw some parallels relating to the cultural development and dynamics of these belief systems. Most importantly, because of their self-insulation and resilience to external challenges, epistemic black holes suffer from a problem of arbitrariness and proliferating alternatives. As a result of this, such belief systems tend to be unstable and vulnerable to internal disarray because believers can always come up with a rival version that accommodates the evidence equally well. In other cases, we see that the evolution of these belief systems flexibly adapts to changing cultural circumstances and sensibilities. Future research may extend our framework of epistemic black holes to less obvious examples, such as extreme political ideologies or belief systems of cults such as Scientology.

Finally, we believe that our epistemological analysis may be useful for pedagogical purposes. By understanding the self-sealing logic of conspiracy theories and other epistemic black holes, people may better appreciate the arbitrary and gratuitous nature of such beliefs. By appreciating how, using the same types of inferences and evidence, entirely different and contradictory theories can be concocted that are equally plausible and equally compatible with the evidence, people may 'inoculate' themselves against the enduring attraction of such belief systems (Norman, 2021).

ACKNOWLEDGEMENTS

We would like to thank Brian Keeley, Giulia Napolitano, Ze Hong, Keith Harris, Nick Brown and Taner Edis for providing helpful comments and feedback, as well as M Dentith and Joe Uscinski for allowing the first author (MB) to present our work at, respectively, the 1st International Conference on the Philosophy of Conspiracy Theories in Beijing in February 2022 and the Conspiracy Theory Conference in Miami in March 2023. Finally, we would like to express our gratitude to Dan Dennett (1942–2024) for being a tremendous source of inspiration and for generously supporting our work.

FUNDING INFORMATION

The research of the first author was partially funded by the Research Foundation—Flanders (FWO).

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

ORCID

Maarten Boudry https://orcid.org/0000-0003-0932-3394

REFERENCES

Aaronovitch, D. (2010) *Voodoo histories: the role of the conspiracy theory in shaping modern history*. New York: Riverhead Books.

Arendt, H. (1951/2017) *The origins of totalitarianism*. London: Penguin Classics.

Basinger, D. (2011) Religious diversity (pluralism). Stanford Encyclopedia of Philosophy. Available at: https://plato.stanford.edu/entries/religious-pluralism/

Begby, E. (2021) Evidential preemption. *Philosophy and Phenomenological Research*, 102(3), 515–530.

Behringer, W. (2008) *Witches and witch-hunts: a global history*. Cambridge: Polity Press.

Blancke, S. & De Smedt, J. (2013) Evolved to be irrational? Evolutionary and cognitive foundations of pseudosciences. In: Pigliucci, M. & Boudry, M. (Eds.) *The philosophy of pseudoscience*. Chicago: The University of Chicago Press, pp. 361–379.
Blackmore, S. (2000) *The meme machine*. Oxford University Press, Oxford.
Borch-Jacobsen, M. & Shamdasani, S. (2011) *The Freud files: an inquiry into the history of psychoanalysis*. Cambridge: Cambridge University Press.
Boudry, M. (2023) Why we should be suspicious of conspiracy theories: a novel demarcation problem. *Episteme*, 1-21, 611–631. Available from: https://doi.org/10.1017/epi.2022.34
Boudry, M., Blancke, S. & Pigliucci, M. (2015) What makes weird beliefs thrive? The epidemiology of pseudoscience. *Philosophical Psychology*, 28(8), 1177–1198.
Boudry, M. & Buekens, F. (2011) The epistemic predicament of a pseudoscience: social constructivism confronts Freudian psychoanalysis. *Theoria*, 77(2), 159–179. Available from: https://doi.org/10.1111/j.1755-2567.2011.01098.x
Boudry, M. & De Smedt, J. (2011) In mysterious ways: on petitionary prayer and subtle forms of supernatural causation. *Religion*, 41(3), 449–469. Available from: https://doi.org/10.1080/0048721x.2011.600464
Boudry, M. & Hofhuis, S. (2018) Parasites of the mind. Why cultural theorists need the meme's eye view. *Cognitive Systems Research*, 52, 155–167.
Boudry, M., & Braeckman, J. (2012) How Convenient! The Epistemic Rationale of Self-validating Belief Systems. *Philosophical Psychology*, 25(3), 341-364.
Boyer, P. (2001) *Religion explained. The evolutionary origins of religious thought*. New York: Basic books.
Buenting, J. & Taylor, J. (2010) Conspiracy theories and fortuitous data. *Philosophy of the Social Sciences*, 40(4), 567–578.
Byford, J. (2011) *Conspiracy theories: a critical introduction*. New York: Palgrave Macmillan.
Cassam, Q. (2019) *Conspiracy theories*. Hoboken, New Jersey: John Wiley & Sons.
Cioffi, F. (1998) *Freud and the question of pseudoscience*. Chicago: Open Court.
Clarke, S. (2002) Conspiracy theories and conspiracy theorizing. *Philosophy of the Social Sciences*, 32(2), 131–150.
Closson, M. (2000) L'imaginaire démoniaque en France (1550-1650): genèse de la littérature fantastique. Librairie Droz.
Cohn, N. (1967) *Warrant for genocide: the myth of the Jewish world-conspiracy and the protocols of the elders of Zion*. London: Eyre & Spottiswoode.
Crews, F.C. (1986) *Skeptical engagements*. Oxford: Oxford University Press.
Crews, F.C. (1998) *Unauthorized Freud: doubters confront a legend*. Oxford: Viking.
Crews, F.C. (2017) *Freud: the making of an illusion*. London: Profile Books.
Dawkins, R. (1976) *The selfish gene*. Oxford: Oxford University Press.
Dawson, L.L. (1999) When prophecy fails and faith persists: a theoretical overview. *Nova Religio*, 3(1), 60–82.
Dennett, D.C. (1987) *The intentional stance*. Cambridge, MA: MIT Press.
Dennett, D.C. (1995) *Darwin's dangerous idea: evolution and the meanings of life*. New York: Simon & Schuster.
Dennett, D.C. (2006) *Breaking the spell: religion as a natural phenomenon*. Viking (Penguin).
Dennett, D.C. (2017) *From bacteria to Bach and Back: the evolution of minds*. Limited: Penguin Books.
Dentith, M.R.X. (2018) *Taking conspiracy theories seriously*. Lanham, Maryland: Rowman & Littlefield.
Dentith, M.R.X. (2019) Conspiracy theories on the basis of the evidence. *Synthese*, 196(6), 2243–2261.
Dillinger, J. (1999) *"Böse Leute": Hexenverfolgungen in Schwäbisch-Österreich und Kurtrier im Vergleich*. Trier: Spee.
Dillinger, J. (2018) *Hexen und magie: 2., aktualisierte auflage*. Trier: Campus Verlag.
Douglas, K.M., van Prooijen, J.W. & Sutton, R.M. (2022) Is the label 'conspiracy theory' a cause or a consequence of disbelief in alternative narratives? *British Journal of Psychology*, 113(3), 575–590.
Edis, T. (2019) Cosmic conspiracy theories: how theologies evade science. In: *Theology and science: from genesis to astrobiology*. Singapore: World Scientific, pp. 143–165.
Enders, A.M., Uscinski, J.E., Klofstad, C.A., Seelig, M.I., Wuchty, S., Murthi, M.N. et al. (2021) Do conspiracy beliefs form a belief system? Examining the structure and organization of conspiracy beliefs. *Journal of Social and Political Psychology*, 9(1), 255–271.
Farrell, J. (1996) *Freud's paranoid quest: psychoanalysis and modern suspicion*. New York: New York University Press.
Freud, S. (1953) *Standard edition. Vol. 4, (1900): the interpretation of dreams (first part)*. London: Hogarth Press.
Freud, S. (1957) *Standard edition. Vol. 11, (1910): five lectures on psycho-analysis, Leonardo da Vinci, and other works*. London: Hogarth Press.
Freud, S., Strachey, J., Freud, A., Richards, A. & Institute of Psycho-analysis. (1960) *The standard edition of the complete psychological works of Sigmund Freud. Vol. 6: The psychopathology of everyday life*. London: Hogarth Press.
Friesen, J.P., Campbell, T.H. & Kay, A.C. (2015) The psychological advantage of unfalsifiability: the appeal of untestable religious and political ideologies. *Journal of Personality and Social Psychology*, 108(3), 515–529.
Gellner, E. (1985) *The psychoanalytic movement: the cunning of unreason*. Boulder, Colorado: Paladin.
Gershman, S.J. (2019) How to never be wrong. *Psychonomic Bulletin & Review*, 26(1), 13–28.
Goertzel, T. (1994) Belief in conspiracy theories. *Political Psychology*, 15, 733–744.
Goodare, J. (2016) *The European witch-hunt*. London: Routledge.

Gordin, M.D. (2012) *The pseudoscience wars: Immanuel Velikovsky and the birth of the modern fringe*. Chicago: University of Chicago Press.
Gosse, P.H. (1857) *Omphalos: an attempt to untie the geological knot*. London: John Van Voorst.
Ham, K. & Cardno, S. (1987) *The lie: evolution*. Green Forest, Arkansas: Master Books, Green Forest.
Harris, K. (2018) What's epistemically wrong with conspiracy theorising? *Royal Institute of Philosophy Supplement*, 84, 235–257.
Harris, K.R. (2023) Conspiracy theories, populism, and epistemic autonomy. *Journal of the American Philosophical Association*, 9(1), 21–36.
Henrich, J. (2015) *The secret of our success: how culture is driving human evolution, domesticating our species, and making us smarter*. Princeton: Princeton University Press.
Hofhuis, S.T. (2022) *Qualitative Darwinism: an evolutionary history of witch-hunting*. Utrecht: Utrecht University. Available from: https://doi.org/10.33540/1460
Hume, D. (1998 [1779]) *Dialogues concerning natural religion*, 2nd edition. Indianapolis, Indiana: Hackett.
Kahan, D.M. (2017) Misconceptions, misinformation, and the logic of identity-protective cognition. Cultural Cognition Project Working Paper Series No. 164, Yale Law School, Public Law Research Paper No. 605, Yale Law & Economics Research Paper No. 575, Available at SSRN:or.
Kahneman, D. (2011) *Thinking, fast and slow*. London: Penguin Books.
Keeley, B.L. (1999) Of conspiracy theories. *Journal of Philosophy*, 96(3), 109–126.
Keeley, B.L. (2007) God as the ultimate conspiracy theory. *Episteme: A Journal of Social Epistemology*, 4(2), 135–149.
Kelly, D. & De Block, A. (2022) Culture and cognitive science. Stanford Encyclopedia of Philosophy. Available at: https://plato.stanford.edu/entries/culture-cogsci/
Krause, V. (2015) *Witchcraft, demonology, and confession in early modern France*. Cambridge: Cambridge University Press.
Kunda, Z. (1990) The case for motivated reasoning. *Psychological Bulletin*, 108(3), 480–498.
Lakatos, I. (1968) Criticism and the methodology of scientific research programmes. *Proceedings of the Aristotelian Society*, 69, 149–186.
Law, S. (2011) *Believing bullshit: how not to get sucked into an intellectual black hole*. New York: Prometheus.
Levack, B.P. (2016) *The witch-hunt in early modern Europe*. New York: Routledge.
Lewens, T. (2015) *Cultural evolution: conceptual challenges*. Oxford: Oxford University Press.
Macmillan, M. (1997) *Freud evaluated: the completed arc*. Cambridge, MA: MIT Press.
Mencken, H.L. (2012) *Mencken chrestomathy*. New York: Knopf Doubleday Publishing Group.
Mercier, H. (2020) *Not born yesterday: the science of who we trust and what we believe*. Princeton: Princeton University Press.
Mercier, H. (2022) Confirmation bias–myside bias. In: *Cognitive illusions*. New York: Routledge, pp. 78–91.
Mesoudi, A. (2011) *Cultural evolution. How Darwinian theory can explain human culture and synthesize the social sciences*. Chicago: Chicago University Press.
Morris, H.M. (1963) *Twilight of evolution*. Grand Rapids, Mich: Baker Pub Group.
Napolitano, M.G. (2021) Conspiracy theories and evidential self-insulation. In: *The epistemology of fake news*. Oxford: OUP Oxford, pp. 82–106.
Napolitano, M.G. (2024) (under review) Conspiracy theories, resistance to evidence, and propaganda: How conspiracy theories advance political causes.
Napolitano, M.G. & Reuter, K. (2021) What is a conspiracy theory? *Erkenntnis*, 88, 1–28.
Nera, K., Bertin, P. & Klein, O. (2022) Conspiracy theories as opportunistic attributions of power. *Current Opinion in Psychology*, 47, 101381.
Nguyen, C.T. (2020) Echo chambers and epistemic bubbles. *Episteme*, 17(2), 141–161.
Nieminen, P., Boudry, M., Ryökäs, E. & Mustonen, A.-M. (2017) Biblical and theistic arguments against the evolutionary argument against naturalism. *Zygon*, 52(1), 9–23. Available from: https://doi.org/10.1111/zygo.12327
Nilus, S. (2009) *The Jewish peril: protocols of the learned elders of Zion*. Connecticut: Martino Pub. Available at: https://books.google.be/books?id=es8_gf4SUPEC
Norenzayan, A. (2013) *Big gods: how religion transformed cooperation and conflict*. Princeton: Princeton University Press.
Norman, A. (2021) *Mental immunity: infectious ideas, mind-parasites, and the search for a better way to think*. New York: Harper Wave.
Philipse, H. (2012) *God in the age of science?: a critique of religious reason*. Oxford: Oxford University Press.
Pigden, C.R. (1995) Popper revisited, or what is wrong with conspiracy theories? *Philosophy of the Social Sciences*, 25(1), 3–34.
Pinker, S. (2010) The cognitive niche: coevolution of intelligence, sociality, and language. *Proceedings of the National Academy of Sciences*, 107(Supplement 2), 8993–8999.
Pinker, S. (2021) *Rationality: what it is, why it seems scarce, why it matters*. London: Penguin.
Pipes, D. (1999) *Conspiracy: how the paranoid style flourishes and where it comes from*. New York: Simon and Schuster.
Popper, K.R. (1963/2002) *Conjectures and refutations: the growth of scientific knowledge*. Oxfordshire: Routledge.

Poth, N. & Dolega, K. (2023) Bayesian belief protection: a study of belief in conspiracy theories. *Philosophical Psychology*, 36, 1–26.
Popular Mechanics Editors (2021) Debunking the 9/11 Myths: The Airplanes, *Popular Mechanics*, 10 September, 2021.
Quine, W.V.O. (1951) Two dogmas of empiricism. *The Philosophical Review*, 60, 20–43.
Remy, N. (2014) *Demonolatry: an account of the historical practice of witchcraft*. Courier Corporation.
Richerson, P.J. & Boyd, R. (2005) *Not by genes alone: how culture transformed human evolution*. Chicago: University of Chicago Press.
Robertson, D.G. (2016) *UFOs, conspiracy theories and the new age: millennial Conspiracism*. London: Bloomsbury Publishing.
Roper, L. (2004) *Witch craze: terror and fantasy in baroque Germany*. New Haven: Yale University Press.
Rowlands, A. (2013) Witchcraft and gender in early modern Europe. In: *The Oxford handbook of witchcraft in early modern Europe and colonial America*. Oxford: Oxford University Press, pp. 449–467.
Sayers, J. (1987) Melanie Klein, psychoanalysis, and feminism. *Feminist Review*, 25, 23–37.
Schellenberg, J.L. (2006) *Divine hiddenness and human reason*. Ithaca, New York: Cornell University Press.
Schlaile, M.P., Veit, W. & Boudry, M. (2023) Memes. In: Dopfer, K., Nelson, R.R., Potts, J. & Pyka, A. (Eds.) *Routledge handbook of evolutionary economics*. Taylor & Francis: Oxfordshire United Kingdom, pp. 235–248.
Shermer, M. (2022) *Conspiracy: why the rational believe the irrational*. Baltimore, Maryland: Johns Hopkins University Press.
Sperber, D. (1996) *Explaining culture: a naturalistic approach*. Cambridge Mass: Blackwell.
Stanford, K. (2017) Underdetermination of scientific theory. Stanford Encyclopedia of Philosophy. Available at: https://plato.stanford.edu/entries/scientific-underdetermination/
Stokes, P. (2018) Conspiracy theory and the perils of pure particularism. In: Dentith, M.R.X. (Ed.) *Taking conspiracy theories seriously*. Lanham, Maryland: Rowman and Littlefield, pp. 25–38.
Sulloway, F.J. (1992) *Freud, biologist of the mind: beyond the psychoanalytic legend*. Cambridge, Massachusetts: Harvard University Press.
Sunstein, C.R. & Vermeule, A. (2009) Conspiracy theories: causes and cures. *Journal of Political Philosophy*, 17(2), 202–227.
Swift, A. (2013) Majority in US still believe JFK killed in a conspiracy. Gallup. Available at: https://news.gallup.com/poll/165893/majority-believe-jfk-killed-conspiracy.aspx
Swinburne, R. (2004) *The existence of god*. Oxford: Clarendon Press.
Todd, P.M. & Gigerenzer, G. (2012) *Ecological rationality: intelligence in the world*. Oxford: Oxford University Press.
Uscinski, J.E. (Ed.). (2018) *Conspiracy theories and the people who believe them*. Oxford: Oxford University Press.
U.S. Senate Select Committee on Intelligence and the House Permanent Select Committee on Intelligence (2002) Joint Inquiry into Intelligence Community Activities Before and After the Terrorist Attacks of September 11, 2001, https://www.govinfo.gov/app/details/GPO-CRPT-107hrpt792/context
Van der Linden, S. (2023) *Foolproof: why misinformation infects our minds and how to build immunity*. New York: WW Norton.
van Prooijen, J.-W. & Van Vugt, M. (2018) Conspiracy theories: evolved functions and psychological mechanisms. *Perspectives on Psychological Science*, 13(6), 770–788.
Weyer, J. (1998) *Witches, devils, and doctors in the renaissance*. Mora, G. (trans.). Tempe, Arizona: Medieval & Renaissance Texts & Studies.
Wilson, D.S. (2003) *Darwin's cathedral: evolution, religion, and the nature of society*. Chicago: University of Chicago Press.
Zarocostas, J. (2020) How to fight an infodemic. *The Lancet*, 395(10225), 676.

How to cite this article: Boudry, M. & Hofhuis, S. (2024) On epistemic black holes: How self-sealing belief systems develop and evolve. *Theoria*, 90(4), 429–447. Available from: https://doi.org/10.1111/theo.12554