

The Feasibility Approach to Imagination as a Guide to Metaphysical Modality

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Abstract

I present a novel approach to modal imagination as a means of knowing metaphysical possibilities. Hume calls the link between imagining and possibility an ‘established maxim’. I ask: what makes it seem so natural to use imagination as a guide to modality? (1.) I draw some lessons on my motivational question from the current debate. (2.) I develop my answer: we use imagination to creatively simulate solutions to feasibility issues. (2.1.) To corroborate my answer, I consider everyday feasibility issues. (2.2.) I then extend the account to more remote feasibility issues. (2.3.) I point out a special connection between imagination and creativity (3.) I show how the feasibility approach bears on issues of metaphysical possibility. (3.1.) I outline how imagination allows to retrieve and test modal constraints. (3.2.) I support my argument by examples from the philosophical debate. (3.3.) I answer my original motivational question. (4.) I address objections.

Keywords: Imagination, Conceivability, Possibility, Modality.

There is a long-standing philosophical tradition of using imagination as a guide to modal knowledge (‘modal imagination’). As Hume put it:

Tis an establish’d maxim in metaphysics, That whatever the mind clearly conceives includes the idea of possible existence, or in other words, that nothing we imagine is absolutely impossible (Hume 1739-40: 1.2.2.8, 32).

Yet *what makes it seem so natural to use imagination as a guide to modality?* I shall develop one answer to this *motivational question*. I concentrate on metaphysical possibility, setting aside necessity for reasons of space.¹

¹ An anonymous reviewer has reminded me that the notion of metaphysical possibility needs clarification. Metaphysical possibilities have been characterized as ‘absolute’ in the sense of being the most inclusive objective (as contrasted to epistemic, deontic) possibili-

1. The Motivational Gap – Lessons from the Debate on Conceivability

Disregarding the historical connections to Hume etc., I list some aspects of modal imagination as discussed in recent literature. All these aspects are contentious, but I select those which I take to be most amenable to a non-sceptical answer to the motivational question:

- (1) Modal imagination, imagination properly used to figure out possibility, is a subcase, distinguished from other uses of imagining, e.g. imagining epistemic alternatives (Yablo 1993). When I henceforth talk of imagination without further qualification, I have in mind modal imagination.
- (2) Often it is emphasized that imagination recruits ‘structural representations’ (like diagrams, maps) as contrasted to ‘conceptual’ ones (Ichikawa and Jarvis 2012: 151). The epistemic contribution of imagination is sometimes even restricted to that of qualitative or quasi-perceptual content (see section 4). Still many authors take a more *holistic* approach. Imagination may recruit any mental resources in *simulating* some reality (Williamson 2007: 143), even canonical world descriptions (Chalmers 2002).
- (3) Modal imagination is often described as *objectual* as contrasted to propositional. This does not mean that objectual imagination cannot proceed via describing its object. The object of imagining p may be a complete world verifying p (Yablo 1993, Chalmers 2002).²
- (4) As far as the object of imagining p goes beyond p , imagination tends to come with elaborating a p -scenario in some detail (Yablo 1993, Chalmers 2002). There are doubts that we can elaborate far-fetched scenarios in *sufficient* detail, though (Van Inwagen 1998).

The picture drawn so far does not yet answer my motivational question. Imagining p is not obviously sufficient for p being possible.

Looking for a way to close the gap, I shall consider two exemplary ways of answering the motivational question as discussed in the literature.³ The *first view*, advocated by Stephen Yablo, is that imagining raises an *appearance of possibility*.⁴

ties (Hale 1996). However, it has been argued that there are more inclusive objective possibilities such as the diverse systems of logical possibilities (e.g. Clarke-Doane 2021, Priest 2021). To deal with this problem, I suggest to understand ‘absolute’ in the sense of lifting any *contextual* constraints on circumstantial objective possibilities (as exemplified by the skunk and the mountaineering example to come), leaving only *general* metaphysical constraints. Logical possibilities do not result from such a process of lifting contextual constraints on circumstantial possibilities. It is to be seen whether the laws of nature form general metaphysical constraints, or whether their generality is more limited.

² I use ‘ p ’ as a variable for propositions. However, I allow myself locutions like ‘the possibility of p ’, ‘a p -scenario’ by which I mean the possibility *that* p , a scenario such *that* p and so on. I do not think that such loose talk is detrimental to my argument.

³ See Evnine’s distinction between two claims: imaginability entails possibility or it merely ‘gestures in its direction’ (Evnine 2008: 666). Yet I do not take my two alternatives to be exhaustive.

⁴ Yablo uses ‘imagining’ to spell out ‘conceiving’.

Just as someone who perceives that p enjoys the appearance that p is true, whoever finds p conceivable enjoys something worth describing as the appearance that it is possible. In slogan form: conceiving involves the appearance of possibility (Yablo 1993: 5).

Later Yablo says:

Just as to perceive that p is to be in a state that (i) is veridical only if p , and that (ii) moves you to believe that p , to find p conceivable is to be in a state which (i) is veridical only if possibly p , and (ii) moves you to believe that p is possible (Yablo 1993: 12).

Yablo's talk of an appearance of possibility seems a promising way of addressing the motivational issue. Perceptual seemings are a natural start for cognizing the world. The same may go for some presentational phenomenology coming with certain imaginings. However, several gaps remain to be filled. Firstly, even if imagination issues in an appearance of possibility, what motivates us to use imagination in the first place? How do we anticipate that it may come with such an appearance? In the case of perception, elementary seemings might be expected to be simply given. They spontaneously arise from external stimuli. But the same does not obviously go for using imagination.

Moreover, the appearance does not simply arise when we *somehow* represent p . We have to imagine a world verifying p . It is not a matter of course that we react to a possibility issue by imagining *a world*, and that we have an idea of how to do that. Yablo (1993: 37) suggests that we leave most of the world unspecified by treating it *as determinate*.⁵ However, we may not simply treat any detail as determinate on pain of trivialization. The motivational issue rearises: how do we come to adopt a practice of imagining a world, treating irrelevant details as indeterminate and relevant details as determinate? One answer is that we use imagination to test p for *coherence* in a suitable sense. This brings me to the second view.

The *second view* is presumably most widespread, and it comes in several variants. It is a somewhat daring enterprise to lump these variants together, but I reckon it worth the attempt. The unifying idea is to use imagination for a *coherence* test.

One variant of this view is that there is a *rational* or *a priori* connection: ideal conceivability as given by a complete and coherent canonical world description entails possibility (Chalmers 2002). Being aware of this connection, we take our exercises of imagination as a test for ideal conceivability.

Another variant is that the connection is *conceptual* (Sidelle 1989, Ichikawa and Jarvis 2012). Conceptual knowledge provides access to a space of conceptual possibilities. We use imagination to check p for coherence with the constraints imposed by conceptual knowledge and empirical knowledge.

A third variant of the view uses the equivalency with counterfactuals: $\Diamond p \equiv \neg(p \Box \rightarrow \perp)$ (\perp being a logical falsehood, Williamson 2007: 163). Reasoning in accordance with the equivalence is part of our competence of everyday counter-

⁵ More precisely, Yablo distinguishes between ignoring the rest of the world as irrelevant and treating the fully determinate way in which p is realized as determinate. I use the *as determinate* clause so as to cover both alternatives.

factual reasoning. We imaginatively develop a counterfactual supposition. If we do not encounter a contradiction after sufficient development, we judge that p is possible.

All these approaches motivate the use of imagination only if we already appreciate certain connections between the possibility and the coherence of a scenario, be they rational, conceptual, or built into the logics of counterfactuals. I harbour the suspicion that this reverses the order in which we first come to know certain possibilities: we first have an immediate tendency to use imagination in a constrained way to figure out possibility; *then* we may come to appreciate the connection between the possibility of a scenario and its coherence.

In the next section, I shall propose an answer to the motivational question. The answer takes inspiration from both views, imagination seen as a coherence test and imagination as coming with an appearance of possibility. I shall build on several features mentioned so far to guide my discussion:

- (1) Imagination may recruit any mental resources in simulating some reality.
- (2) Imagination is object-directed.
- (3) Imagining p comes with coherently fleshing a larger scenario that verifies p .
- (4) When imagining informs modal belief, it does so by raising an appearance of possibility.

2. Imagination and Feasibility

2.1 Addressing Everyday Feasibility Issues

I shall answer the basic motivational question by pointing to the use of imagination in figuring out *practical solutions to feasibility issues*. The close connection between possibility and the feasibility of a course of action has been noticed before:

Plausibly, the idea of possibility has a primitive association with action: the world at large determines how things *are*; we determine what to *do*, and in these episodes we take ourselves to choose from possibilities. From there, a sense of possibility projects backward and sideways. We see other events, including past events, as embedded in a cloud of ways- things- might-have-been... Action gives us the idea of possibility, and also an accompanying idea of dependence: *if I do this, things will go like that*. The forward models used in planning can also be applied to testing (*if I do this, I expect things to look like that—unless I am wrong*). The sense of possibility thus gains an epistemic role (Godfrey-Smith 2020: 166).

Godfrey-Smith points out that a capacity of exploring different possible courses of action may be evolutionarily hardwired and even be found in animals:

...as rats make a spatial decision, they activate a collection of neural paths that sweep ahead of the animal's representation of its current position, running "first down one path and then the other," apparently representing future possibilities... (Godfrey-Smith 2020: 166).

As an example of how partly sensory imagination may be used to address everyday feasibility issues, I consider Neil van Leeuwen's (fictive?) report of how he encountered a skunk while on a run:

SKUNK:

I visualized the skunk spraying, imagined myself running across the street to a distance beyond where I imagined the skunk spray going, and then ran across along the route I had imagined (Van Leeuwen 2011: 69-70).

I shall assume that van Leeuwen's runner could indeed have used imagination to figure out a near-optimal route around the skunk. I shall work within the broad paradigm of imagination as a capacity of *simulating* aspects of reality, perhaps partly by re-creating mental processes like perception 'off-line' (see Currie and Ravenscroft 2002: 11; Williamson 2007). The runner simulates sensorimotor experience as of a not-yet actual reality in which he runs along a certain route. The imagined route tracks the contextually restricted possibility of pursuing one's course without entering the spraying range. It seems plausible that, at some point, the runner might have enjoyed an appearance of possibility, at least if he had pondered the question of feasibility: a distinctive appearance as of the route as feasible.

I shall try to remain as neutral as possible about the minutes of this appearance, but I follow Yablo in suggesting that it moves the runner to believe the route to be possible, and that it has the veridicality condition that the route indeed is possible. It is a matter of further debate whether the appearance may take the form of perceiving an affordance (Gibson 1966) or some sort of potentiality (X-ability, viability, Nanay 2011), and whether there is some implicit reasoning involved (Fodor and Pylyshyn 1981). I also hope to stay clear from commitments with regard to the debate on the format of imagery (see Pylyshyn 2002).

To prepare my transition to more theoretical possibilities, I shall stipulate that the runner first had a purely theoretical knowledge about the danger of getting sprayed and the circular spraying range of about 6m. Theoretical knowledge had to be translated into a structurally represented tangential curve. Bringing to bear his theoretical knowledge on the case, the runner faced the problem of how to adapt the goal of running straight to the unexpected obstacle. He used imagination to find a feasible way of overcoming the obstacle which optimally reconciled the goal with newly encountered constraints. The solution was easy but not trivial. It took a minimal innovative effort to figure it out.

To bring out the innovation, I add two comparisons. First, I contrast the imaginative effort to the formidable alternative of *calculating* the route in the abstract. Calculating would involve a substantial step, which is so much facilitated as to become barely noticeable by imaginatively manipulating the perceived situation. Second, I compare SKUNK to a related case:

MOUNTAIN:

A skilled climber is faced with the explicit issue of whether the north flank of a mountain can be ascended by free climbing. Looking at the mountain, she imaginatively traces several routes but finds them blocked. She makes an innovative effort to figure out a new route, being well-aware of her limited range of movement. At some point in her imaginative tracing of the route, she suddenly enjoys a positive appearance as of the route being feasible.

I suggest that MOUNTAIN is another typical and unproblematic example of an imagination-based appearance of feasibility. An effort of imagination is the most natural reaction to the feasibility problem. It is intimately linked to one's awareness of the obstacles on the route and the innovative effort to overcome them.

I discern a pattern which guides fleshing out a scenario. The climber begins with a dim awareness of the difficulties to be expected in attacking the flank. She has a general idea of the difficulty of overcoming gravity by climbing a near-vertical wall and the solution of exploiting friction with its uneven surface. But the best way to get into view the more *determinate obstacles* is to consider particular candidate routes. Imaginatively tracing one particular route will give the mountaineer a more concrete idea of the pertinent constraints imposed by the precise physical condition of the wall (angle, material...) and ways of meeting them (cracks, edges ... to get a hold on). Generalizing: often modal constraints will not simply be manifest; our awareness of more determinate versions of these constraints depends on our going through exemplary ways for a possibility to be realized.

The cases described show imagination in its life function; why it is useful to have this capacity, when it is properly used, and how the modal use of imagination naturally arises: not yet as a response to abstract modal issues, but as an effort at solving a practical feasibility problem. In representing the solution as feasible, imagination takes on board all relevant information about the actual state of things but goes beyond that actual state in simulating some real situation that is not (yet) actual.

I shall list some characteristic features of using imagination for addressing a feasibility issue:

- (1) We start from a concrete actual situation.
- (2) A feasibility issue arises: we are more or less dimly alerted by some difficulties in achieving a goal.
- (3) We set out to imaginatively simulate some particular solution: some not-yet-actual way to change the situation such that the goal is attained.
- (4) The solution does not straightforwardly follow from our current informational state. It takes some innovation.
- (5) Many details of the solution will be left open, though we may tend to fill the scenario with features of the actual world.
- (6) Imagination works holistically: the simulation may recruit any informational resources and any mental capacity we have, in particular sensorimotor representation, but also propositional information.
- (7) Different pieces of (partly tacit) information in different formats are activated, interact, and are transformed by concocting the imagined scenario.
- (8) Our awareness of the more specific obstacles to be overcome viz. constraints to be met gradually emerges in the course of imaginatively developing the exemplary solution.
- (9) Our imaginative effort is reliably constrained by our awareness of the obstacles: a phenomenology of feasibility ('appearance') arises only upon imagining a suitable solution.

2.2 More Remote Feasibility Issues

The feasibility issues considered arise from our perceptual acquaintance with concrete actual situations. Philosophical possibilities often completely detach from such situations. Still I suggest that the use of modal imagination preserves core features of the normal application of imagination to situational feasibility issues. The key function of imagination remains the simulation of some varia-

tion of reality by a creative albeit restrained departure. Certain additional tendencies distinguish the use of imagination from general theoretical inquiry, although both may go together and the distinction only be one of degrees:

- (1) Imagination is *case-directed*. In responding to a possibility issue, it tends towards *simulating a concrete scenario* that confirms the possibility at issue. Yet the scenario will typically be left partly indeterminate. It can be multiply realized and thus is only treated *as if* it were an individual.
- (2) Imagination is *holistic*. Due to its case-directedness, it tends towards sensorimotor representation, but it recruits any informational resources and any mental capacities that bear on a possibility issue; in particular, it is highly sensitive to information about the restrictions which delimit a solution to the issue at stake.
- (3) The creative development aims at exploring ways of meeting the pertinent constraints and thus testing whether they preclude p from being possible. Our understanding of both these constraints and ways of satisfying them grows the more determinate the case imagined becomes.

To get these tendencies into view, I shall consider a new example. The use of imagination must not be confined to manipulating the perceived situation, and the general structure outlined should be transferred to theoretical/propositional content. I shall introduce a use of imagination meeting these conditions by anecdotal evidence. I do not aim at historical accuracy. Instead, I follow Amy Kind (2016: 154) in assuming that the case described is typical for the way imagination can be used:

TESLA: *Nicola Tesla's invention of the alternating current motor.*

Tesla's proficiency in using imagination was noted by his biographers:

Before I put a sketch on paper, the whole idea is worked out mentally. In my mind, I change the construction, make improvements, and even operate the device. Without ever having drawn a sketch, I can give the measurement of all parts to workmen, and when completed these parts will fit, just as certainly as though I had made accurate drawings (O'Neill 1944: 257).

Tesla reportedly used his imaginative powers in a dispute with his teacher Poeschl in Graz whether a motor without a commutator was (technically) possible:

In his mind he constructed one machine after another, and as he visioned them before him he could trace out with his finger the various circuits through armature and field coils, and follow the course of the rapidly changing currents (O'Neill 1944: 50).

The climax of the anecdote is that, taking a walk with a friend in Budapest, Tesla envisioned the working alternating current motor with a rotating magnetic field replacing the commutator, exclaiming:

I have solved the problem. Can't you see it right here in front of me, running almost silently? It is the rotating magnetic field that does it (O'Neill 1944: 57).

Judging from his avowal, Tesla was under the impression of having solved the feasibility problem. The seeming he enjoyed was intimately connected with a visualization of the motor ('see... running silently').

There is also a deflationary reading of the case: Tesla's modal knowledge of the motor was entirely justified by an applied physical theory. Nevertheless I think that the following alternative has some plausibility: at some point, Tesla's justificatory basis for his feasibility claim was holistic. The state of the art in physics and engineering did not yet settle the dispute with Poeschl. Tesla's base comprised a partly explicit physical theory, but *as applied* to an imagined object. Tesla imaginatively simulated a concrete working exemplar of the motor; that objectual imagination first gave him the veridical appearance of possibility that rationalized his belief that the motor was feasible.

The imagination that rationalized Tesla's modal belief was the result of a series of efforts at creative problem-solving: 'In his mind he constructed one machine after another.' It took Tesla several trials to come up with a motor that satisfied the technical constraints. The trials formed a series of innovative steps. They were not simply pre-determined by the pertinent constraints. At each step, Tesla attained a better understanding of the technical constraints and ways to meet them. Eventually, Tesla 'saw' the last of these trial pieces running in accordance with the laws of electromagnetism. He enjoyed a positive appearance of possibility, coming with a case confirming this possibility.

The example illustrates the transition towards a more detached use of modal imagination. While still addressing an issue of practical feasibility, Tesla's visualization completely detached from his actual perceptual environment (the road in Budapest). It has been criticized that my feasibility approach is too centred on *imagining actions*. However, Tesla did not imagine how to build the motor. He imagined the motor itself working in a certain way. It took a further step to draw consequences for how to build the motor.

Before pursuing the continuity to issues of metaphysical modality, I shall add another motivational consideration, which further supports my focus on *creativity* as a main feature of the role of imagination in addressing feasibility problems.

2.3 Imagination and Creativity

I have emphasized that the use of imagination for solving practical problems is most pronounced when it takes some ingenuity to come up with a solution. Thus, I draw a close connection between imagination and creativity. I illustrate this association by results on *pretense*.

There are substantial differences between the exercise of imagination in many pretense games and in modal reasoning. Pretense may aim at verisimilitude, but it usually does not aim at settling possibility issues. Still I suggest that there are commonalities in the general function of imagination. One of them lies in creatively projecting an as-if particular situation. To illustrate the role of creativity in games of pretense, Nichols and Stich report an experiment in which participants were supposed to play waiters in a restaurant:

WAITER:

... in one of our fancy restaurant pretenses, the waiter pretended to decapitate one of the diners! A theory of pretense needs to be able to accommodate these

kinds of elaborations as well as the more sober inferential elaborations (Nichols and Stich 2000: 119).

This shockingly unexpected albeit not illicit move in a standard pretense game testifies to the creative function of imagination. The use of imagination for solving feasibility issues explains this striking feature. It is part and parcel to the use of imagination in addressing non-trivial feasibility issues to generate and test innovative solutions. In contrast to normal feasibility issues, the pretense game is only minimally constrained by the premise of playing waiter. It invites eccentric ways of filling the role. The aspect of creativity prevails.

One may doubt that creativity is *part* of imagination. Imagination, one may say, only serves to spell out an independent pretense premise (or a supposition). Creativity lies only in coming up with the premise. Such doubts neglect that the continuous exercise of creativity is not simply a prerequisite but part of imaginative development. The idea of decapitating the guest may not have been premeditated but arisen spontaneously from enacting the pretense premise that one is a waiter.

To see creativity at work in the use of imagination to figure out metaphysical possibilities, I consider an example of Frank Jackson's. Jackson discusses how to assess

CAT: There could be a cat which is not an animal.

Jackson here is interested in questions of apriority, but his remarks are relevant to my discussion:

Our failure to decide in advance how we would jump in fantastical, remote cases gives philosophers with their notorious ability to think up fantastical, remote cases, plenty of scope to come up with a case for which it is undecided whether, as it just might be, 'cat' and 'animal' apply, and so is a case where we can be induced, without going against anything determinate in the meaning of the terms, to apply, say, 'cat' and not apply, say, 'animal'. Thus, the case becomes one where cats are not animals (Jackson 1998: 54).

I use the quote to illustrate my main point: general metaphysical considerations and general conceptual analysis may be relevant. But such resources provide no alternative to imagining 'fantastic, remote cases' like perfect mechanical facsimiles of cats in order to test the metaphysical constraints on being a cat.

3. Feasibility and Metaphysical Possibility

3.1 The Feasibility Approach to Modal Constraints

I shall now generalize my feasibility approach to metaphysical possibility. A first requirement is *detachment*. In TESLA, I have illustrated how an exercise of imagination can detach from actual perception and interact with theoretical background knowledge. Nevertheless Tesla was still faced with a practical feasibility problem. In contrast, interesting metaphysical possibilities do not reduce to feasibility *for us*. Still there are relevant parallels. We have a tendency to tackle questions whether *p* is possible as *how possible?*-questions. Just as we imagine a solution to a feasibility issue, we more generally try to imagine *how it could be that p*.

One may frame such *how could it be?*-questions in a way that comes closer to feasibility issues. One main use of imagination is to put oneself into the shoes of other subjects.⁶ For instance, the runner may imagine how far the skunk could spray. In metaphysical considerations, one may even detach from *any* normal subject. Philosophers sometimes raise issues of metaphysical necessity by asking what a *god* could have made real (e.g. Chalmers 2002: 146; Fine 2005: 259). In a similar vein, we may ask how an immensely powerful subject, call it nature, God, or a metaphysical engineer, could make it the case that *p* while abiding by metaphysical constraints.

Another key requirement for generalizing my everyday examples is to generalize the interplay between appreciating pertinent *constraints* on feasibility and envisaging *creative* solutions for how to meet them. We cannot simply presume these constraints to be manifest. We need empirical knowledge of the corresponding facts, and we need an awareness of their modal resilience. On pain of circularity, this awareness must not amount to outright modal knowledge, though (see Roca-Royes 2011).

I shall draw on Williamson's suggestion that the pertinent constraints are *implicit* in our imaginative exercise. Consider:

GOLD: Gold could have an atomic number different from 79.

'...we need not judge that it is metaphysically necessary that gold is the element with atomic number 79 *before* invoking the proposition that gold is the element with atomic number 79 in the development of a counterfactual supposition. Rather, *projecting* constitutive matters such as atomic numbers into counterfactual suppositions *is part of our general way of assessing counterfactuals*. The judgment of metaphysical necessity originates as the output of a procedure of that kind; *it is not an independently generated input* (Williamson 2007: 170, m.e.).

To get a better idea of Williamson's suggestion, consider his account of the folk physics backing our everyday counterfactual assessments:

...the folk physics needed to derive the consequents of counterfactuals such as [If the bush had not been there, the rock would have ended in the lake] from their antecedents may be stored in the form of some analogue mechanism, perhaps embodied in a connectionist network, which the subject cannot articulate in propositional form... the supposed premises may not be stored in a form that permits the normal range of inferential interactions with other beliefs, even at an unconscious level (Williamson 2007: 145).

Judging from this picture, our awareness of modal constraints is largely inexplicit and needs suitable cues to be activated. The constraints often need interpretation, precisification, and weighing, but such tasks of qualification cannot always be performed in the abstract. Often they can only be tackled by exploring suitable ways of embedding *p* (the possibility at issue) into an overall situation. The ways considered should help us with our limited minds to get a hold on the pertinent constraints.

To see how the difficulty of retrieving the pertinent constraints is addressed within the feasibility approach, consider again MOUNTAIN. The climber's at-

⁶ I do not take stance on the theory vs. imagination debate on mindreading.

tention to the minutes of the route provides the right cues for her to become aware of the obstacles to be overcome. She starts with a general idea of the different kinds of obstacles arising in climbing a mountain. A more specific take on the pertinent obstacles will partly depend on specifying candidate routes. The result is a process of weighing. The mountaineer will adjust her route such as to overcome certain obstacles; more specific obstacles will emerge; and so on.

In a parallel vein, addressing a *how possible?* issue sharpens our sense for the metaphysical requirements of making something possible. One starts from a general take on the metaphysical restrictions that bear on p . But often this take will not be specific enough to be directly applied to the question whether p is reconcilable with the pertinent constraints. Sometimes it can be developed further by general metaphysical considerations. But if imagination is useful in addressing a possibility issue, this is because of the epistemic interplay between getting a grip on more determinate metaphysical constraints and coming up with a concrete solution of how they may be reconciled with p being true. The conceivability test takes the form of creatively rehearsing ways for p to be fitted into the metaphysical structure of the world.

3.2 Examples

I shall present some examples illustrating the creative use of imagination in metaphysics. My first example is a standard conceivability argument for possibility, Bohn on the possibility of junky worlds (everything is a proper part of something else). The example shows the maieutic aspect of the feasibility approach, making a solution palatable to our limited capacities:

Now consider the following scenario. Everything in this world is spatially extended and just one half of something else that is also spatially extended. That is, for any thing in this world, there is something else of which it is a spatial proper part. Or consider this scenario. Our universe is a miniature replica universe housed in a particle of a bigger replica universe, which is again a miniature replica universe housed in a particle of an even bigger replica universe, and so on ad infinitum. Conceiving of these scenarios amounts to conceiving of worlds in which *everything* is a proper part. Let's call such worlds, *junky worlds*. Official definition: world w is *junky*_{af} anything in w is a proper part.

Having thus conceived of junky worlds, we seem provided with some *prima facie* reasons to think such worlds are possible (Bohn 2009: 28).

Bohn does not simply ponder the possibility of a world in which there is no universal object, he uses imagination creatively to conjure up *two* recipes for how such a world could be made true, in one case putting halves together infinitely, in the other case a Chinese box- or matryoshka doll-like encapsulation of universes. These recipes are crafted such as to make the abstract mereological requirements of junk more accessible to us by an easy algorithmic structure: wholes are assembled from parts which have obvious and non-gerrymandered mereological features themselves.⁷ To be sure, we do not imagine assembling junk-worlds ourselves, but the repetitive procedure displays some analogy to action recipes. It seems that we could go on and on in the same way in reproduc-

⁷ See also Gibberman's (2015) imagination of a 'junky spruce'.

ing the structure of the junk-world imagined. This intuition supports our developing an appearance of possibility.

My second example aims at illustrating the relevance of creative solutions in testing metaphysical constraints. Take Williamson's

GOLD: Gold could have an atomic number different from 79.

Metaphysicians in the tradition of Kripke tend to deny GOLD. Yet we should not naïvely assume that atomic number wears its modal status on its sleeve. On pain of circularity, an epistemological account of how we assess GOLD should not start from outright modal knowledge that atomic number is metaphysically necessary. It must start from the role of atomic numbers in our scientific world view: the atomic number of gold plays a key role in explaining the overall chemical behaviour of gold (see Tahko 2015: 813). We take into account the full extent of molecular chemistry. Still textbook chemistry is unlikely to straightforwardly answer the modal question.

One salient way of approaching GOLD is by general considerations which embed the chemistry of gold into a metaphysical framework, which may be assessed by its explanatory virtues, as in recent neo-aristotelean proposals of an empirically informed *essentialism* (Mallozzi 2021 has an overview of the literature). However, if I am right about modal imagination, our appreciation of the metaphysical status of atomic numbers may depend on enriching the general metaphysical framework by considering particular ways for gold to have a different atomic number.

The use of imagination for tackling GOLD can be framed analogously to Tesla's problem of a motor without a commutator. We ask a *how possible?* question: how could nature or god make it true that gold has an atomic number different from 79? We try ways for gold to have a different atomic number, starting from our initial grip on the theoretical bond between gold and atomic number. One salient option is to vary further aspects of our world to see whether they might *compensate* for the differences in theoretical roles of different atomic numbers. Perhaps a stuff with a different atomic number could come sufficiently close to gold to *be* gold if the chemical laws for the constitutive particles like protons, neutrons, electrons, positrons, are slightly twisted in this or that direction.

In performing the task, we may simulate exemplary manipulations. For instance, we may start with considering changing the atomic number of gold to 80. We realize that this yields mercury, which is not gold. We consider ways of solving this problem like a change in the laws for protons and electrons such that 80 protons and electrons exert the same gravitational and electromagnetic forces as 79, go through the corresponding changes for other elements, and so on. The more determinate the scenario becomes, the more specific our awareness of the modal status of atomic number will become. If atomic number is necessary, the changes will prove too substantial to preserve gold as part of our system of elements. But we may not find out unless we try. In any case we get a more precise idea of the essential status of atomic numbers as related to the overall theoretical roles of the particles involved.

My third example is the necessity of origin (the standard example used in Roca-Royes 2011 against conceivability-based modal epistemologies):

ORIGIN:

Aristotle could not have originated from a different zygote than he actually came from.

General metaphysical considerations bear on ORIGIN (see Rohrbaugh and DeRosset 2004), but again they might have to be supplemented by test scenarios, trying to figure out ways for Aristotle to originate from a different zygote. The purported constraint that binds Aristotle to the zygote he actually came from might permit qualification: perhaps Aristotle could have emerged from something that came close enough to the actual zygote to play the metaphysical role of the latter. To check, we might consider one of Jackson's 'fantastic, remote cases', e.g. a scenario in which Aristotle developed not from the actual zygote but from some perfect molecule-per-molecule replica implanted by some advanced extra-terrestrial scientists into the body of his mother at the very moment of his conception.

In sum, the creative use of imagination in thought experimenting seems an often helpful and sometimes even indispensable device for clarifying the modal status of metaphysical constraints.

3.3 Filling the Motivational Gap

I shall now elaborate how the feasibility approach fills the motivational gap. It seems that, in an individual's development, modal issues first arise in issues of feasibility: how can she attain or miss her goals (see Papafragou 1998)? We are immediately disposed to solve feasibility issues like SKUNK and MOUNTAIN by imaginatively simulating a solution. A reliable simulation must recruit any relevant mental resources, propositional thinking, imagery, explicit and tacit knowledge activated by suitable cues.

There is a natural tendency to extend this established practice to more detached possibility issues like TESLA. Responding to a debate of feasibility, Tesla imagined a motor without a commutator without having in mind one particular course of action. There is a continuity even to more detached issues of metaphysical possibility. They do not concern what anyone can do but what could be the case. Imagination works holistically; it may even be confined to propositional content. Still the use of imagination is special compared to principled metaphysical arguments. The original use of imagination in devising a particular solution to a feasibility issue is preserved in the *case*-directedness of modal imagination. The focus is on creatively crafting a concrete recipe for meeting the pertinent constraints on a *p*-situation. The recipe is instrumental in getting a grip on the determinate constraints and their modal status.

The proposal takes on board both the view of imagination as a coherence test and the view of imagination as raising an appearance of possibility. As for the former, just as it is crucial for solving a feasibility issue to come up with a sufficiently concrete solution which meets the relevant restrictions, it is crucial for modally imagining *p* that we can come up with a scenario that (i) verifies *p*, (ii) brings out the pertinent modal constraints and (iii) reconciles them with *p*. As for the latter, if imagination functions properly, an appearance of possibility arises precisely if the scenario meets these conditions, just as it plausibly arises from a use of imagination for tackling more everyday feasibility issues.

4. Objections and Replies

CIRCULARITY OBJECTION: we need modally qualified knowledge (e.g. knowledge of essences) to constrain imagination (Roca-Royes 2011). A more

recent internalist challenge is that we should give reasons why imagination is suitably constrained (Vaidya and Wallner 2021).

REPLY: I have already used the general circularity worry to outline how imagination is used to manifest *implicit* constraints in the first place, drawing on any available knowledge of the actual world. My resulting feasibility account also lends itself to a reflective justification of why the modal use of imagination is suitably constrained.

ENABLING OBJECTION: The work of imagination is confined to meeting enabling conditions or to a context of discovery. The real justificatory work is done by general arguments.

REPLY: Principled arguments may settle many issues of modality, but I have used my examples TESLA, GOLD, and ORIGIN to argue that they often have to be supplemented by using imagination. Imagination plays a genuine justificatory role in devising concrete solutions for some p to be made true.

EXCEPTIONALISM OBJECTION: Modal imagination cannot be integrated into a naturalistic picture which explains epistemic capacities by their life role (see Morato 2019).

REPLY: It is part and parcel to my feasibility approach to bring out a continuity between the use of imagination in tackling everyday issues of feasibility and an eligible way of addressing more remote modal issues. The feasibility approach perfectly fits into a naturalistic epistemology.

UNIQUENESS OBJECTION: Imagination is not our only pathway to modal knowledge, and it does not cover all cases of such knowledge, e.g. the necessity of mathematics.

REPLY: My argument shows how imagination may play a key role in addressing modal issues, but it does not support stronger claims to uniqueness. I shall remain neutral about the format of an integrative modal epistemology. One model for such an epistemology is given by the Kripkean tradition, in particular Chalmers's (2002) notion of ideal conceivability in terms of surveying the space of possible worlds by canonical descriptions. Theoretical considerations and more limited exercises of imagination may play a role in preparing canonical descriptions. Another model would be that the results of using imagination become part of a general metaphysical theory, which does not have to conform to canonical world descriptions but may integrate them.

IMAGISTIC OBJECTION: There is a strong tendency to delimit the epistemic contribution of imagination by its qualitative content, driving a wedge between my pre-philosophical and my philosophical examples (Tidman 1994, Byrne 2007, Fiocco 2007, Kung 2010, Kind 2016, Berto and Schoonen 2018, Jago 2021). In SKUNK and TESLA, qualitative content plays a key role. It is not a matter of course that the same goes for philosophical examples. I outline three motivations for the imagistic view.

The first motivation is the *definitional* issue: how are we to define imagination if not by imagery?

The second motivation lies in confining the genuine *epistemic contribution* of imagination. One obvious answer is that it consists in providing imagery or qualitative content.

The third motivation concerns the *limits and freedom* of imagination. On the one hand, as far as its qualitative content goes, imagination seems very limited. We cannot sensorily imagine things like a ten-dimensional space. Most authors grant that imagination may take on board propositional content, though.⁸ Once admitted, propositional content greatly expands the range of imagination. We might *assign* almost any content.: ‘I imagine myself receiving the Fields medal for proving Goldbach’s conjecture. ... I imagine (and I suggest that you have imagined too) that I *really have proved it*. I can also engage in a similar imaginative project: I can imagine disproving Goldbach’s conjecture.’(see Kung 2016: 96). In this vein, Priest (2017) claims that we can imagine anything we can grasp. Thus, the propositional content of imagination does not seem properly restrained to provide modal knowledge on its own.

REPLY: I harbour broadly Moorean misgivings about the imagistic objection: an ‘established maxim’ of using imagination in philosophy is challenged on the basis of a highly debatable hypothesis about how imagination works (see Lam 2018, 2167). When in doubt, we should sacrifice the latter rather than the former, especially given the salient alternative of a holistic view of imagination (see Williamson 2007). But the challenge becomes to tell why that approach yields a notion of *imagination*.

I shall use my feasibility approach to rebut the three motivations of the imagistic objection. The first and the second line of motivation can be tackled together. My feasibility account along broadly simulationist lines provides material for defining imagination and identifying its core epistemic functions. One core function of imagination is to approach issues of feasibility by simulating limited variations of the current situation. The function transmits to more detached issues of possibility. Other uses of imagination like pretense can be connected to this core function (see section 2.3.). The core function supports a holistic view of imagination. The latter may recruit any mental resources required to simulate solutions for feasibility issues.

Coming to the third line of motivation, as illustrated by SKUNK, MOUNTAINEER, and TESLA, imagination recruits any capacities, representational resources, and information available to the mind. It combines them in a more complicated way than presupposed in the objection. A feasibility issue *streamlines* the use of imagination beyond concocting imagery and a free propositional gloss. Streamlining goes beyond explicitly and voluntarily observed constraints. It is largely triggered by thoroughly addressing an issue how *p* is possible. Determinate versions of implicitly known constraints are not explicitly imposed. They emerge in imaginatively developing a solution for how to make *p* true. The constraints apply to our entire representation of the scenario. They delimit both qualitative content and assigned content. This explains why the epistemic role of imagination goes far beyond the contribution of qualitative content. Yet again, there are other uses of imagination than the modal one, which come with different requirements and restrictions.

⁸ A middle position would be to admit rich quasi-perceptual content (see Byrne 2007).

FREEDOM OBJECTION: As contrasted to perception, imagination is free. We can manipulate its content at will. How can such a manipulation yield independent evidence (see Balcerak-Jackson 2018)?

REPLY: My account shares the deeper motivation of the freedom objection but forges an intimate connection between the epistemic function of imagination and its freedom. We exert the freedom of imagination in creatively coming up with innovative solutions to feasibility issues, but this freedom is also limited by the constraints thereby activated. Imagination in my account resembles a tool. Within limits, we can use a tool in many ways, among them dysfunctional ones. But we can also use it in line with its proper functioning. There are (relatively) free uses of imagination as in WAITER. But if we intentionally use imagination to seriously address a feasibility issue, it is constrained by this purpose. Then it can provide knowledge.

OBJECTION OF FAR-FETCHEDNESS: Does imagination provide a firm grip on remote, fantastic cases like perfect replicas of zygotes and mechanic cats? Relatedly: we cannot simply rely on actuality to fill in the neuralgic details of far-fetched worlds; do we have a suitable grip of them (van Inwagen 1998)?

REPLY: Again the continuity to our normal use of imagination in addressing issues of feasibility provides an answer. Our competence of imagining differentiated action plans as in MOUNTAIN calibrates our imaginative powers. It also comes with *implicit monitoring* when a scenario is sufficiently developed to permit a confident assessment, comparable to our automatic monitoring of perception as to whether it is differentiated enough to support perceptual judgements (see Williamson 2007: 153-155; Gregory 2020). A skilled mountaineer would not be confident about some particular route being feasible if her plan were not suitably developed. The skilled engineer Tesla would not have been satisfied with his vision of the motor if the latter had not been suitably detailed and accurate. In a similar vein, a diligent modal reasoner may be occasionally misled, but she would not generally base her modal verdicts on underdeveloped imagined scenarios, which leave open how to satisfy the pertinent constraints.

APOSTERIORITY OBJECTION: The classical objection to imagination-based accounts is that we can imagine a posteriori impossibilities like water not being H₂O.

REPLY: Imagination within the broad confines of a simulation account can be used in many ways, among them to track epistemic possibilities from viewpoints that differ from ours, e.g. viewpoints from which it is open whether water is H₂O.⁹ But modal imagination as modelled on feasibility issues is sensitive to any relevant information, including empirical knowledge. We pay due respect to such information, and we are at a loss how to imagine a suitable way for *p* to be made true in sufficient detail when we lack crucial information, as in Yablo's example of Goldbach's Conjecture (Yablo 1993: 10).

⁹ See Yablo 1993: section VIII; Chalmers's (2002) *primary* conceivability.

5. Summary

I have raised and answered a basic motivational issue about the modal use of imagination: what motivates us in using imagination in the first place? My answer is: there is a natural inclination to use imagination in simulating solutions to everyday feasibility issues. There is a continuity between this natural use of imagination and the use of imagination in tackling philosophical possibility issues.

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