

Article

Thought Experiments as a Tool for Undermining Methodological Naturalism

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Abstract: There is a substantial literature on the question of whether methodological naturalism (MN) is and/or should be among the principles operative in the natural and social sciences; moreover the status of MN has been one of the battle grounds in prominent debates regarding the demarcation lines between science and theology (e.g., the debate over whether intelligent design hypotheses can ever count as genuinely scientific). I review some concrete examples of the use of thought experiments in this context, and argue that there are realistic thought experiments showing how metaphysical naturalism (MTN) could be subjected to empirical falsification; that in turn implies that MN should not be employed universally as an operative principle in the sciences. I conclude by discussing some recent actual experimental work concerning near-death experiences (NDEs), work which may point towards the likelihood of just such empirical falsification taking place in the relatively near future.

Keywords: thought experiment; near-death experience; theology; science; God; naturalism

1. Introduction

The view known as ‘methodological naturalism’ (MN) has been defined in various ways, but the core elements of the idea may be stated as follows:

MN is the proposition that natural and social scientists should operate under the assumption that non-physical powers, entities and agencies have no scientifically relevant causal influence on the natural world

This particular formulation, though designed simply to encapsulate the essential components of MN as commonly seen in the literature,¹ still warrants a bit of unpacking. **First**, it is a prescriptive rather than descriptive claim; it purports to tell us what scientists *should* do, not necessarily what they actually do. Thus the fact that some past and present scientists have entertained supernatural entities in the course of their research should not be taken as undermining the truth of MN. (Though some advocates of MN would wish to add that it may also be taken as a descriptive claim, at least with respect to any *genuinely* scientific rather than pseudoscientific research. This is a claim that would be added specifically by those who wish to employ adherence to MN as part of their criteria for demarcating science from pseudoscience.) **Second**, it is a claim about both natural and social science. On this view, just as molecular biologists should not, *qua* biologists, take seriously the possibility of a supernatural designer having intervened in nature to influence the development of cellular structures during their evolution, so classical historians should not, *qua* historians, take seriously the possibility of the resurrection of Jesus Christ having been an actual event literally occurring within our spatio-temporal realm. (This second point is contentious among some scholars; for instance, some

¹ See for instance the definitions of MN employed in (Barker and Kitcher 2014, pp. 66–70); (Koperski 2015, pp. 202–3); (Lennox 2009, pp. 32–39); Moreland (1994, pp. 46–48); (Pennock 2001, pp. 83–85); and (Pigliucci 2010, pp. 178–79).

Christian advocates of theistic evolution maintain that MN should be observed when it comes to alleged supernatural interventions in biological evolution, but think that it needn't be observed in historical inquiry, such that historical evidences for the resurrection of Jesus and other miracles can still be assessed for their possible supernatural import. See for instance [Lamoureux \(2016, pp. 63–65\)](#). This implies a willingness to observe MN within the natural sciences, but not the social sciences.) **Third**, the reference to non-physical powers, entities and agencies is meant to be as broad and inclusive as possible, encompassing both *non-conscious* supernatural forces (e.g., magical energies or astrological influences) and any purported supernatural *agencies* (e.g., personal gods or angels or Cartesian egos). And **fourth**, the assumption rules out *scientifically relevant* causal influences, i.e., influences that would impact research outputs. An example of a *non-relevant* influence may be seen in the idea that God conserves all contingent reality in existence moment by moment via the divine sustaining power. That kind of general causal influence would obviously be important and relevant in some broader sense (i.e., if divine conservation were actually real then no scientific observation or experiment could ever be completed without it), but it would remain irrelevant in the sense that, *taking for granted the ongoing existence of the laws and initial conditions*, such supernatural activity would not affect the observed outcome of the research. On this notion, divine activity might keep the observed particles in existence, but even if so it would not alter their natural course of motion (a *relevant* influence).

MN is thus chiefly a normative claim about how science ought to be conducted. It is frequently contrasted with an ontological claim, 'metaphysical naturalism' (MTN). MTN (sometimes referred to as 'physicalism' or 'materialism') has also been the subject of varying definitions,² but the core idea is this:

MTN is the proposition that the only kind of reality is physical reality. Consequently there are no non-physical divinities, souls, Cartesian egos or any other sort of immaterial object.³

Advocates of MTN are typically also advocates of MN, but the reverse does not always hold; sometimes defenders of MN are agnostic about the reality of the supernatural, or even religious believers.

Unsurprisingly, both MN and MTN remain highly contested. In this paper I look at the role thought experiments have played in some of the recent debate surrounding MN, focusing in particular on the literature surrounding alleged intelligent design (ID) in the natural sciences. Thought experiments are obviously a prominent tool in the hands of both philosophers and scientists, and their application to the theology & science dialogue has also received some attention in the literature.⁴ This project may be seen as an addition to the latter body of work.

² See for instance the extended discussions found in ([Goetz and Taliaferro 2008](#)), [Jaworski \(2016, chp. 11\)](#), [Rea \(2002\)](#), and [Stoljar \(2010\)](#). Note that not everyone follows my practice of taking the three terms (naturalism, physicalism, materialism) as synonymous; Rea for instance distinguishes sharply between metaphysical naturalism and materialism, and only his use of the latter accords with mine. Similarly, Jaworski defends a distinction between physicalism and materialism. In general, within analytic philosophy of religion it is fairly common to treat these terms as synonymous, while in the philosophy of mind it is more common (though hardly universal) to draw finer-grained distinctions between them. Since the present paper falls more within the former category, it follows customary usage there.

³ I am skipping over the notable complications that arise when one undertakes the task of precisely defining what 'physical' really means. This is actually quite important, by way of clarifying exactly what sorts of entities are ruled out by adherence to MTN. To give some sense of that ongoing debate: [Dummsday \(2014, 2015, 2016\)](#) presents the view that the possession of essential (not merely contingent) spatial extension is a necessary (and probably sufficient) condition for being a physical object; [Lowe \(1994\)](#) makes the case that for an entity to be physical it must be necessarily (not merely contingently) extended in both space and time; [Markosian \(2000\)](#) equates being a physical object with possession of spatial location; [Schaffer \(2009\)](#) analyzes the physical in terms of possessing not merely spatial but *spatiotemporal* location; both ([Crook and Gillett 2001](#)) and [Montero \(1999\)](#) define the physical in terms of a negation: something is physical when it is *non-mental*; [Vicente \(2011\)](#) understands the physical as whatever is studied by current physics; [Dowell \(2006\)](#) argues that the physical should be defined not by reference to the entities studied by current physics but rather by reference to the entities studied by a hypothetical completed *future* physics; and [Wilson \(2006\)](#) adopts a hybrid view according to which the physical is defined by being non-mental *and* by being the proper object of study by physicists. Note that the meaning of 'supernatural' is arguably also bound up with this debate, insofar as one might plausibly understand the supernatural as equivalent to (or at least including) the non-physical or what transcends the physical.

⁴ See [Fehige \(2012\)](#) for a helpful entry point here.

The specific argument I wish to pursue may be summed up in a tidy modus ponens:

Premise 1 If one or more realistic thought experiments indicate that MTN can be empirically falsified through scientific research, then MN is undermined.

Premise 2 One or more realistic thought experiments indicate that MTN can be empirically falsified through scientific research.

Conclusion Therefore, MN is undermined.

Note that the conclusion is framed in terms of *undermining*, not *defeating*; I am not claiming that the realistic prospect of a potential empirical disproof of MTN would automatically show that MN is false, or even that it is *probably* false—merely that such a prospect would undermine MN to at least some degree. To what degree exactly? I don't know. However I am inclined to think that the degree of undermining provided is such as to warrant abandoning MN as a universal operative principle in science. In other words, it will become apparent below that if my argument holds, then there are at least some legitimate forms of scientific inquiry in which MN is not employed as a background assumption (and is even *actively rejected* as a background assumption).

The debate over MN (and closely related debates surrounding the demarcation of science from pseudoscience) has many moving parts, and I would not be so foolhardy as to try and settle it here. But I can attempt to tilt the scales a bit in one direction or the other.

In the next section of the paper I defend P1, and then in the subsequent section turn to the justification of P2. In the concluding section I briefly make the case that an empirical falsification of MTN will soon move from the merely hypothetical realm of thought experiments into the real world of *actual* scientific experiments; more specifically, I will argue that within the next 30 years MTN is probably going to be empirically falsified, most likely on account of work on near-death experiences (NDEs).

2. A Defence of P1

The conditional proposition that is P1 draws on a claim about the empirical falsifiability of MTN, not the truth of MTN. This is worth highlighting, because some proponents of MN have stated that MN must be upheld regardless of whether or not MTN is true. Indeed, some have argued that even if it were actually the case that God intervened in nature to produce organisms by intelligent design, scientists *qua* scientists should have no truck with such an idea—supernatural intervention is beyond the proper reach of science and causal explanations referencing such intervention must be left to one side, *even if true*. Typically, at least part of what is motivating that normative claim is the background idea that science deals properly in empirical facts subject to empirical testing and possible falsification, and that the alleged reality of supernatural interventions is not thus subject. With all that in mind, my proposed critique of MN proceeds on the basis of a challenge not to the *truth* of MTN, but rather a challenge to the claim that MTN is *not subject to empirical falsification*. In other words, if we could show that, in principle at least, science could obtain good empirical evidence for the reality of the supernatural, then the automatic exclusion of the supernatural from the purview of science would be undermined.

And in principle, MTN is subject to empirical falsification.⁵ A number of such in-principle falsifications have been put forward in the literature via creative thought experiments. Some of these are clearly not intended to be taken as realistic, *plausible* scenarios—they are meant simply to show that empirical evidence for the reality of the supernatural could be accessed and rationally evaluated by scientists. Consider for instance the scenario presented by Ratzsch (2001, p. 46):

⁵ Note that I am assuming for the sake of argument that the concept of empirical falsifiability is legitimate, pace some readings of the Duhem/Quine thesis. Obviously these are deep waters, but insofar as falsifiability is frequently invoked by *proponents* of MN my usage of it here should be acceptable to the main parties to the debate.

Suppose that we had an apparently ordinary chunk of uranium ore. Suppose further that it began triggering clicks on our decay detectors that contained messages in Morse code—and perhaps even engaged in Morse conversations with us. We would, naturally, immediately suspect the nearest graduate assistant of having tampered with the detector (meaning, of course, that we recognized *prima facie* evidence of design in this case). But suppose that the best efforts of the best experts on earth established not only that the ore was otherwise perfectly ordinary but that the detector was in perfect working order. We would likely be forced at least to the conclusion that agent causal activity—causal activity of a sort forbidden by most current theory—was involved. Given the belief common among physicists that quantum mechanics is the best scientific theory ever developed (and the consequent perfectly natural reluctance to junk it), we might eventually conclude that the communicating agent involved had overridden natural law to generate the communication. Ruling that option out on, for example, definitional grounds would (ironically) be to insist on giving up our best *empirical* science—quantum mechanics—in order to protect a favoured *philosophical* view of the character of natural law.

This thought experiment is putting forward a scenario in which MN would likely be abandoned by scientists as a result of new empirical evidence for the falsity of MTN. It is designed to show that, in principle, MTN is subject to empirical falsification.

Here is another example of a thought experiment with the same aim, from Monton (2009, pp. 51–52):

I will now argue that it is counterproductive to restrict scientific activity in such a way that hypotheses that invoke the supernatural are ruled outThe scenario I am about to describe is implausible, but there is nothing logically inconsistent about it. The point of the scenario is that in the described situation, it would be reasonable for scientists to postulate and test the hypothesis that there is supernatural causation occurring. Imagine that some astronomers discover a pulsar that is pulsing out Morse code. The message says that it's from God, and that God is causing the pulsar to pulse in this unusual way. The astronomers are initially skeptical, but they find that when they formulate questions in their head, the questions are correctly answered by the message. The astronomers bring in other people to examine this, and the questions are consistently answered. The message goes on to suggest certain experiments that the scientists should perform in particle accelerators—the messages says that if the experiments are set up in a specific precise way, then God will cause a miracle to occur. The experiments are done, and the resulting cloud chamber tracks spell out Biblical verses. Then the message explains to the scientists how to form a proper quantum theory of gravityI could go on, but you get the picture. The evidence doesn't *prove* that God exists—maybe some advanced alien civilization is playing a trick on us; maybe the scientists are undergoing some sort of mass hallucination; maybe all this is happening due to some incredibly improbable quantum fluctuation. But the evidence does provide some support for the hypothesis that God exists. It would be silly for the scientists to refuse to countenance the hypothesis that God exists, due to some commitment to methodological naturalism.

The goal again is to present a situation where MN would rationally be abandoned in the face of empirical falsification (or at least severe undermining) of MTN.

However, it is not immediately clear that such thought experiments (certainly more could be cited) of themselves directly undermine the truth of MN. Generally speaking, for just about any plausible methodological principle one might adopt in the sciences (or any area of life), it is surely possible to come up with a more-or-less weird thought experiment where a scenario is presented in which that principle would have to be abandoned. (Cartesian demons can after all be deployed quite liberally in such discussions—I'll leave the reader to think up her own examples.) To attain a clearer, more direct undermining of MN it would be more helpful to have on hand a *realistic* thought experiment

presenting a scenario in which MTN is empirically falsified through scientific research. Realistic thought experiments can do the work that more fanciful thought experiments cannot do (at least in this context). And with this we come to P2 of our argument.

3. A Defence of P2

The recent literature on MN has often centred around the idea of supernatural intelligent design (ID), particularly in the context of the biological sciences, but also cosmology. This is hardly surprising, given the public profile that debates surrounding ID have enjoyed since the mid-1990s, especially in the United States. And given the current state of research into cosmic fine-tuning, the idea that MTN might be empirically falsified via new findings in physics and cosmology cannot rightly be seen as wildly unrealistic (except by those already certain of the truth of MTN). [Koperski \(2015\)](#), pp. 211–12) concurs:

Under MN, when physicist Lawrence Krauss explains fine-tuning by positing a vast multiverse of possible universes each with different values for these constants, he's doing science. When astronomer Owen Gingerich explains the very same observations by means of design, he's doing religion. This, it seems to me, is completely artificial and ad hoc Almost everyone believes that God *might* exist even if there isn't sufficient evidence to believe it. If so, then God might have literally fine-tuned the universe in order for life to exist. **As a thought experiment, let's just stipulate that this has happened.** Let's say God exists and directly fixed the values of the fine-tuned cosmic constants. If science must be naturalist, then since (i) the fine-tuning data cries out for an explanation and (ii) the only explanations allowed are naturalistic, science would be driven into accepting false explanations. MN is therefore potentially in conflict with realism. In order to hold scientific realism, one must believe that mature theories are generally reliable indicators of truth. But if there is a choice between naturalism and truth, MN forces science to choose the former. Once science is limited to certain kinds of entities, it can no longer follow the data wherever it leads. Science is instead forced to beat the data until it offers a naturalistic confession. [Emphasis added]

Obviously there are several things going on in this passage, but the key idea for our purposes is that based on current research trends in cosmology, one can realistically imagine a scenario in which, all naturalistic explanations for apparent cosmic fine-tuning having been plausibly excluded, supernatural intelligent design is left as the only workable option. Precisely what sorts of theoretical developments and experimental tests might lead up to that point may be difficult to envisage at present (and impossible for us non-physicists); as such this realistic prospect does not give us a very well-defined thought experiment, unlike the detailed if fanciful thought experiments laid out in the previous section. But it may serve much the same end, only with the added advantage of *not* being fanciful.

However, one disadvantage of trying to support P2 by reference to the possible intelligent design of alleged cosmic fine-tuning is that so much of the current literature on MN is focused precisely on ID. That is, much of the recent literature surrounding MN is prompted by the very question of whether ID hypotheses can be legitimately treated as scientific within cosmology and biology. As such, referencing the ID debate for this purpose is liable to strike some readers as question begging. So is there some other route to a realistic thought experiment indicating that MTN can be empirically falsified?

At the risk of alienating a goodly sized portion of the readership: at this point it's perhaps worth recalling that older debates on MN (especially prior to the 1980s) often centred less around creationism and ID and more around the scientific legitimacy of parapsychology. Though marginalized in contemporary academia, parapsychology once enjoyed rather more public cachet and a greater degree of respectability (think for instance of the past status of the Rhine Institute at Duke University). For our purposes the important point is that academic centres for parapsychological research functioned in part as workhouses generating thought experiments designed to test for the presence of supernatural forces or agencies, thought experiments sufficiently realistic that they could sometimes be translated into *actual* experiments using real human subjects.

I trust readers are already familiar with some of the more iconic such experiments. For instance, to test for the presence of the *prima facie* supernatural ability of telepathy, one can imagine giving a test subject a set of specially made playing cards, one side of which bears visually distinctive basic patterns. That first subject looks at a card, perhaps concentrating hard on the image, while a second test subject (completely spatially isolated from the first) attempts to read the first person's mind and accurately guess the image. Run enough such experiments (with adequate controls) on enough subjects and then do a statistical analysis to see if the guesses achieve a rate of accuracy greater than that to be expected from chance. If the rate of accuracy is greater, that provides evidence for the reality of telepathy and hence evidence for the falsehood of MTN. If the rate of accuracy is far greater, and the results consistently replicable, then MTN is empirically falsified. The very fact that such a test can plausibly be worked out in a thought experiment, such that it can actually be run in the real world, serves to undermine MN. For MN would dictate that the experiment should not be done, whereas in fact there seems nothing wrong—nothing immoral⁶ or antiscientific—with running it.

And of course just such a thought experiment was actually realized, in the form of the famous Zener card experiments. (If the reader has not encountered any of the literature on this, I trust she has at least viewed Bill Murray's opening scene in *Ghostbusters*.) These and other closely related experiments generated a great deal of data and a massive amount of controversy.⁷ I have no intention of wading into those controversies here; even if I were competent to adjudicate them, they would take us rather far afield from our main concern. And that concern is to justify P2 by showing that there are realistic thought experiments indicating the possibility of falsifying MTN by empirical means. At least some of the thought experiments developed within parapsychology (and indeed frequently *carried out* within parapsychology) should suffice to indicate this.

Nevertheless, so far I expect the argument has left advocates of MN fairly unperturbed. While parapsychology is no longer employed in the literature as the standard example of a field falling afoul of MN, at one time it *was* (though always controversially); consequently, referencing it here for purposes of defending P2 might still leave some readers concerned about question begging. Moreover the marginalized status of parapsychology renders it a precarious ally in this context (whether or not that marginalization is actually justified).

So let's consider yet another realistic thought experiment indicating a path to empirical falsification of MTN via scientific research. This thought experiment is not original to me, and it has the further twin advantages of drawing on neither ID nor parapsychology and thus sidestepping the aforementioned concerns regarding question begging. This thought experiment involves near-death experiences (NDEs), which I trust the reader is familiar with, at least in general terms: thanks to modern CPR techniques, people can now be brought back from clinical death far more often than in the past (especially pre-1960s). In a substantial minority (around 10%) of such resuscitation cases, the resuscitated individuals report one or more of a cluster of interrelated experiences, such as: floating above their clinically dead bodies and witnessing what is going on in the hospital room / ambulance; travelling down a dark tunnel towards a bright light; encountering deceased loved ones or supernatural beings like angels; being given a 'life review' in which the sum total of their good and bad actions flash before their consciousness; encountering what they interpret as a higher power/light Being/God; and eventually returning to their bodies, often after being informed that it is not their time to die or that

⁶ In fact some ethical issues have been raised concerning certain sorts of parapsychological research, in particular those involving mediums and other such attempts to contact the dead. Religious believers in particular have shown concern about the latter sorts of practices, in light of Biblical injunctions against mediumship.

⁷ For some readable extended discussions (generally favourable to the legitimacy of parapsychology), see for instance Carter (2012); Jacobsen (2017); McLuhan (2010); and Radin (1997). Pigliucci (2010, pp. 77–83) provides a nice example of a rather less favourable treatment. See also the reasonably balanced anthologies edited by (Stoeber and Meynell 1996); and (Krippner and Friedman 2010).

they have something more to accomplish on earth. It has been demonstrated that these basic features of NDEs are remarkably consistent across ages, ethnicities, social classes, religions, and cultures.⁸

Unlike parapsychology, the academic study of NDEs is at present far from marginalized, despite dealing with a class of events that at least *prima facie* challenges MTN. Partly this is due to sociological factors: many of the prominent NDE researchers are medical doctors, and in our society no profession carries more prestige. MDs can ‘get away with’ studying NDEs and their associated out-of-body experiences whereas self-identified parapsychologists simply cannot study telepathy (etc.) without self-marginalization, and this is in part because the latter aren’t MDs. A more rational, less subjective grounding for the prominence and comparative respectability of NDE research flows from the massive commonality of NDEs: over the last 50–60 years hundreds of thousands (likely millions) of people have had NDEs, thanks to improved resuscitation techniques. Most of the sorts of phenomena that parapsychologists study, by contrast, cannot claim anything like this sheer numerical weight of testimony; the aforementioned consistency of that testimony is also a factor lending credence to NDEs, if not as veridical then at least as genuine phenomena demanding some sort of explanation (whether neurological or supernatural). So far as I can recall, no one in the philosophical literature on MN has explicitly claimed that empirical research on NDEs (including research that takes seriously the idea that they may be supernatural in origin) is *ipso facto* unscientific. Though perhaps this is merely an oversight?

All that is by way of preface. On then to the thought experiment: knowing how common NDEs are in cases of clinical death, and how common it is that patients report floating above their deceased bodies witnessing what is going on in the hospital room (their descriptions of events frequently being verified afterwards as accurate), there is a way to run a prospective empirical test of the veracity of what these patients claim to be seeing. In the hospital room or emergency ward or ambulance etc., place a distinctive visual image at a strategic location, such that only someone situated near the ceiling looking downward would be able to see it. Ensure that the image is routinely changed and that the researchers running the experiment are not informed of what the image is. Then, for all the patients resuscitated from clinical death in that room (or rather all those who are able to respond afterwards), question them about whether they had an NDE and if they remember anything about the operating room. In particular, *see if they mention anything about the distinctive image*. If they do, that will provide evidence for the veracity of their experience. And if much replication on wide sample sizes over an extended period of time should uncover a consistent pattern of verified veridical experiences, this will provide empirical confirmation that human consciousness really does separate itself from the physical body at clinical death. That would in turn plausibly falsify MTN. With this, I think we have a workable, non-question begging justification for P2.

Again, I see no reason why such a research setup should not count as a legitimate form of scientific inquiry. Yes it deals with the supernatural (in the form of non-physical agency), but it does so in a way that is subject to empirical testing and replicability. Moreover the masses of anecdotal evidence for veridical perception in NDEs provide good *prima facie* grounds for thinking that undertaking such research might provide important new information about reality. And as Koperski noted in the citation above, that is after all one sensible way of describing the overarching goal of scientific inquiry.

I think the preceding suffices as a defence of the argument laid out in the Introduction. In the final section I wish to conclude with a brief examination of how this thought experiment involving NDEs has been translated into an actual research program, and at the published results so far obtained in that research (discussed below).

⁸ Accessible sources on NDEs include (Facco et al. 2015); Fenwick and Fenwick (1995), Fox (2003); (Habermas and Moreland 1998); (Long and Perry 2017); Moody (1975, 1977); (Morse and Perry 1990); Sabom (1998); van Lommel (2010); and Wilson (1987). [My thanks to an anonymous referee for drawing my attention to the piece by Facco et al., which I had been unaware of.]

However before doing so I wish to address an important worry raised by an anonymous referee, a worry pertaining to the overall structure and strategy of this paper. The referee quite reasonably raises the issue of why the sorts of hypothetical thought experiments put forward by Ratzsch and Monton should be thought of as potentially undermining MN, insofar as they are not presenting *actual* evidence against MTN. However one must recall the dialectical situation that Ratzsch and Monton are entering into here: a situation in which their dialogue partners reject any discussion of ID in the natural sciences because they think that any reference to the supernatural in the sciences violates MN. What Ratzsch and Monton are trying to do is undermine the intuition that discussions of the supernatural must ipso facto lack any capacity for empirical falsification and replicability. Once one has shown that *in principle* there could be cases where evidence for the supernatural is falsifiable and/or replicable, the hope is that the MN advocate might be open-minded towards looking at proposed *actual* evidence (whether from cosmic-fine tuning or biological ID or parapsychology). I think including their *in principle* point is in turn an important part of the dialectic of my paper—hence my strategy of progressing from their in principle argument to Koperski’s point about *actual* fine-tuning data to the point about actual parapsychology data (and finally shifting to NDE data in order to avoid accusations of question-begging in the latter two contexts). Hopefully that serves to clarify further the role played by that earlier material in the overall structure of the argument.

4. NDE Research and the ‘Future’ of MTN

The most thorough research program of this kind published so far is the AWARE study conducted between 2008 and 2012 by Parnia et al. (2014)⁹. To sum up briefly: the study had fifteen participating hospitals in the United States, United Kingdom and Australia. Patients involved in the study had to have suffered cardiac arrest (defined in terms of the cessation of heartbeat and breathing) and received CPR; had to be 18 years of age or older; had to be judged able to undergo an interview, with the judgement made by physicians and caregivers; and the patient had to provide informed consent for the post-CPR interview. These individuals were interviewed mostly while still inpatients (between three days and one month post-CPR), though sometimes circumstances necessitated an interview by phone post-discharge, and those interviews sometimes involved a greater time lag, between three months and one year. The people conducting the interviews were nurses or physicians, all of whom underwent special training on the proper interview methodology by Parnia. A key component of the study (ibid., p. 1800):

To assess the accuracy of claims of visual awareness (VA) during CA [cardiac arrest], each hospital installed between 50 and 100 shelves in areas where CA resuscitation was deemed likely to occur (e.g. emergency department, acute medical wards). Each shelf contained one image only visible from above the shelf (these were different and included a combination of nationalist and religious symbols, people, and animals, and major newspaper headlines). These images were installed to permit evaluation of VA claims described in prior accounts. These include the perception of being able to observe their own CA resuscitation from a vantage point above. It was postulated that should a large proportion of patients describe VA combined with the perception of being able to observe events from a vantage point above, these shelves could be used to potentially test the validity of such claims (as these images were only visible if looking down from the ceiling).

The study recorded 2060 cardiac arrest occurrences with a survival rate of about 16%—so roughly 330 patients survived and left the hospital. 140 of those were up to being interviewed and gave informed consent. The interviews were done in 2 stages, with only the second stage delving into NDE-specific

⁹ As is common with research papers appearing in medical journals, this article has many co-authors (thirty in fact) whose names appear in the byline. For reasons of space I have omitted the final twenty in the reference information below.

questions. 101 patients completed both stages of the interview process (the remainder being too ill to complete the second stage), and of those 101 patients, 9 reported experiences corresponding to one or more classic features of NDEs. Of those 9 patients, 2 reported what they believed to be veridical visual perceptions of their environment while in a state of cardiac arrest (with verified physical unconsciousness). [Parnia et al. \(2014\)](#) continues:

Both were contacted for further in-depth interviews to verify their experiences against documented CA events. One was unable to follow up due to ill health. The other, a 57 year old man described the perception of observing events from the top corner of the room and continued to experience a sensation of looking down from above. He accurately described people, sounds, and activities from his resuscitation . . . His medical records corroborated his accounts and specifically supported his descriptions and the use of an automated external defibrillator (AED). Based on current AED algorithms, this likely corresponded with up to 3 mins of conscious awareness during CA and CPR. As both CA events had occurred in non-acute areas without shelves further analysis of the accuracy of VA based on the ability to visualize the images above or below the shelf was not possible. Despite the installation of approximately 1000 shelves across the participating hospitals only 22% of CA events actually took place in the critical and acute medical wards where the shelves had been installed and consequently over 78% of CA events took place in rooms without a shelf.

These results are to some extent frustrating, insofar as the scale of the study and other related research parameters (like the number and location of the shelves) ended up proving insufficient to acquire results of the sort needed to verify or discredit the presence of veridical disembodied awareness during cardiac arrest. However, [Parnia et al. \(2014\)](#) rightly notes that given the preliminary nature of this study such results as were achieved are not insignificant:

Despite many anecdotal reports and recent studies supporting the occurrence of NDE's and possible VA during CA, **this was the first large-scale study to investigate the frequency of awareness, while attempting to correlate patients' claims of VA with events that occurred during cardiac arrest.** While the low incidence (2%) of explicit recall of VA impaired our ability to use images to objectively examine the validity of specific claims associated with VA, nonetheless our verified case of CA suggests conscious awareness may occur beyond the first 20–30 s after CA . . . [Emphasis added]

Parnia explains that claims of awareness beyond 30 seconds into cardiac arrest are particularly significant, insofar as the current consensus is that residual electrical activity in the brain ceases after that 30 second mark.

The key point I want to emphasize is that this is precisely the sort of scientific research that could one day result in the empirical falsification of MTN. My own guess is that if such research continues (and in particular if it continues at a larger scale than was feasible in Parnia's initial study), then within a generation science will have shown that MTN is badly undermined, *or perhaps even that it is false*—and more specifically, it will have shown that human consciousness may persist independently of the body, constituting good evidence for the possibility of some sort of post-mortem existence.

To put it more starkly: I am inclined to think that within the next 30 years, students will be learning in their high school biology textbooks that human consciousness is non-physical and that there is probably life after death. And with that, MN will have been thoroughly discarded as a universal norm in the sciences. If this admittedly bold prediction is actually fulfilled, it will be interesting to see what the larger social implications will be. Personally I think this is something theologians should start to ponder—but they aren't going to do so if they remain convinced that MN needs to be observed, and unfortunately a good many theologians involved in the theology & science literature accept MN. My hope is that this paper will prompt some reconsideration from *that* audience (even if not from convinced physicalists who affirm MN because of a prior commitment to MTN).

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