**The Epistemic Imagination Revisited**

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**Abstract**

Recently, various philosophers have argued that we can obtain knowledge via the imagination. In particular, it has been suggested that we can come to know concrete, empirical matters of everyday significance by appropriately imagining relevant scenarios. Arguments for this thesis come in two main varieties: *black box reliability* arguments and *constraints-based* arguments. We suggest that both strategies are unsuccessful. Against black-box arguments, we point to evidence from empirical psychology, question a central case-study, and raise concerns about a (claimed) evolutionary rationale for the imagination’s reliability. Against the constraints-based account, we argue that to the extent that it works, this does not give rise to knowledge that is distinctively *from the imagination*. We conclude by suggesting that the imagination’s role in raising possibilities, traditionally seen as part of the context of discovery, can in fact play a role in justification, including as a bulwark against certain sorts of skepticism.

# Introduction

We often try to solve problems by using our imagination: will this suitcase fit into the overhead luggage compartment? If I run fast enough, will I catch the bus before it leaves the station? If I get the orange shirt, will it go well with my favorite dark jeans? Recently, a number of philosophers have argued that such mundane imaginative exercises are in fact epistemically significant – in particular, that they often provide us with knowledge (Balcerak-Jackson 2016, 2018; Dorsch, 2016; Kind 2016, 2018; Hyde, 2019; Myers, 2021a, 2021b; Williams, 2021; Williamson 2007, 2016). According to Timothy Williamson, “imagining has the basic function of providing a means to knowledge — and not primarily to knowledge of the deep, elusive sort that we may hope to gain from great works of fiction, but knowledge of far more mundane, widespread matters of immediate practical relevance” (2016, 113).

The idea that one can obtain knowledge, including of “matters of immediate practical relevance”, merely by using the mind’s eye runs contrary to a fairly entrenched tradition in epistemology and philosophy of mind, associated with the distinction between the context of discovery and the context of justification. According to this tradition, the imagination is, at most, a capacity for generating ideas, a means for coming up with *candidates* for knowledge. These are then to be evaluated on the relevant evidence, irrespective of their provenance. In particular, the fact that a given item of putative knowledge results from an exercise of the imagination does not provide support for it. If anything, the opposite: the imagination is seen as an “untamed” cognitive instrument, a means for recreation and narrative construction.

Thus, if these philosophers are right their claim is surprising and significant. It suggests a method for attaining knowledge that is both far reaching and ready at hand; or, more accurately, ready at mind. The suggestion is especially striking when the knowledge at issue concerns particular, concrete aspects of the actual world – the kind of knowledge that typically requires perceptual engagement with its objects. Moreover, some have suggested that the manner in which the imagination functions in philosophical—specifically, metaphysical—contexts is continuous with its role in more everyday empirical ones (e.g. Gregory, 2019; Williamson, 2007, 2020). Thus, if we can show that the imagination supplies knowledge in the latter context, this opens a path toward showing that the imagination can play a productive epistemic role in more heavy-duty counterfactual thinking, thought experimentation and the like.

Our goal in this paper, we fear, is to dampen enthusiasm for such claims. Our focus is on the idea that the imagination has distinctive epistemic powers, such that, if exercised under appropriate conditions, a belief may be warranted by virtue of being the output of the imagination. We do not think that the idea of knowledge via the imagination is incoherent or in some strong sense impossible. But we submit that existing arguments either fail to establish that this is *in fact* the case, or else fail to show that the imagination represents a *distinctive* mode of obtaining knowledge.

Although, as we have mentioned, claims about the imagination’s role in everyday settings can serve as the basis for arguing that it can play a role in philosophy, we will focus on the everyday uses. These have been at the center of recent attention, and seem to raise issues sufficiently special to merit a dedicated discussion. In particular, we will not address the imagination’s role in assessing outré possibilities of the sort relevant to the conceivability-possibility link. That requires a more involved discussion of the epistemology of metaphysics than we can offer here.

Broadly speaking, we consider two primary lines of argument, variants of which have appeared in recent philosophical discussions of the imagination. These arguments are often conflated, and in general many proponents of knowledge via the imagination rely on various combinations of the two. Separating them helps clarify matters, and exposes some significant weaknesses, as we show below. We label the first type of argument a *black box reliability* argument and the second a *constraints-based* argument. *Black Box* arguments seek to establish that the imagination is reliable, without probing how it attains reliability. Against this, we point to evidence from empirical psychology, question a central case-study, and raise concerns about a (claimed) evolutionary rationale for the imagination’s reliability. The *constraints-based* argument opens the black-box, so to speak. It proceeds by suggesting that the imagination employs principles, or constraints, such that abiding by them will produce knowledge. The basic thought is that if the imagination can begin from a realistic initial setup and develop it appropriately, then its outputs will be justified. We contend, however, that to the extent that this works, it will not give rise to a form of knowledge that is distinctive, in the relevant sense; one that is appropriately thought of as knowledge *via the imagination.[[1]](#footnote-1)*

The next section describes our assumptions regarding the key notions of imagination and knowledge. Section 3 discusses black-box arguments, while section 4 discusses constraints-based arguments. In section 5 we extend and clarify our position, by looking at some possible objections. Section 6 concludes and outlines a different take on the epistemic significance of the imagination.

# Preliminaries and assumptions

# Imagination

Needless to say, the paper concerns the imagination. But what, exactly, ‘imagination’ designates is far from obvious (Liao & Gendler, 2019). Some authors we discuss wish to remain non-committal, or nearly so, on this score; others have well-developed accounts. Without presupposing a full-blown theory of the imagination, we wish to highlight one distinction that bears on most recent discussions. It has to do with how involved, as it were, one is in an imaginative exercise.

In a weak sense, we imagine whenever we entertain a proposition – roughly speaking, whenever we take it under consideration without presuming its truth (Weinberg & Meskin, 2006; Salis & Frigg, 2020). Call this *suppositional* *imagination*. On the other hand, we often engage our imagination in a richer sense: we immerse ourselves in a scenario, trying to “live it” in our minds. We can label this *immersive imagination*. Some, perhaps many, instances of immersive imagining involve an appropriate mental image or other sensory-like experience – “seeing in the mind’s eye”. But the suppositional versus immersive distinction isn’t identical to sensory versus propositional imagination. It is, rather, a matter of an imaginative episode’s having rich and elaborated content, versus a thinner, mere taking-under-consideration, state of mind that also, sometimes, gets the label ‘imagination’ (Langland-Hassan 2020, Ch. 1, offers a similar distinction). We will assume that the imaginative exercises to be discussed below, to the extent that they are epistemically special, have an immersive character and that this is part of what makes them epistemically special. We think this is, implicitly at times, the focus of the authors we critique. At any rate, we take it that suppositional imagining does not raise novel epistemic questions, at least in the sense that it does not represent a distinctive method for obtaining knowledge. Epistemically speaking, it is plain old hypothetical reasoning.

# Knowledge

Let us also offer a few remarks about knowledge. We do not presuppose any specific view of knowledge or the conditions needed for it. Specifically, we do not take a stand on the question of internalism versus externalism. Rather, we engage with the arguments we critique on their own terms. For instance, Williamson’s evolutionary argument presupposes a more externalist conception. We criticize it, accordingly, primarily for matters relating to the imagination’s reliability vis-à-vis the facts it purports to supply knowledge of. Other arguments can be read in either an externalist or an internalist light, it appears, but the concerns we raise are applicable regardless.

We do, in general, assume that reliability matters for knowledge, at least insofar as lack of reliability can defeat knowledge. We take this to be a modest and very plausible assumption, unlikely to be contested by anyone in this debate. However, we are aware that it raises questions about what counts as lack of reliability and about how to individuate epistemic methods. We will not offer a general discussion of these matters, but instead comment on them to the extent they are relevant to specific points we make. The issue comes up, in particular, in the argument in section 3, which relies on empirical work addressing intuitive physical reasoning, and when discussing the possible role of imaginative heuristics, in section 5.

Finally, sharpening a point already made above, we assume that the issue at hand is not whether the imagination is *in some way or other* *involved* in knowledge acquisition. Rather, the question concerns the warrant-providing role of the imagination. Or, to put this in less internalist-sounding terms: not any demonstration that (concrete, close-to-home) knowledge can be obtained partly by use of the imagination will do. What’s at issue is whether, and if so when, the fact that a belief that *p* was produced via the imagination *leads, in some distinctive way, to knowledge that p*. In particular, and as the authors we discuss acknowledge, the question is not whether the imagination plays an exploratory or discovery-related role or if we use our imaginations to “learn to how to learn” (Aronowitz & Lombrozo, 2020). These may be important functions of the imagination, and, in particular, they may matter epistemically – we come back to this in section 6. But our primary focus is on the imagination’s purported capacity to secure (everyday) knowledge.

# “Black box” reliability arguments

We begin with a look at arguments aiming to establish the imagination’s reliability. Rather than putting forward suggestions as to how the imagination generates knowledge, which we discuss in section 4, these are “black-box” arguments – they suggest *that* the imagination is reliable without worrying about *how* it attains reliability. We discuss three variants of this strategy.

# Everyday cases

A variety of authors buttress their case for knowledge via the imagination by offering examples. For the most part, such examples pertain to everyday exercises of the imagination, often ones involving spatiotemporal matters, and/or the unfolding of a physical event: will a piece of furniture fit through a doorway (Dorsch, 2016)? Can one successfully leap over a flowing stream, and where will a rock, rolling down a mountainside, land (Williamson, 2007; 2016)? Is a tower of bricks likely to fall over (Myers, 2021b)?[[2]](#footnote-2) These authors suggest that people are, generally speaking, reliable in answering such questions using their imagination. But the appeal to such cases isn’t typically backed by formal evidence; the authors appear to be taking them at face value, and then to suppose that they generalize, at least to some significant extent. But why treat them so? Is there systematic evidence in this context? And does it shore up the claim that humans are able to arrive at such knowledge via their imaginations? The answers are (a qualified) ‘yes’ and ‘no’ respectively. Let us explain.

There is a fairly large body of experimental and theoretical work on people’s untutored ability to predict simple physical events (reviewed in, e.g., Kubricht, 2017; Bertamini, Spooner & Hecht, 2005; Proffitt & Kaiser, 2006).[[3]](#footnote-3) Much work on so-called *intuitive physics*, initiated in the late 1970s, stresses biases and errors. For instance, a classic result concerns estimates of the trajectory of an object shot from a curved tube (McCloskey et al., 1980). Many, in some cases most, subjects—including those with a physics background—judge that such an object will follow a curvilinear path akin to the tube’s shape. In fact, it will follow a straight path, in accordance with simple Newtonian principles, since no force acts on it once it leaves the tube. Another well-known study asked participants to estimate the masses of two objects, after viewing a video clip in which one object moved toward, and then collided, into the other. This produced a so-called, *motor-object bias*, wherein subjects overestimate the mass of the initially moving object, judging it heavier even when it was lighter than the second object (Todd & Warren, 1982). Examples like this can be multiplied: subjects routinely make incorrect predictions about the path of an object dropped (vertically) while in horizontal motion (McClosky et al, 1983), the behavior of wheels (Proffitt, 1990), the motion of accelerating projectiles (Hecht and Bertamini, 2000; Brtzke & Ulrich, 2020) and similar questions.[[4]](#footnote-4)

Early on, and still to some extent today, this work was seen as attesting to the use of rough-and-ready heuristics (Todd & Warren, 1982; Gilden & Proffitt, 1994), or informal versions of outdated physical theories, such as Aristotelian mechanics (Disessa, 1982) or impetus theory (McCloskey, 1983; McCloskey & Kohl, 1983). Recent work has revisited these claims, and recast them in more systematic Bayesian terms. In particular, some current work suggests that humans are “noisy Newtonians” – that is, our intuitive physical thinking works by approximating the principles of Newtonian mechanics, taking into account perceptual uncertainty, especially regarding hidden properties such as mass and acceleration. Theoretical models in this vein seem to do a better job at predicting subjects’ successes and failures at some kinds of tasks (Battalia et al., 2013; Sanborn et al, 2013; Hamrick et al. 2016[[5]](#footnote-5)). Several philosophers have appealed to this work, suggesting that it buttresses claims about the imagination’s knowledge-providing capacity (e.g. Myers, 2021a, b[[6]](#footnote-6); Williams, 2021). To be sure, the Noisy Newtonian picture suggests that we are more *systematic* in our intuitive physical thinking, and, accordingly, it presents errors as stemming from a cognitive capacity with an overall “rationale” – handling uncertainty in a cost-effective manner. But it is important to see that even such a rosier take on intuitive physical reasoning accepts – indeed, it aims to explain – that humans make frequent errors in this domain (Sanborn et al., 2013; Sanborn and Chater, 2016; Bass et al., 2022).

How unreliable are subjects in these experiments? Exact numbers vary by task, sometimes depending on seemingly small variations in the task’s structure.[[7]](#footnote-7) So no general estimate can be given. And in any event, our argument does not rest on any quantitative claim about the reliability of intuitive physics. Rather – at this early stage in the discussion – we mainly wish to blunt the force of appealing to everyday cases. Thus, we are not suggesting that research on intuitive physics provides clear-cut conclusions about the epistemic power of the imagination, not even in the limited domain of mechanical problems. But we think the existing evidence suffices to undermine a casual appeal to everyday cases. It is worth noting, in this context, that many of the examples put forward by advocates of knowledge via the imagination belong to the same family of tasks studied in intuitive physics research, namely predictions about relatively simple mechanical interactions between a small number of rigid bodies. Indeed, some of the examples, are, perhaps unwittingly, very similar, in some cases identical, to tasks studied by psychologists and found to be error-prone. For instance, Myers (2021a,b) appeals to the tower of bricks case studied by recent Noisy Newtonians. Williamson’s falling rock example is, in terms of the underling physics, essentially similar a wheel rolling downhill. As Proffitt et al. (1990), who ran a series of experiments to test people’s ability to predict wheel dynamics note: “The wheel is one of the simplest and most commonplace extended body systems encountered in our culture. Be that as it may, common-sense intuitions about its dynamical properties in extended body contexts are terribly muddled.” (*Ibid*, 371.)

Now, perhaps a domain or a set of contexts wherein our imaginations are trustworthy can be systematically circumscribed. To the best of our knowledge, such a domain has yet to be delineated. And even if such a delineation were to be carried out, it is doubtful that it would encompass anything like the imagination *simpliciter* or that it could be generalized in any substantial way. But at the very least we wish to suggest, in light of the empirical work just reviewed, that the supporter of knowledge via the imagination must meet this challenge. Unless and until they do so, a casual appeal to everyday cases remains moot.

# Nikola Tesla as an “extraordinary imaginer”?

A related sort of argument, pertaining to specific *actual* cases, is made by Amy Kind (2016, 2018). As we construe her, the interest in such cases stems from the fact that they represent best-case scenarios for imaginative knowledge – these are cases that allow us to see how the epistemic imagination works, under near-perfect conditions. This allows Kind to make the case that such knowledge is possible (what better way of showing that something’s possible than showing that it’s actual?). We will discuss one such case in this section – that of Nikola Tesla – as a way of showing that even a best-case scenario raises serious doubts concerning the likelihood of knowledge via the imagination., It should be noted that the Tesla case apparently forms the basis for an inference to the best explanation, leading to Kind’s account of constraints-based imaginative knowledge, which we tackle separately terms in the next section. [[8]](#footnote-8)

The Serbian -American electrical engineer Nikola Tesla was well-known for being a brilliant if eccentric inventor, and Kind appeals to his purported ability to imagine how various inventions would work, prior to testing them out. Much of her evidence is drawn from Tesla’s autobiography. It includes multiple descriptions of his work process, such as the following:

"I do not rush into actual work. When I get an idea, I start at once building it up in my imagination. I change the construction, make improvements and operate the device in my mind… When I have gone so far as to embody in the invention every possible improvement I can think of and see no fault anywhere, I put into concrete form this final product of my brain. Invariably my device works as I conceived that it should, and the experiment comes out exactly as I planned it" (Tesla, /19191995, 33).

Kind cites this passage, and her discussion gives the impression that it is a typical (and correct) description of his work. So, one would assume that, at least when he tried, Tesla’s imagination could be counted on to produce true beliefs. However, while Tesla states in a number of places that his imagination has rarely if ever failed him, in other places he presents a different picture. Indeed, later in his autobiography, he notes that “[when younger,] I thought and planned, and conceived many ideas almost as a rule delusive” (Tesla, 55). Subsequent years were not so peachy either: for example, he made countless futile (if important) experiments trying to construct wireless communication and energy transfer systems; and he was known for many grandiose announcements concerning unrealized inventions. Indeed, A report analyzing Tesla's bequest upon his demise concluded that most of the inventor’s work over the last 15 years of his life was “primarily of a speculative, philosophical and somewhat promotional character”, and “did not include new, sound, workable principles or methods for realizing such results” (quoted in Bernard, 2013, 368.)

Thus, while it is plausible that Tesla was a gifted imaginer, even his is not a clear-cut instance of a reliable imagination. As in the case of the appeal to everyday cases, we think it is helpful to point this out, if only as a reminder that we should not be too nonchalant about apparent successes in this context. If the previous subsection’s argument showed that appeals to everyday cases needn’t be taken at face value, then the present discussion shows that even in a best-case scenario the imagination might not deliver the goods. Furthermore, if Kind’s appeal to Tesla is indeed part of an inference to the best explanation[[9]](#footnote-9), then if Tesla didn’t in fact succeed as often as Kind assumes, it would appear that the plausibility of the explanans is correspondingly diminished. Finally, let us note that our argument here has a somewhat externalist flavor, in that it points to Tesla’s lack of reliability.[[10]](#footnote-10) But we also address Kind’s suggestion about how justification (via constraints) purportedly works, in cases like Tesla’s, in section 4, below.

# The imagination as an (epistemic) adaptation

A final black-box reliability argument we will discuss appeals to evolution by natural selection. Specifically, the claim is that the imagination has been selected for allowing humans to attain knowledge in mundane yet important contexts. Such an argument is made, in detail, by Timothy Williamson (2016; see also Ichikawa, 2016).

Williamson’s discussion consists of two main elements – a claim about the function of the imagination and a related claim about its reliability. On the first score, Williamson holds that “imagining has the basic function of providing a means to knowledge” (2016, 113). But the imagination is not merely *for* obtaining knowledge; it is, per Williamson, *good* at this job. Indeed, he connects the two claims: the suggestion is that the functional claim explains why we are good at obtaining knowledge via the imagination, and thereby lends it support.

To buttress the first, functional, claim Williamson briefly considers and dismisses two alternative possibilities: that the imagination is a by-product of the evolution of a different capacity; and that it was sexually selected – that is, selected due to its contribution to attracting mates. We do not think either of these possibilities is out of the question. But we wish to highlight a third possibility, one that enjoyed more mainstream support in evolutionary biology - namely, that the imagination’s primary function is related to social cognition, i.e. to interactions with peers, dependents, rivals and so on. Such interactions include developmentally crucial activities such as social pretend play (Renfrew, Morley & Boyd, 2018). They may also be related to the origins and functional aspects of language (Scott-Phillips, 2015) and art (Davies, 2012). On such a proposal, humans would have been selected for a less reality-oriented and more mind-oriented imagination. That is to say: our imaginations would rather be geared toward tracking the goings-on inside the minds of other people, including their responses to oneself and to one’s imagination, than to figuring out “dry”, third-personal and non-social facts.

While it is very difficult to decide among such hypotheses, it is noteworthy that many evolutionary theorists do not seem to endorse Williamson’s hypothesis, at least not in a strong form. Instead, they point to the value of imagining in developmental and social contexts – including the benefits of imagining as a form of practice (in negotiating social interactions, for instance) in young and maturing individuals (Ginsburg & Jablonka, 2014; Tomasello, 2014; Nielsen, 2012;). This is part of a broader mainstream picture which emphasizes social interactions and social learning as keys to understanding the evolution of human cognition (Sterelny, 2012). Of course, the imagination may have multiple functions, an option we comment on below.[[11]](#footnote-11)

Wherever one comes down on the question of function, there remains the question of whether the human imagination is good at its selected-for task(s). Over and above the considerations previously raised in connection with intuitive physics, does the appeal to natural selection add weight to the assertion that the imagination is a reliable source of knowledge? We do not think it adds much. The fact that a trait is a product of natural selection implies that it was fitter than contemporaneous alternatives. But that is compatible with it being fairly poor in absolute terms. Speaking generally, even if conditions are such that evolving a truth-tracking capability is worthwhile, and even if natural selection acts so as to bring about a functionally-relevant capacity, still there is no guarantee that the such a capacity is reliable. There are at least three inter-related reasons for this.

First, adaptations, especially cognitive adaptations, are costly (both energetically and in other ways). For a trait to be selected it must be fitness enhancing, *costs included*. If it isn’t, then natural selection may well favor a creature with a cheaper yet less powerful capacity. Moreover, evolution typically operates as a tinkerer rather than an engineer, to use Jacob’s (1977) famous metaphor; it builds new traits from preexisting ones. This constrains possibilities and implies that a new trait will often have quirks and built-in limitations. Second, selection for a cognitive mechanism that tracks some set of external facts depends on the associated risks and opportunities (Sterelny, 2003). It can readily happen that the costs of not attending to a certain sort of fact are so significant, that selection leads to a system that is highly sensitive to stimuli that may be indicative of it, even if this results in an abundance, or indeed a majority, of false positives. Third, the system may have multiple functions or may be subject to conflicting demands. If so, the system’s performance may be good, or even optimal, from an overall standpoint, yet fairly far from the optimum for each task.

These and similar considerations suggest that even if the human imagination does indeed have a truth tracking function, it may still be biased and error-prone. Bearing in mind the earlier discussion of intuitive physics – a domain from which several of Williamson’s examples are drawn – we think such a possibility can hardly be ruled out. To be sure, considerations of the sort we’ve here adduced are *consistent* with an evolved faculty’s being reliable. Perception, and in particular human vision – a generally reliable evolved capacity – are cases in point. But the claim that human vision is reliable is on firmer grounds both experimentally and evolutionarily. In the case of perception, vision specifically, it is hard to imagine evolutionary rationales other than supplying information about the organism’s environment, unlike in the case of the imagination. And it is easy to see that an organism would be under selective pressures which should push it, within certain bounds, to improved reliability. Finally, recall that our goal isn’t to offer a positive hypothesis about the evolution of the imagination so much as to point out that Williamson’s hypothesis rests on rather shaky premises. We think that the foregoing considerations suffice to show this.

# “Constraints-based” arguments

Having focused on reliability so far, we now turn to a type of argument whose aim, in the words of Amy Kind, is to “[provide] a framework for showing when and how an imaginative project can play a justificatory role with respect to our beliefs about the world” (2016, 145). More specifically, Kind and others employing this strategy seek to spell out principles or “constraints” which a felicitous exercise of the imagination will have to comply with in order to justify a particular output. The gist of the idea, then, is that to the extent that one’s imagination abides by appropriate principles one can use it to generate knowledge – including, in particular, knowledge of concrete, actual, worldly facts.Suggestions in this vogue are made, *inter alia*, by Balcerak-Jackson (2016), Dorsch (2016), Hyde (2019), Kind (2016, 2018), Langland-Hassan (2016), Myers (2021a, 2021b) and Williams (2021).

Generalizing, two constraints are usually taken to suffice for an imaginary exercise to justify an output. Following Kind, we call these the *reality* and the *change* constraints. According to the *reality constraint*, for an imaginative exercise to lead to knowledge, we need to craft our basic imaginative setup so as to reflect an initial state of affairs accurately. According to the *change constraint*, the imaginative exercise should then unfold in a way that mimics real-world occurrences. Together, then, the two constraints coalesce into a picture wherein the imagination—in successful cases—begins from an appropriate starting point and then develops a scenario of interest in a manner that tracks how a real-world analog would unfold.[[12]](#footnote-12)

Importantly, ‘reality’ and ‘change’ do not name specific principles but function as labels for the sorts of conditions that would be required in order for an imaginative project to be epistemically successful. In fact, surprisingly little has been said about the specifics – perhaps because they are too involved or too context-dependent. Be that as it may, the general idea is clear: the imagination can lead to knowledge inasmuch as it is, roughly speaking, truth preserving: if it proceeds from reality-based initial conditions according to realistic principles, then it will arrive at correct outputs. While the different accounts do add upon (or make some caveats regarding) this basic framework, we will not dwell on them. As far as we can see, our counterargument does not depend on these details.

It should be clarified that some authors intend these arguments primarily to an answer a concern that we do not here aim to address – namely, that the imagination cannot supply knowledge because it is subject to our voluntary control (Kind, 2018; Langland-Hassan, 2020). The thought is that if the imagination isconstrained, then the fact that we choose what to imagine is no barrier to knowledge. Our discussion is orthogonal to this issue. We do not dispute this. Rather, our claim is that even if constraints-based account identify conditions under which knowledge is supplied, the resultant knowledge isn’t of a distinctively imaginative kind.

Our argument takes the form of a dilemma: we suggest that if the constraints underlying our imaginative exercise are followed explicitly (and, we suppose, intentionally) then the resulting knowledge is a product of a familiar process, namely hypothetical reasoning. Otherwise, the constraints remain mysterious, and we seem to be back in black box argument territory.[[13]](#footnote-13)

To see why, it will be useful to turn to Amy Kind’s illuminating comparison between constrained imagining and computer simulations. Kind draws the comparison to buttress the case for knowledge via the imagination. She suggests that when operating under appropriate constraints, the imagination’s epistemic standing is akin to that of a computer simulation. And “[o]nce we accept that computer simulations can provide us with justification for beliefs, it becomes very hard to deny that imaginative simulations can do so as well” (2018, 237). While this may be true, we find that the analogy exposes a key flaw in the appeal to constraints: to the extent that imagining under constraints supplies knowledge—as some computer simulations indeed do—that is because it is a form of hypothetical inference. And to the extent that what happens in the imagination is such an inferential process, the motivation to think about the application of constraints as a new path for acquiring of knowledge is greatly diminished. Let us spell this out in more detail.

A computer simulation is a piece of software that mimics—usually in an approximate and simplified manner—some natural process.[[14]](#footnote-14) Often, its results are displayed in graphic form, to aid comprehension by human users. Being a computer software, a simulation is essentially an inference, executed by a machine, wherein a formal transformation is applied to a given input.[[15]](#footnote-15) The input might be, say, atmospheric conditions on a given day and the output is the weather on the next day. Such an inference is governed by strict formal principles – some logical, but mostly principles relevant to the domain in question, such as the physics of weather systems. These principles are, in a typical case, explicitly written into the simulation’s code by a programmer, based on their understanding of the relevant domain and given various limitations on computing power and other resources. In all but rare cases, we can take the output of such a simulation to be a proposition (Beisbart, 2017). If such a proposition is to count as knowledge – if, say, we can come to know that there is such-and-such a chance of it raining tomorrow – then that is because we can take the simulation to serve as a justification for it. But on what grounds?

This question brings us back to the imagination, and to its alignment with simulations. As far as we can see, there are two ways of grounding the justificatory power of a computer simulation. One option is that we have run the simulation many times, on diverse input conditions, and found it to be reliable (to whatever degree deemed necessary in the context). In the case of the imagination, we are already in a position to see why this will not do – for this is, essentially, the strategy we labeled ‘black box reliability’. We have already shown, as the reader will recall, that the imagination’s reliability is far from assured. Accordingly, authors who embed in their account a reliability requirement alongside the constraints (e.g. Dorsch, 2016, if we understand him correctly) – that is, leave some black boxes sealed – essentially run into the same problems we described above.

The other option for justifying a simulation’s output is that we have (well-grounded) faith in the code, presumably because we are confident in the theoretical background in which it is based. In this case, we operate with a good understanding of how the simulation works and that understanding warrants our confidence in its outputs.[[16]](#footnote-16) This, then, is a live option for cashing-out the idea of a *reality* and a *change* constraint: they can be understood as explicit, intentionally-followed “algorithms”, so to speak.

But there is a fly in this ointment. For under this construal, the imagination appears to serve as no more than an arena, as it were, for performing “regular” hypothetical inferences. What it does is, essentially, to put forward a proposition and explore whether it leads to some consequence of interest. And, crucially, it is the quality of these inferences, and not the imaginary setup, that justifies us in believing their output. To be sure, these inferences are performed *in* the imagination – but that appears unimportant, epistemically speaking. Just as we do not want to speak of "knowledge via paper" when we perform a calculation with pencil and paper or of “knowledge via blackboard” when our instruments consist of a chalk and a blackboard (or, for that matter, of “knowledge via Mac” if that is the machine we’re using) so it does not seem appropriate to speak here of a special form of knowledge via the imagination. The imagination may be, for some people in some contexts, an effective means for representing relevant propositions and working out their consequences. But, epistemically speaking, their success is attributable to the proper application of appropriate principles of inference.[[17]](#footnote-17)

Interestingly, it is possible to read Kind’s appeal to the case of Nikola Tesla (discussed above in §§3.2) as a “proof of concept” move, intended to demonstrate a successful use of constraints. However, when one examines the writings of Tesla one finds descriptions that match our take on the computer analogy quite well. Thus, right after boasting, as quoted above that “in twenty years there has not been a single exception [to my ability to preplan a device in my imagination],” Tesla adds: “Why should it be otherwise? Engineering, electrical and mechanical, is positive in results. There is scarcely a subject that cannot be mathematically treated and the effects calculated or the results determined beforehand from the available theoretical and practical data" (1995, 33). He explains his early failures of imagination in similar way: "[when younger] I thought and planned and conceived many ideas almost as a rule delusive. The vision was clear enough but [my] knowledge of principles was very limited" (Ibid., 55). Thus, if this construal of the Tesla case is correct, Kind’s example backfires.

Accordingly, we view the computer simulation analogy as helpful, but ultimately working against advocates of constraint-based arguments. It holds inasmuch as the imagination functions to execute principles of inference that we have independent reasons to accept. And the justification lent by the imaginative exercise to the output rests on the appropriateness of the principles and their application. Calling this “knowledge via the imagination” is correct only if ‘imagination’ is used in a rather thin sense. Epistemically speaking, we do not here have a novel form of knowledge production.

Finally, to round off the argument of this section, let us consider two potential rejoinders. First, have we put too much emphasis on the idea that the imagination is supposed to represent a distinctive mode of knowledge production? Might not the philosophes we are discussing settle for appealing the imagination in the thin sense just described? Perhaps they would. But this would significantly reduce the interest in their position, we believe. For it essentially amounts to a relabeling of hypothetical reasoning – no one has seriously doubted that, if correctly undertaken, hypothetical reasoning can supply knowledge. Renaming such knowledge “knowledge via the imagination” leads to a far less exciting thesis, to put it mildly, then advertised by authors such as Williamson[[18]](#footnote-18), Kind[[19]](#footnote-19) and others. We think it is more plausible, and more charitable, to read them as making a suggestion of a thicker and more interesting sort. It is this sort of suggestion that our argument in this section has targeted.

Second, consider a somewhat different way of developing a constraints-based account. In a recent paper, Joshua Myers argues that the imagination can serve as a distinctive faculty for reasoning, relative to belief-based reasoning. When we use our imagination, he suggests, “sensory imagination… takes inputs from many different modules and subsystems such as beliefs, memories, and perceptions and… integrate[s] them into a single imaginative episode” (2021b, 115). Myers doesn’t explicitly make a comparison with computer simulations, but we can consider this as a potential alternative to the way we have construed the analogy.[[20]](#footnote-20) In other words, might the difference between a computer simulation and an episode of imaginative reasoning have to do with the manner in which they draw on, and combine, various cognitive resources in order to execute the relevant inference?

Surely it might; Myers is describing a coherent situation. But our discussion throughout has been concerned not with the mere possibility that the imagination may supply knowledge. If that were the issue, the discussion would be short indeed – we agree that it is conceivable that the human imagination could be designed to produce knowledge and could even be fairly good at that task. But we are asking whether the recent philosophical discussion has provided reasons to think that this is, in some interesting set of cases, in fact so.

Myers’ description of the integrative role of the imagination would only be relevant to the question of how such episodes of imagining produce knowledge, *on the assumption that they do*. Myers is aware of this, and he justifies this assumption by appealing to intuitions regarding everyday cases. But the cases he alludes to belong to the same category of physical intuitions which we discussed in §§3.1 above, and we have already voiced our objections to this way of arguing for imaginative knowledge.

To recapitulate: we argued that constraints-based accounts of knowledge via the imagination face a dilemma. Constraints are either to be cashed-out as an application of appropriate principles of inference, a view in which imaginative knowledge seems unremarkable; or else they remain mysterious, and thus collapse into the black box route, with its attendant problems.

# Possible responses?

Before concluding, let us tackle three potential responses to our overall argument, with a view to further clarifying our position.

First, a person might accept the claims we have made and yet contend that the imagination can serve to execute useful heuristics – in the sense in which cognitive and social phycologists use this term (Tversky and Kahneman, 1974; Gigerenzer, 2008) Roughly, the resultant view would be that we use our imagination, sometimes and under some conditions, to figure out problems in a cheap and efficient manner, albeit with in-built biases and limitations. We have no in principle objection to such a view, but we do not think it should give much solace to supporters of knowledge via the imagination. For one thing, the class of heuristics would, at most, partially overlap with uses of the imagination: Some well-known heuristics do not involve employment of the imagination, in any but the thinnest senses, e.g. take-the-best, or the gaze heuristic (Gigerenzer & Brighton, 2009). Secondly, whether and when a given heuristic supplies knowledge (or justification) would have to be assessed on a case-by-case basis. Heuristics are usually tailored to specific informational contexts, succeeding only under particular, favorable circumstances. Thus, their epistemic credentials must be assessed relative to the circumstances and the problem at hand. Such an assessment does not, in most cases, form a basis for generalizing to other heuristics. Certainly not to other uses of the imagination, inasmuch as the heuristics in questions involves the imagination. So we do not think the appeal to heuristics can ground claims about knowledge via (the heuristic, as it were) imagination, in any interestingly general sense.

Second, an audience member in an oral presentation of this paper asked us whether the concerns we have raised about knowledge via the imagination might run amok, implying skepticism of a far greater extent than our discussion lets on. In particular, can our claims about unreliability be generalized from knowledge via the imagination to knowledge via perception? If so, this would seem a high price, a consequence to be avoided if possible. We consider such a worry to be misplaced, or at the very least significantly overblown. Here we revisit some points made in section 3 (specifically, §§3.3.) For one thing, we have ample evidence pertaining to the functioning of our senses, and the picture is overall much rosier than with respect to naïve physics. There are known perceptual illusions, of course, and we do err in some cases, but by and large perception appears reliable across a wide range of conditions. For another, the evolutionary rationale for the idea that our perceptual capacities are truth-tracking is much sounder than the analogous case for the imagination (Griffiths & Wilkins, 2015). Doubts of the sort we raised for Williamson’s evolutionary speculations are much harder to entertain with regards to perception.

Third, following Grush’s “emulation theory” (2004) several writers (e.g., Langland-Hassan, 2016) have suggested that we may be able to use our motor skills, and in particular our ability to predict the effects of our movements, in imaginative “offline” mode, to generate knowledge.[[21]](#footnote-21) Shouldn’t this be seen as a promising route to imaginative knowledge? And wouldn’t this poke a significant hole in our argument?

We do not want to rule out such a possibility *a priori*. But we will make several cautionary points. First, while Grush and others have offered emulation as a theoretical hypothesis, and while evidence for our ability to predict our actual bodily movements (“online”, that is) can hardly be doubted, extending this to “offline” predictions is a further step, and requires further and distinct evidence. Second, even if such a mechanism is at work and turns out to be reliable, it is not clear that it should be seen as a form of imagination. To some extent, this would require one to say more about what counts as imagining. But it is also a matter of how exactly emulation, if real, works. Third, and most importantly, many of the knowledge claims made on behalf of the imagination by philosophers are not ones where the imaginers’ body is part of the imagined scenario (think of the rock sliding down a mountainside, or of the sofa fitting through the door, or of Tesla’s inventions). Thus, even if motor emulation is a source of knowledge, and even if this knowledge counts as via the imagination, this will amount to a far less impressive category of knowledge than philosophical discussions have targeted (Langland-Hassan, *Ibid*, in efffect acknowledges this).

Lastly, what about other minds: Might we be able to attain knowledge of the beliefs, wants and further mental states of other people by imagining their circumstances, taking their point of view, having their experiences, or some such? We do not have a settled view on this question, but we think of it as a rather different matter than the one we have addressed in this paper. For if such knowledge is attainable *via the imagination,* then it is likely to be through some kind of simulation of the thoughts and sensations of others. (In partial analogy to the discussion of emulation, above.) Such a process, however, is inherently different from figuring out how a concrete material scenario would unfold. So even if other minds can be known via the imagination, this is unlikely to generalize; such knowledge appears to be *sui generis*, or at any rate different in character from the types of knowledge forms usually discussed in the literature, and therefore also in this paper.

# Conclusion

The overall message of this paper is primarily negative: the human imagination is unlikely to be a good source of concrete, mundane knowledge; that is neither its likely function nor what seems to do best. Perhaps when exercised under near ideal conditions—as when it abides by strict and appropriate constraints—it can be a source of knowledge. However, that is not because of any special feature the imagination possesses, but rather because we can use it to perform hypothetical inferences, and it is the soundness of such inferences, if and when they are sound, that endows them with epistemic oomph. Of course, we have not suggested that it is *impossible* to obtain knowledge by imagining. Nor have we shown that there aren’t real-life cases of such knowledge. What we have argued is that there is no reason to presume, in general, that the imagination is geared at, or that it tends toward, knowledge production.

But we wish to end on a somewhat more constructive note, returning to a point raised early on. As we remarked in the Introduction, the imagination is usually placed within the context of discovery. It is seen as a means for generating ideas rather than evaluating them. We think that instead of straining to find a context-of-justification role for the imagination, it may be best to explore how it contributes to knowledge by playing a rolein discovery*.* In particular, we wish to call attention to the imagination’s potential role in *eliminative reasoning*.

A lot of our knowledge is based, either explicitly or implicitly, on ruling out possibilities. That is certainly true in science, where our confidence in a given proposition is often a matter of there not being any plausible alternative. It also holds in many extra-scientific contexts. One consequence of the importance of eliminative inference is that if we have reason to suspect that we have not covered enough of the space of possibilities, then we should be correspondingly less confident in the option we accept. Therefore, the question of whether and how we generate hypotheses has indirect but important implications in epistemology. For instance, Kyle Stanford (2006) has relied on it to argue for a form of (scientific) anti-realism: he suggests that the history of science shows that humans are woefully bad at mapping out potential hypotheses. For all we know, says Stanford, we may well be in such a state at any given moment, including the present. It is likely that there are plausible theories that conflict with our best current science, but that we have not conceived of (as can be seen, this is a variant of the classic “pessimistic meta-induction”).

If the imagination can be shown to be an effective means for mapping out possibilities, then it can play an important role in knowledge generation, and we can more readily resist skeptical challenges like Stanford’s. To show this would be, in part, a matter of characterizing the conditions – psychological, but also social-institutional (Stanford, 2015) – under which our imaginations are good idea generators. We cannot, of course, do this here. But we do wish to explain why the arguments we have discussed do not block such a possibility-mapping role for the imagination.

We have argued that, on the one hand, the idea that the imagination runs along truth-tracking rails is unlikely, empirically speaking. And, on the other hand, that even if it did operate this way, that would not mean that it represents a distinctive mode of knowing. However, mapping out possibilities does not require reliability vis-à-vis the world, but rather creativity, and a certain degree of internal consistency. That is because, in eliminative inferences, an idea’s bottom-line justification depends on our ability to rule out as many as of the alternatives as we can, on the basis of empirical evidence. The imagination does not play a warrant-providing role per se, even though its proper functioning is necessary. Moreover, to the extent that the imagination operates this way, it does not seem to be construable as a form of inference or observation.

Now some will say that this kind of view allots a non-epistemic, or at any rate a “boring” role to the imagination. Many conditions are necessary for knowledge – to learn something one must be alive, attentive, have intact sense organs etc. – but that does not make them epistemically interesting. We disagree: the generation of appropriate alternatives is not merely a background causal condition, nor is it a generic requirement presupposed by all successful epistemic endeavors. It is a distinctively epistemic matter, which plays a part in a distinctive kind of reasoning. If it can be shown that the imagination performs this role that would endow it, in our view, with genuine epistemic importance.

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1. Our argument bears some similarities with a recent paper by Antonella Mallozzi (2021). It too raises concerns about the imagination’s reliability and she too presents a dilemma – albeit a somewhat different one – for knowledge via the imagination. Mallozzi’s argument, unlike ours, tackles Timothy Williamson’s position, exclusively. It does so with the aim of undermining his challenge for the a-priori/a-posteriori distinction. Our focus is on a broader set of authors and views, and our primary interest is in more everyday, rather than philosophical, uses of imagination. [↑](#footnote-ref-1)
2. Another recurring type of example concerns aesthetic, taste-related matters: will two ingredients “go together” in a dish (Myers, 2020)? “Which shoes will look better with this outfit” (Kind, 2018, 242)? We are unsure that such questions have objective answers and suspect that they may involve complicated feedback between one’s prospective imagining and one’s experience and retrospective evaluation. So we set them aside. [↑](#footnote-ref-2)
3. A potential concern might arise as to the relevance of this body of scientific work: whether and in what ways does it pertain specifically to the imagination? In the experimental work, subjects are typically asked to make predictions about how some state of affairs will unfold. It seems plausible that they use their imagination to get answers and there are cases where they are explicitly instructed to do so (e.g. Schwartz and Black, 1999; Gravano et al., 2017). Be that as it may, this kind of work appears to be the best and most relevant evidence we have, at present. [↑](#footnote-ref-3)
4. As these examples illustrate, the bulk of research in this area looks at mechanical problems. But some work addresses different kinds of intuitive physics, such as optics or fluid dynamics. Croucher et al. (2002) showed subjects an image of a room with a mirror hanging on one of its walls and asked them to estimate where they would have to stand in order to see their mirror image. Subjects systematically exaggerated the distance. Likewise, some investigators have probed the so-called ‘water level principle’: many subjects do not realize that the surface of a liquid remains horizontal even when a containing vessel is tilted sideways, and consequently mis-estimate whether and when the liquid will spill (Howard, 1978) [↑](#footnote-ref-4)
5. But it is as yet unclear, we think, whether this framework provides a correct account of intuitive physics: it has only been tested against a relatively small number of tasks; and it faces empirical objections, too (Ludwin-Peery et al, 2020) [↑](#footnote-ref-5)
6. In a footnote to his 2021b paper, Mayers relies on Battaglia et al., 2013 to fend off the objection that the human imagination isn’t reliable. We think Myers misreads that study. It shows that subjects do *as best they can, given the uncertainties they face*. But doing the best one can is consistent with low reliability. This is indeed what Battaglia et al. found, when they compared subjects’ performance to what they call “the ground truth” physical model (Fig. 2D in their paper). [↑](#footnote-ref-6)
7. For instance, in Todd & Warren’s 1982 study that first discovered the motor-object bias, the experiments measured both estimates of mass for a collision between two moving objects, and for collisions where one of the objects was stationary. The differences were dramatic: in most cases of the former type, subject were highly reliable (correctly answering, sometimes, as much as 95% of the time), whereas in most of the latter type, subjects were unreliable (sometimes getting fewer than 30% correctly). Moreover, in both tasks, the elasticity of the collision made a large difference to subject’s reliability. [↑](#footnote-ref-7)
8. Kind also discusses Temple Grandin, an autistic animal scientist and engineer who has made significant contributions to the design of livestock handling facilities. Grandin’s case is fascinating but highly complex, as she claims to able to occupy a “cow’s eye view” of relevant situations, including an assessment of what a cow would see and how it would feel. Hers is a unique case, as far as we know, of mental simulation of another species’ mental processes. For this reason, Grandin’s case raises distinct issues, that we cannot discuss here. [↑](#footnote-ref-8)
9. Kind doesn’t explicitly describe the argument as having this form, but we think that is the most charitable reading of it. [↑](#footnote-ref-9)
10. We thank an anonymous referee for flagging this point. [↑](#footnote-ref-10)
11. Given this option, may one suggest that the imagination is an adaptation for gaining knowledge of *other mind*s? Proponents of knowledge via imagination only rarely cull examples from this domain – and ‎this is especially true in Williamson’s case. We think the suggestion raises a number of difficulties of its own; but we have separate reasons for setting it aside, which we shall come back to in section 5. [↑](#footnote-ref-11)
12. Two comments: First, the term ‘constraints’ appears too weak for what several of the relevant authors have in mind. The suggestion seems to be that the imagination’s content, and especially its output—in successful cases, that is—is not merely kept within certain bounds but is *positively determined* by the initial state given appropriate principles of change. Terminology aside, this is how we will understand the view. Second, the picture as stated fits best with dynamical problems of a fairly specific sort – ones that can be split into an initial condition and a subsequent change. It is not clear how well other cases – including, potentially, inventions of the sort Tesla was engaged in – fit such a model. But this lack of generality does not hinder our (critical) argument. [↑](#footnote-ref-12)
13. Egeland (2019) makes an argument that may seem, on first blush, similar to ours. Specifically, he distinguishes doxastic justification, by which he means the process of forming a novel belief, from propositional justification, by which he means the (informational, in his words) relationship by which some subset of one’s beliefs justifies – and thereby makes into knowledge – some further belief. Our argument is different: cast in terms of Egeland’s distinction, we claim that convincing cases of constraint-based knowledge do not exhibit a novel form of doxastic justification, but reduce to a familiar kind of epistemic process, namely hypothetical reasoning. [↑](#footnote-ref-13)
14. A stricter, and perhaps more precise, definition would note that a simulation is almost invariably grounded in an underlying mathematical model. The model is seen as an (approximate, simplified) representation of some system of interest, and the simulation is a tool for exploring the model’s behavior (Humphreys, 1990, 500; Winsberg, 2019, §§1.2). [↑](#footnote-ref-14)
15. Quilty-Dunn & Mandelbaum distinguish formal inferences from other transformations of mental content (especially ones operating over iconic representations). While we focus here on the former, that is primarily due to the analogy to computer simulations. The argument’s essential thrust applies to non-inferential transformations, *sensu* Quilty-Dunn and Mandelbaum, as well. [↑](#footnote-ref-15)
16. Whether simulations are typically transparent in the required way is a separate matter (Humphreys, 1990, Ch. 5). We assume that if not, then confidence in it can only come from evidence as to its reliability. [↑](#footnote-ref-16)
17. [↑](#footnote-ref-17)
18. Williamson (2016, pp.119-120) draws an analogy, in epistemic terms, between online belief updating and offline, imaginative exercises. One way of understanding his claim is that he suggesting analogy between t hypothetical inference as traditionally understood and imagination-based inference. Our claim is stronger and less friendly to the imagination than Williamson’s. We are saying that the imagination, when explicitly operating under constraints, *collapses* into hypothetical reasoning. “Imagining is often contrasted with knowing… this paper sketches a way of thinking about the imagination on which that stereotypical contrast is utterly misleading.” (2016, 113). [↑](#footnote-ref-18)
19. “[I]magination has generally been taken to be, as Brian O’Shaughnessy has said, “out of the cognitive circuit”… In my view, however, this conclusion is unwarranted…” (2016, 145). [↑](#footnote-ref-19)
20. Myers makes these points so as to show that his construal of imagination-based reasoning doesn’t reduce it to “ordinary” doxastic reasoning. Our framing of his argument here is slightly different given the broader structure of our discussion. [↑](#footnote-ref-20)
21. We thank NAME OMITTED (personal communication) for alerting us to this point. [↑](#footnote-ref-21)