



Intentional astrobiological signaling and questions of causal impotence

Chelsea Haramia^{1,2}

Accepted: 30 January 2024 / Published online: 6 March 2024
© The Author(s) 2024

Abstract

My focus is on the contemporary astrobiological activity of Messaging ExtraTerrestrial Intelligence (METI). This intentional astrobiological signaling typically involves embedding digital communications in powerful radio signals and transmitting those signals out into the cosmos in an explicit effort to make contact with extraterrestrial others. Some who criticize METI express concern that contact with technologically advanced extraterrestrial life could be seriously harmful to Earth or humanity. One popular response to this critique of messaging is an appeal to causal impotence sometimes referred to as the ‘Barn Door’ Argument—we are already engaged in many other detectable activities not intended for cosmic communication. If the Barn Door Argument is correct, then those who engage in messaging arguably have a moral excuse. They are permitted to continue messaging because there is no point in abstaining. I develop three ways in which the claim of causal impotence in the Barn Door Argument could be understood. I evaluate each of these in turn and demonstrate that only one is appropriate to contemporary messaging. However, this interpretation does not generate the moral excuse on which the proponents of the Barn Door Argument rely; thus, the argument fails. Finally, I entertain and respond to candidate objections.

Keywords Astrobiology ethics · METI · Radio signaling · Causal impotence · Technology ethics

Introduction

Consider the decision to stop eating animal products because one does not want to be responsible for contributing to the harmful and damaging effects of climate change brought on by the animal-agriculture industry. At first glance, this decision seems understandable. But upon closer inspection, it’s not clear that this act of abstaining will have the desired effect on the outcomes about which the individual is concerned. After all, how likely is it that *one* person’s ceasing to eat animal products will really make a difference?

Thus, one common response to acts of conscious consumerism aimed at mitigating environmental damage is to claim that there is no point, or it makes no difference—that is, that the consumer is causally impotent in the matter. Their abstinence is not going to alter the circumstances in a way that

causes the better outcome. If this is correct, then those who do not abstain from eating animal products arguably have a morally justifiable excuse. They are permitted to continue their consumption because there is no point in abstaining.¹

Now consider the relatively recent astrobiological activity of Messaging ExtraTerrestrial Intelligence, commonly referred to as ‘METI.’² Contemporary messaging typically involves embedding digital communications in powerful radio signals and transmitting those signals out into the cosmos in an explicit effort to make contact with ExtraTerrestrial Intelligence (ETI). Some who criticize METI express concern that contact with ETI could be seriously harmful to Earth or humanity, and these critics often charge those who message with contributing to the potentially very damaging effects of our being detected by extraterrestrial others (e.g., Billingham & Benford, 2014).

One popular response to this critique of messaging is what is sometimes referred to as the ‘Barn Door’ Argument (Brin, 2019). Though there are other interesting defenses of METI, the focus of this paper is specifically on Barn

✉ Chelsea Haramia
haramia@uni-bonn.de

¹ Senior Research Fellow, Center for Science and Thought, University of Bonn, Bonn, Germany

² Department of Philosophy, Spring Hill College, Mobile, AL, USA

¹ At least, for the purposes of this example, no point if the goal is to avoid climate change.

² Also sometimes referred to as ‘Active SETI’.

Door-style reasoning. This defense does not deny that detection could be potentially harmful; rather, it posits that the outcomes of detection are a foregone conclusion. The Barn Door Argument is grounded in claims of causal impotence. Put simply, there are a myriad of ways in which humanity or our planet could be detected. Abstaining from messaging will not affect other detectable astrobiological signaling, and other detectable signaling is already contributing significantly to the outcomes we're worried about. Thus, halting messaging will not alter our detectability in a way that causes the desired effect. If this is correct, then those who engage in messaging arguably have a moral excuse. They are permitted to continue messaging because there's no point in abstaining.

Though not perfectly analogous, both scenarios above posit harmful outcomes that can be genuinely bad, but the agents who fail to abstain from acts that contribute to these outcomes are exempt from being held responsible for those actions, due to their alleged impotence. Much work has been done to carefully analyze claims of causal impotence in environmental debates. Such analyses, then, are useful tools for examining this METI debate and assessing the moral responsibilities of messengers. I begin here with an outline of the Barn Door Argument and an exposition of the different ways in which planet Earth and humanity may be detectable. I then develop three ways in which the claim of causal impotence in the Barn Door Argument could be understood. I evaluate each of these in turn and demonstrate that only one is appropriate to contemporary messaging. However, this interpretation does not generate the moral excuse on which the proponents of the Barn Door Argument rely; thus, the argument fails in one important respect.

The barn door argument and possibilities for our detectability

For the purposes of this paper, we may distinguish between two types of cosmic signals that ETI might detect: *unintentional* signals and *intentional* signals.³ Intentional signals are METI signals—these are any messages intended to serve as communication with potential ETI. Unintentional signals are all the other activities and features of our planet that could be detected but are not meant to serve as communication with potential ETI.

³ This is not to suggest that ETI themselves are necessarily able to distinguish our intentional signals from unintentional ones, and this factor provides reason to consider cosmic signaling as a whole under certain circumstances. For example, Thomas Cortellesi (2020) contends that all astrobiological signaling occurs on a single continuum, but he nonetheless acknowledges that METI is the most intentional manifestation of this signaling.

Our detectability is affected primarily by two phenomena—Earth's *biosignatures* and our *technosignatures*. Biosignatures indicate the potential for a planetary body to support life as we know it. One clue that human astrobiologists look for when searching for life in the universe is planetary bodies with life-supporting conditions, such as water or an atmosphere (Jones & Linewater, 2010; McKay, 2014). Such biosignatures indicate potential habitability but would not necessarily provide much or any information about a planet's inhabitants. If extraterrestrial others are searching, they may be searching for biosignatures as well, and may detect ours. Earth has displayed its biosignatures for 3.5 billion years or more, and Earth houses a rich diversity of life, including technologically intelligent life. Our biosignatures currently qualify as unintentional signals—indeed, they do not even originate in humans. Our technosignatures, however, are uniquely human. They are observable manifestations of human technology, and they may be either intentional or unintentional. Technosignatures vary in type and in strength, and unintentional technosignature signaling ranges from the background leakage of television and radio broadcasts—beginning in the mid-twentieth-century with the advent of these forms of entertainment and communication—to contemporary high-powered radar signals, such as present-day military missile detection and asteroid pinging. Other possible unintentional technosignatures include waste heat, artificial illumination, and artificial atmospheric constituents (such as CFCs in our atmosphere). Roughly speaking, intentional technosignature signaling ranges from early artifact signaling, such as the Golden Records and Pioneer Plaques, to high-powered contemporary radio signaling, such as that which is undertaken today by, for example, the METI practitioners at METI International.

Both our biosignatures and our technosignatures may be detected by extraterrestrial others, but only intentional technosignature signals are explicitly meant to attempt communication with ETI who are able to receive them. Prominent proponents of Barn Door Argument-style reasoning maintain that intentional technosignature signaling fails to differ from unintentional signaling in morally relevant ways, thus, METI signaling is morally permissible (e.g., Brin, 2019; Shostak, 2013; Vakoch, 2017).⁴ Let us look at a logical reconstruction of the Barn Door-style reasoning that is our focus.

⁴ The moral claims here are entailed by the reasoning in the literature but are not typically expressed by scientists in the ethical terms that philosophers would use.

The barn door argument

P1: If we are already signaling the cosmos in detectable ways, then there's no point in stopping intentional METI signals.

P2: We are already signaling the cosmos in detectable ways (i.e., unintentional signaling).

P3: Therefore, there's no point in stopping intentional METI signals.

P4: If there's no point in stopping an activity, then it's morally permissible to perform that activity.⁵

C: Therefore, METI signaling is morally permissible.

Much of the force of this argument is generated by the idea that "there's no point" in stopping METI signaling. This is presented as an appeal to causal impotence, but it's not yet clear what exactly this claim ought to convey, and there are multiple candidate interpretations.

Interpreting claims of causal impotence

The success of the Barn Door Argument turns on the question of which interpretation is the best interpretation of its appeal to causal impotence. Utilizing a recent framework provided by Benjamin Hale (2022) regarding causal impotence defenses in environmental debates, let's consider the three distinct ways in which the above claim of causal impotence could be understood. It could be interpreted:

- (1) As a claim of causal inefficacy;
- (2) As a claim of causal overdetermination; or
- (3) As a claim of causal indeterminacy.

The first two interpretations seem to be the most likely intended meanings, however, these interpretations are not appropriate, given our current knowledge. To see why, let's start with (1), the causal inefficacy interpretation.

Causal inefficacy

In a causal inefficacy defense, the claim is not that the act in question has no effects, but rather that the effects are relatively insignificant (Glover & Scott-Taggart, 1975; Nefsky, 2017). This type of defense has received a lot of

attention in environmental circles with, for example, Walter Sinnott-Armstrong's (2005) famous argument maintaining that aggregate problems such as climate disaster are not the fault any given individual who contributes in a miniscule way to this outcome—by, say, taking a leisurely and unnecessary weekend drive in an emissions-producing vehicle. According to the causal inefficacy interpretation of the Barn Door Argument, METI messaging is crucially miniscule and insignificant. It is unlikely to tip the balance and generate our detection because the effects of messaging are too negligible. In this case, one is appealing to a situation in which an enormous amount of aggregate signaling is already occurring, such as our unintentional biosignatures and technosignatures. Among this already-occurring signaling are the arguably minor messaging activities of METI practitioners. Let's assume here that worries about various harmful outcomes of our actually being detected are legitimate. Arguments from causal inefficacy hold that METI messaging is nonetheless unlikely to result in our detection and therefore should not be a focus of our moral concern. If it is true that METI will likely be ineffective in establishing our detection, then METI signaling is not dangerous enough to be morally criticized.

This defense of causal inefficacy can also be presented as an appeal for consistency. METI, one may claim, is a tiny drop in the ocean of signaling already occurring. Those who challenge METI often restrict their criticisms to METI signaling and do not criticize, say, those who are broadcasting programs or providing cellular phone service. The METI proponent may therefore rebut the METI detractor, arguing that since we are not critical of the oceans of unintentional signals traveling from our planet into the cosmos, then, on pain of consistency, we ought not be critical of the relatively few drops of intentional METI signals that have been added to the mix. If the outcome of our being detected is indeed worrisome, it is unfair to single out METI messages as the only detectable signals worth worrying about.

To refute an argument based on the causal inefficacy interpretation, we do not need to engage in otherwise worthwhile debates about the soundness of the reasoning that generates inefficacy claims. We may even assume here for the sake of argument that it is a good defense, but it can nonetheless be shown that the causal inefficacy interpretation is inappropriate in the context of the Barn Door Argument.

As noted earlier, both intentional and unintentional signaling risk the potential harmful outcomes of our detection. But there is reason to claim that they do not risk them to the same degree. First of all, our unintentional biosignatures may not be as strong as our technosignatures in one important respect. While biosignatures may be detectable, they are on the visible light and infrared spectrum and are therefore highly susceptible to attenuation

⁵ The truth of this premise may depend on consequentialist moral reasoning. Because the bulk of this paper focuses on claims of causal impotence, such outcome-based reasoning is relevant, and I will show that the argument is not successful under this kind of framework. However, non-consequentialists could also reject this premise and thereby the argument itself on, for example, deontological or virtue-ethics grounds, which is a further problem for the proponent of the argument that is beyond the scope of this paper.

from the gas and dust prevalent in our Galaxy between our Solar System and others. ETI would also have to clear the visibility hurdles presented by the brightness of our sun in order to detect Earth's biosignatures. Second, with respect to unintentional technosignatures, everyday activities such as radio and television broadcasting do send irreversible signals traveling through space, and they do so on the radio spectrum rather than the visible spectrum. They travel through space undeterred by that which attenuates signals on the visible spectrum. So, they are arguably stronger and therefore more noticeable than Earth's biosignatures.⁶ However, the radio signals from unintentional radio leakage are omnidirectional and they degrade relatively quickly—two features that typical messaging lacks. David Brin invokes the inverse square law to counter the claim that background leakage is as noticeable as intentional METI messaging, and he says that “[e]ven Seth Shostak, a leading METI proponent, admits that none of those earlier leakages could be deciphered beyond half a light year, by any telescope even a hundred times as sensitive as our best one” (Brin, 2019, p. 18).

Radars, however, are, according to Shostak, “much more directional than television and FM radio broadcasts... [and] are not declining on Earth, suggesting that they have indefinite utility” (2013, p. 18). If this suggestion is correct, then these transmissions are arguably much stronger than our background radio leakage. That means that human radar activities such as missile detection and asteroid pinging may be noticeable to the same or similar degree as METI messaging. According to Shostak, this fact about radar weakens the argument that claims that “our leakage is safe, but we need to forestall deliberate transmissions,” insofar as non-deliberate radar transmissions are no less noticeable, and therefore no safer, than high-powered, deliberate messaging signals (2013, p. 18). However, noticeability could be affected by factors other than strength, namely, directionality and targeting. These factors can have an important effect on how noticeable a signal is. The signals that target, say, asteroids are far stronger than typical radio signals, but they are not aimed at known exoplanets. In fact, they are typically intended to bounce back to Earth. But many METI messages are aimed directly at what we have reason to believe are potentially habitable areas of our galaxy. This targeting makes messaging *ceteris paribus* more noticeable than unintentional transmissions, even those that are as powerful as the METI signals.

In sum, the version of the Barn Door Argument based on the causal inefficacy interpretation is currently unjustified under our present scientific knowledge. There is reason

to think that METI signals may be significantly more noticeable than most or all unintentional cosmic signals, and more research is needed to determine whether this is the case. Beyond this, and independently of our own scientific uncertainties, we are crucially uncertain of ETIs' actual perceptual and technological capabilities, and their actual capabilities determine what they are in fact able to detect. Perhaps their physiology renders them capable of perceiving only certain kinds of signals but not others. Perhaps they have developed extraterrestrial artificial intelligence that allows them to quickly learn from aggregate signaling data that they cannot themselves perceive. There are many possibilities regarding ETI's capabilities, including ones we may not be able to imagine. This means that we cannot simply do more scientific research to decisively justify claims of how noticeable we are, and we will likely need to wait for some sort of contact in order to reasonably hope that we can acquire knowledge of which activities in fact increased our noticeability.

Causal overdetermination

Let's turn now to (2), the causal overdetermination interpretation of the claim of causal impotence in the *Barn Door* argument. Unlike the appeal to causal inefficacy, claims of causal overdetermination do not assume that the acts in question must be overly weak or the effects merely negligible. Under a causal overdetermination interpretation, the act is sufficient to cause the outcome in question, however, that outcome will arise regardless of whether the act is performed. Put simply, if the outcome is assured, abstaining from the act will make no difference to the outcome. A classic example of causal overdetermination is that of a firing squad in which all shooters have live ammunition and excellent aim. A given shooter's bullet is enough to kill a victim. However, if, while in a firing squad, that shooter abstains from shooting while everyone else shoots to kill, their abstinence cannot change the outcome.

In environmental ethics debates, such causal overdetermination claims are often presented as collective action problems. For example, when addressing issues of collective action regarding climate change, Elizabeth Cripps (2013) argues that individual choices to reduce emissions make no difference. What matters, according to her argument, are actions that promote cumulative change at the collective level. In METI debates, we may recognize some parallels. Abstaining from messaging will presumably do little to nothing to stop the other, unintentional instances of signaling emanating from our planet. Thus, METI messaging doesn't tip the balance because the balance has already been tipped. If one is truly concerned about our detectability, one could take actions to promote a less noticeable future, such as advocating for greater collective use of fiberoptic cables

⁶ Also, there is an argument to be made that biosignatures are inherently “ambiguous” where technosignatures are unambiguous in terms of confirming detection.

instead of airwaves to transmit information on Earth. But, if the causal overdetermination interpretation is correct, abstaining from messaging by itself doesn't change any facts about our noticeability.

However, there is good reason to conclude that the causal overdetermination interpretation is not applicable to METI debates. This version of the Barn Door Argument assumes that our being detected without METI is already a certainty. Yet, we know nothing about the ETI that might detect us. So we cannot guarantee that our unintentional signaling will reach that ETI. There is also no guarantee that METI messaging won't be the first, or only, signal of ours that ETI detect. Under our current knowledge, it is decidedly possible that METI messaging in fact tips the balance toward our being detected, which means that claims of overdetermination are currently unjustified and could be false. The earlier response to the causal inefficacy interpretation applies here as well, insofar as the strength and directionality of METI signals make us more noticeable than other signaling does. At this point, the parallels have begun to break down. While many given individual acts of carbon emissions by themselves truly cannot change our climate outcome, a given individual act of messaging could, by itself, secure our detection. And, again, without knowledge of ETI's actual perceptual or technological capabilities, it is extremely difficult to ascertain how likely or unlikely this situation is. Thus, *pace* the causal overdetermination interpretation, we should not simply help ourselves to the assumption that non-METI signaling will be detected.

At this point, we have seen that there is good reason to dismiss both (1) the causal inefficacy interpretation and (2) the causal overdetermination interpretation of the Barn Door Argument. We are now left with (3) the causal indeterminacy interpretation. This interpretation from indeterminacy coheres best with the known facts about our current messaging situation. However, as I will show, while causal indeterminacy may in fact apply in METI situations, it fails to generate the conclusion of the Barn Door Argument.

Causal indeterminacy

Hale (2022) recently coined the term 'causal indeterminacy' to refer to this third way of interpreting causal impotence arguments, though he notes that these ideas are detectable in his own and other earlier works on climate change, such as Stephen Gardiner's (2006) canonical Perfect Moral Storm article. Whereas interpretations (1) and (2) above posited determinate outcomes in the Barn Door scenario, (3) acknowledges the crucial indeterminacy at work in this and many causal impotence debates. Noting the difference between these two kinds of interpretations, Hale writes,

Where with determinate outcomes the causal pathway between an initiating action and the eventuating outcome can be anticipated with some level of certainty—an actor flips a light switch and a light goes on—in indeterminate systems, the causal pathway between an initiating action and the eventuating outcome can be drawn only retrospectively (2022, p. 7).

So, let's reconsider an agent who abstains from eating animal products with the goal of avoiding contributing to environmental damage and climate disaster. This is in part an economic decision, and, as Hale notes, markets are indeterminate systems. Even a noticeable downward shift in demand for animal products does not obviously or directly entail that production will also go down. Consider that,

[W]hen these shifts occur, investors change their investment strategies, insurers change their insurance strategies, advertisers change their advertising strategies, all of which scrambles the numbers in the non-human animal lottery. These knock-on effects push market actors to make adjustments that keep them in business, preventing even close observers of these markets from knowing what will come next (Hale, 2022, p.13).

The choice is embedded in a system characterized by complexity and strategic choices, rendering not only the actual outcome of the choice unpredictable but also making both actual and potential outcomes themselves factors in the strategizing choices of the various agents involved in the process. Indeterminate systems are therefore self-undermining insofar as predictions become moot as soon as agents strategize based on those predictions. An agent's choice to abstain contributes not only to the deep uncertainty within the model but also to the possibility of perverse outcomes, making the agent causally responsible for contributing to climate disaster despite a willful intention to avoid precisely that. Furthermore, their causal responsibility cannot be assumed at the time of the choice or action; it can only be ascertained retrospectively once the actual outcome materializes.

Such complexity and strategy are key features of situations of causal indeterminacy, and these features are present in current messaging scenarios as well. The answers to many of the questions raised by these scenarios—of *whether* we will be detected, of what *particular* signals will be detected, and whether our being detected will be *harmful*—are crucially indeterminate insofar as strategizing intermediary agents act on dynamic anticipatory models, and those acts affect which outcomes actually arise.⁷ How

⁷ I'm setting aside the question of whether we've already been detected and the possibility that we'll never be detected, but these

our detection ultimately plays out depends on complex factors and strategic choices—not only here on Earth but out in the cosmos as well.

Here on Earth, our detectability stands to be affected by several complex systems—economic, political, ecological, and many others. For example, what technology we use and its relative noticeability are largely the products of ongoing, dynamic economic and political decisions. Likewise, our environmental carbon footprint is a product of increasingly strategic economic choices affecting and affected by complex ecological systems, and these effects can potentially be detected in our planet's atmosphere. Messaging itself is one of the complex factors of our detectability, and the fact that messages are intended to be detected highlights the central role of strategic actors in this particular activity. For example, targeting known exoplanets versus near-Earth objects is a strategic decision that affects subsequent strategizing agents. Furthermore, whether we embed messages in our signals and what messages should be transmitted is an ongoing debate and discussion in the astrobiology community (Denning, 2010). At this point, anyone with access to the right kind of radio equipment may transmit a message. New strategic actors or groups of actors might enter the scene anytime in the near or distant future and further complicate the anticipatory factors involved in messaging scenarios. These are just some of the many ways that complexity and strategy can lead to indeterminacy in situations of messaging and our detectability.⁸

Out in the cosmos, matters are even more indeterminate and uncertain. We cannot justifiably assume that there is just one ETI with just one set of capabilities, nor that any ETI's capabilities are static. We know nothing for certain about their specific, concrete situation nor how that might change or affect their ability to detect us. These strategizing agents could be anticipating outcomes in ways that we cannot access or even imagine. But we can and do speculate about what they might be capable of detecting, and about which detected signals would prompt a response and what kind of response each might prompt. The difference between a

friendly response and a hostile one may hang on certain details or strategic decisions of ETI that we are unable to properly anticipate or successfully control. For example, what outcomes we can anticipate will change depending on whether we believe ETI will be able to distinguish unintentional signals from intentional ones, or whether we believe an intentional message, if it is indeed received as such, can be interpreted accurately. We cannot know whether we are anticipating correctly, but we can affect our subsequent strategic choices *by* anticipating different outcomes, and these could in turn affect ETIs' strategic choices in ways that are completely opaque to us. The ETI who might detect us bring their own factors of complexity and strategy to the equation, and our ignorance of those factors, coupled with our own terrestrial complexities and strategies, generates a crucial indeterminacy with regard to the issue of whether, when, and how messaging affects our detectability.

The first lesson here is that the appeal to causal impotence in the *Barn Door* argument is best interpreted as an appeal to causal indeterminacy. However, unlike with interpretations (1) and (2), in situations of causal indeterminacy, the impotence of the actor is not guaranteed; it is merely possible. It is also possible that the actor play a causally and morally significant role in generating the worrisome outcome. But because of the indeterminate nature of the situation, the question of potency versus impotency cannot be answered at the time of the action because the causal line cannot be drawn until after the outcome materializes. That is, we won't be able to understand how or to what extent messaging affected our detection before contact occurs. And how contact occurs, if it does, cannot justifiably be deemed a foregone conclusion. The details of a contact situation will likely be affected by past, current, or future decisions made by terrestrial and extraterrestrial agents taking strategic actions that are embedded in complex and indeterminate systems. A given decision to message may be one of the causal factors that leads directly to our detection or detectability. Or it may be the only causal factor. Or it may have nothing to do with our detection or detectability. Causal power is not guaranteed, but it is still very much on the table for Earth's messengers. And the possibility of causal power brings with it moral responsibilities, even when it doesn't guarantee potency.

The second lesson is that the causal indeterminacy interpretation fails to generate the moral excuse on which interpretations (1) and (2) relied. Choosing to act when your action could have a significant effect on the outcome is not morally equivalent to choosing to act when your action does not appreciably affect the outcome. If you know your action has the potential to significantly affect the outcome in question, you bear some responsibility for choosing such an action. In METI scenarios, messengers are not justified

Footnote 7 (continued)

issues only add to the uncertainty and potential for strategizing indeterminacy at work here.

⁸ One might counter here that this claim of indeterminacy is not true indeterminacy but rather an especially thorny epistemological problem of mere uncertainty. See Hale 2022 for responses to this objection. However, even if one is not convinced by the responses, the objection fails to undermine the ultimate challenge presented here for the METI-proponent of the Barn Door Argument. The deep uncertainty and significant potential for perverse outcomes remain present even if the situation is one of mere indeterminability rather than true indeterminacy, and this does not change the fact that given, individual messages could be highly causally potent in ways that cannot be ascertained until the actual outcome materializes.

in assuming that their choices are impotent. They know that the choice to message has the potential to significantly affect the outcome in question. They also cannot justifiably claim ignorance regarding the potential cosmic effects of their actions—which is something that *can* be claimed by many who have and do engage in *unintentional* signaling activities. This awareness, coupled with the potential for effective power, means that the agent bears moral responsibility for the decision itself even before we know whether the act was causally efficacious.

For analogy, imagine someone who posts on their personal social media account their armchair assumption about the identity of a terrorist in the immediate aftermath of a terrorist attack. Let's stipulate some potential attributes of this kind of decision. It is possible that this person is *correct* regarding the identity of the terrorist, but, given the evidence available to them, they are not *justified* in their accusation. It is possible that almost no one will see the post, and that it has little to no effect on the situation. It is also possible that the post goes viral and is highly effective in influencing what happens. If the post goes viral and the assumption is correct, a terrorist will be caught earlier than they otherwise would have. If the post goes viral and the assumption is incorrect, an innocent person's life will be upended and they will be severely harmed. Whether an individual social media post goes viral or gets ignored is arguably a case of causal indeterminacy, with the outcomes resting on a combination of often-opaque technological systems and algorithms along with the complex and strategic choices of various actors and intermediaries. So, the original poster cannot justifiably claim at the time that they post that their post will be causally impotent. And the strategic choices of the intermediaries can be affected by whether they predict, correctly or not, that the post will go viral. The effects of the post could be very bad, though it is also possible that they are rather good. What matters morally at the time of the decision is that the possibility for significant and direct harmful effects generates the moral responsibility of the agent based on the decision's potential causal efficacy. Many people intuit responsibility for this kind of action and may explain that intuition in the following way. Because the agent cannot assume that their choice will be inefficacious, the decision is arguably reckless and morally irresponsible.⁹ The same cannot be said of decisions that are truly causally impotent.

Thus, premise 3 in the *Barn Door* argument—the premise that states that there's no point in stopping METI signals—is unjustified. Abstaining from METI signaling could have a very significant effect, we simply don't know now whether

it will or will not have such an effect, or how the choice to message will affect future strategic choices and the ultimate outcome. Put simply, there may be a point in stopping METI, so the *Barn Door* argument fails and its conclusion cannot be reached in the manner proposed by the proponents of that argument.

Objections and responses

There are two important objections I will consider here. First, parallels have been drawn throughout this work to acts of environmental degradation, but METI messaging diverges from acts of environmental degradation in a morally relevant way. Acts of environmental degradation reliably produce bad outcomes. METI messaging *could* produce very good outcomes. Even if both acts involve causal indeterminacy, potentially contributing significantly to the outcome of, say, climate disaster is not morally analogous to potentially contributing significantly to the outcome of our detection. The potential outcomes of messaging are decidedly mixed in ways that the outcomes of environmental degradation typically are not. In this way, METI messaging is more like the social media poster example than the climate change examples. There is the potential for very good outcomes alongside the potential for very bad outcomes. And messaging proponents are often quick point out that our being detected could potentially be beneficial, and that this should be considered alongside concerns about the risks of harm (Korbitz, 2014; Vakoch, 2016).¹⁰

To reply, these benefits are possible, but we do not know how likely they are, nor can we confidently calculate those probabilities on our current evidence. But more important is the fact that we do not lose out on the possible benefits of detection even if we forestall messaging until we can work out proper and just representation. This is due to the fact that our unintentional technosignatures, along with eons of biosignatures, allow for the possibility of such benefits without raising many of the terrestrial justice-based concerns that accompany current, intentional messaging. Questions of representation are important because METI messaging carries a high risk of misrepresentation here on Earth and the harm and injustice that can follow.¹¹ With their

¹⁰ For example, aliens might be able to help humans to achieve sustainability or to avoid some existential threat we independently face.

¹¹ Our focus so far, and the focus of the *Barn Door* Argument per se, has been on the potential outcomes of our being detected by an extraterrestrial species, and this is an interspecies concern. As I have shown, such interspecies outcomes, while morally relevant, may be crucially indeterminate. However, these are not the only relevant outcomes of messaging, and other relevant outcomes do not fall prey to similar claims of indeterminacy. In fact, there are serious *intraspe-*

⁹ I'm setting aside debates about circumstantial moral luck here. For a brief overview of moral luck issues, see Spelman 2014.

messages, METI practitioners are speaking on behalf of all humanity. Many have noted that the social and historical location of those who speak for and intentionally represent others has a strong bearing on the meaning and impact of their words (Alcoff, 1991; Spivak, 1988). It is remarkably easy to introduce or reinforce injustice here on Earth—even without meaning to—whenever an activity involves speaking for others in an attempt to represent them. Taking the time to work out proper and just representation is consistent with allowing unintentional signaling that does not aim to represent humanity or our planet but could still result in contact and its potential benefits.

This relates to a second kind of objection, which acknowledges that, like intentional messaging signals, *unintentional* signals are also not necessarily causally impotent. They too are part of causally indeterminate systems. Perhaps, then, the moral concerns with messaging carry over to all of our technological signaling. A radio or television broadcast could be detected by ETI, and the effects could be disastrous. Thus, perhaps the critic of METI proves too much: the point about avoiding risk generalizes to forbid us from engaging in everyday broadcasting activities.

To respond, there are distinct features of messaging that render it disanalogous to unintentional signaling and prevent this generalization, despite the overlap in causal indeterminacy. Most if not all unintentional signaling lacks the intention to, or the awareness of the potential to, contact extraterrestrial others. This lack affects the justifications for moral claims of blame and responsibility. Consider one more environmental parallel regarding awareness. At the onset of the Industrial Revolution, polluting agents did not know that they were serving as the catalyst for an eventual global climate catastrophe. This means that they are either not blameworthy, or that they are far less blameworthy than those who today knowingly and intentionally act in ways that seriously amplify the climate crisis. Likewise, those who broadcast or signal for terrestrial entertainment, communication, or tactical purposes have not historically been consciously aware of the potential to reach ETI with their transmissions, nor are they intentionally representing humanity to the cosmos with these transmissions.

This makes a moral difference. Consider also a historical parallel regarding intentionality. One way of learning about the past is through historical representations intended

to convey a particular picture of a period. Another way is through historical artifacts that, at the time of their construction, were not meant to be representative of, say, an entire period or culture. So, a historian who creates a representation of a particular period in the past has far stronger moral responsibility to properly represent that moment than does, say, a past person who corresponded privately with another and whose letters are preserved and then displayed as representative of that time period. Both are representative, but the difference is that latter is *not intended* to be representative. Because METI messages are intended to be representative, they entail special moral responsibilities to represent properly and to avoid misrepresentation—responsibilities not borne by those who have no intention of representing humanity to the cosmos and whose detectable activities satisfy other, important goals.¹²

Conclusion

METI messengers are not necessarily causally impotent when they send astrobiological signals out into the cosmos. The causal indeterminacy at work in these cases generates moral responsibility at the time of the action—responsibility that is grounded in the action's potential for efficacy, even though the causal line cannot be drawn until after the outcome materializes. This indeterminacy prevents the agents in question from justifiably offering the moral excuse that there's no point in abstaining, or that their action makes no difference. Thus, the Barn Door Argument must be abandoned, and METI practitioners have good reason to take seriously both the potential efficacy of messaging actions out in the cosmos as well as the effects of their intentionally representational activities here on Earth.

Funding Open Access funding enabled and organized by Projekt DEAL.

Declarations

Conflict of interest There are no financial or non-financial interests that are directly or indirectly related to the work submitted for publication.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes

Footnote 11 (continued)

cies concerns of harm between humans that are ostensible here and now, though they are not factored into the Barn Door Argument (and, of course, there are other terrestrial interspecies outcomes involving humans and other species and ecosystems here on Earth that are relevant). These issues are important to consider as well, however, they extend beyond the scope of this paper and must be omitted due to considerations of space.

¹² This type of critique applies to other intentional messages sent as artifacts—such as the Pioneer Plaques and Golden Records—that do not rely on high-powered radio signals per se, because these too stand to reinforce or disrupt social dynamics here on Earth through intentional representation, even though they are presumably far less likely to be detected out in the cosmos.

were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

References

- Alcoff, L. (1991). The problem of speaking for others. *Cultural Critique*, 20, 5–32.
- Billingham, J., & Benford, J. (2014). Costs and difficulties of interstellar ‘messaging’ and the need for international debate on potential risks. *Journal of the British Interplanetary Society*, 67, 17–23.
- Brin, D. (2019). The barn door argument, the precautionary principle, and METI as prayer—An appraisal of the top three rationalizations of for “Active SETI.” *Theology and Science*, 17(1), 16–28.
- Cortellesi, T. (2020). Reworking the SETI paradox: METI’s place on the continuum of astrobiological signaling. *Journal of the British Interplanetary Society*, 73(7), 260–267.
- Cripps, E. (2013). *Climate change and the moral agent: Individual duties in an interdependent world*. Oxford University Press.
- Denning, K. (2010). Unpacking the great transmission debate. *Acta Astronautica*, 67(11), 1399–1405.
- Gardiner, S. M. (2006). A perfect moral storm: Climate change, intergenerational ethics, and the problem of moral corruption. *Environmental Values*, 15, 397–413.
- Glover, J., & Scott-Taggart, M. J. (1975). It makes no difference whether or not I do it. *Proceedings of the Aristotelean Society, Supplementary Volumes*, 49, 171–209.
- Hale, B. (2022). Indeterminacy and impotence. *Synthese*, 200(3), 250.
- Jones, E., & Linewater, C. (2010). To what extent does extraterrestrial life “follow the water”? *Astrobiology*, 10(3), 349–361.
- Korbitz, A. (2014). The precautionary principle: Egoism, altruism, and the active SETI debate. In D. Vakoch (Ed.), *Extraterrestrial altruism: Evolution and ethics in the cosmos* (pp. 111–127). Springer-Verlag.
- McKay, C. (2014). Requirements and limits for life in the context of exoplanets. *Proceedings of the National Academy of Sciences USA*, 111(205), 12628.
- Nefsky, J. (2017). How you can help, without making a difference. *Philosophical Studies*, 174(11), 2743–2767.
- Shostak, S. (2013). Are transmissions to space dangerous? *International Journal of Astrobiology*, 12(1), 17–20.
- Sinnott-Armstrong, W. (2005). It’s not my fault: Global warming and individual moral obligations. In W. Sinnott-Armstrong & R. Howarth (Eds.), *Perspectives on climate change: Science, economics, politics, ethics* (pp. 285–307). Elsevier.
- Spelman, J. (2014). Moral luck. *1000-word philosophy: An introductory anthology*, May 8
- Spivak, G. C. (1988). Can the subaltern speak? In C. Nelson & L. Grossburg (Eds.), *Marxism and the interpretation of culture* (pp. 271–313). University of Illinois Press.
- Vakoch, D. (2016). In defence of METI. *Nature Physics*, 12, 890.
- Vakoch, D. (2017). Hawking’s fear of an alien invasion may explain the Fermi paradox. *Theology and Science*, 15(2), 1–5.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.