

On Choosing What to Imagine

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Abstract: If imagination is subject to the will, in the sense that people choose the content of their own imaginings, how is it that one nevertheless can learn from what one imagines? This chapter argues for a way forward in addressing this perennial puzzle, both with respect to propositional imagination and sensory imagination. Making progress requires looking carefully at the interplay between one's intentions and various kinds of constraints that may be operative in the generation of imaginings. Lessons are drawn from the existing literature on propositional imagination and from the control theory literature concerning the prediction and comparison mechanisms (or "forward models") involved in ordinary perception. A more general conclusion is reached that, once we have the tools to understand how some imaginings are both under willful control and helpfully guide action and inference, we will have what we need to understand the cognitive basis of imagination in general.

1. Introduction

If we choose the content of our own imaginings, how does the process of imagining *move us forward*, epistemically speaking? We *do* learn from our imaginings, after all. Imagination is implicated in modal reasoning¹, action planning², art appreciation³, mindreading (Goldman, 2006), pretense⁴, artifact design (Arp, 2008), scientific innovation (Kind, forthcoming), and spatial reasoning (Kosslyn, Thompson, & Ganis, 2006). These are just some of the contexts where imagination is said to helpfully guide action and inference. Yet, unlike more paradigmatic examples of states that guide action and inference—beliefs and perceptual

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¹ Examples include Yablo (1993), Chalmers (2002), and Kung (2010).

² See, e.g., Addis *et al.* (2009), Schachter *et al.* (2007), and Van Leeuwen (2011).

³ Examples include Doggett & Egan (2012) and Walton (1990).

⁴ See, e.g., Nichols & Stich (2000), Nichols (2004), and Currie and Ravenscroft (2002).

experiences— the content of our imaginings is usually said to be “up to us” in some significant sense. What we imagine seems determined by what we wish to imagine.

But how can it be that we are able to wish ourselves into more epistemically favorable states of mind? Even if one were very careful with one’s wishes, the fact that the content of an imagining is chosen would seem to render the imagining itself pointless. For it suggests that the content of the imagining was already present in one’s intentions (why else would the imagining count as chosen?). If that is the case, why go through with it? Imagining becomes a kind of internal transfer of contents—the mental equivalent of handing yourself a dollar.

At the same time, neither will simply letting your imagination run wild bolster its capacity to guide action. When we imagine in the above contexts, we don’t pull the lever on a mental slot machine. The process is controlled and, it would seem, subject to constraints. That is why we can rely on our imaginings to guide our behavior and judgments in so many important domains. So the epistemic value of imagination is at odds *both* with its being completely unfettered, and with its being completely under intentional control. Philosophers tend to emphasize the great freedom of choice we have in imagination, without squaring this with its capacity to guide action and inference.⁵ Psychologists, by contrast, often highlight the role of imagination in practical reasoning, without explaining how this is compatible with our ability to choose what we imagine (Byrne, 2005; Schacter et al., 2007). My goal here is to see if and how imagination’s capacity to guide action and rational inference can be brought into alignment with our freedom to choose what we imagine.

1.1 *Some fine-tuning*

One way to approach the question is to grant that imagination, as a *type* of mental process, has instances that are “chosen” and instances that helpfully guide us, while maintaining that these qualities are not typically possessed *at the same time* by token imaginings. For instance, Amy Kind (forthcoming) contrasts imaginings where “we constrain

⁵ Cf. Fodor (1975, p. 191): “What makes my stick figure an image of a tiger is not that it looks much like one...but rather that it’s *my* image, so I’m the one who gets to say what it’s an image of.” More recently, Colin McGinn has called it a “familiar point” that “I cannot misidentify the object of my imagining” because “the identity of my imagined object is fixed by my intentions” (2004, p. 31). See also Noordhof’s (2002, pp. 429-434) “Straight Forward View”, which identifies what is imagined with what an imaginer supposes is imagined.

our imaginings to fit the facts of the world as we know them” to those where we do not. If only the latter imaginings are subject to the will (in the sense of being chosen), and only the former helpfully guide action and inference, this might remove the need to explain how it can be that a particular mental process is *simultaneously* subject to the will and conferring of epistemic advantage.

Can imaginings be divided into distinct kinds in this way? To answer, it will help to consider bodily actions by comparison, and the conditions under which we say a bodily action is chosen. If a bodily action derives from an explicit intention to carry out that action, it clearly counts as chosen (tabling more general worries about free will). However, many actions are chosen even when the subject did not form a conscious or explicit intention to perform them. For instance, when I select the correct key from my keychain to open my office door, selecting that key is something I choose to do. But I need not have formed an explicit intention or plan to select that key. And when I go to the kitchen to get a glass of water, my opening of a particular cabinet, and my selecting of a tall rather than short glass, are things I *choose* to do, even if my doing them feels quite automatic. In these cases, there is some (perhaps only sub-conscious) action-guiding mental state in virtue of which the act was not simply accidental, or a mere reflex. I will follow Searle (1983, Ch. 3) in calling this sort of action-initiating mental state an *intention in action*.⁶ Intentions in action can be contrasted to *prospective* (or “prior”) intentions, such as the intention to go for a run today, or to file one’s taxes by April. Prospective intentions relate to consciously made future plans that may or not come to fruition. An intention-in-action, by contrast, is what accounts for a particular movement’s being willful, in the sense that a person can be held responsible for it. Motor commands (of the sort discussed in Section 3.2 on “forward models”) are a species of intention in action, as I will understand them. A bodily movement that is accidental, or that is forced by an outside power, will not have been guided by an intention-in-action. A bodily action can thus be thought of as having two necessary (but distinct) components: the intention in action that initiates it, and the movement that carries it out.

⁶ I do not, however, endorse Searle’s claim that the content of an intention in action is self-referential. For Searle, the content of an intention to raise one’s arm is something like: (My arm goes up as a result of this intention in action), whereas I would have its content simply be: (My arm goes up).

Now, our question was whether one could quickly dissolve the apparent puzzle of chosen imaginings by holding that it is only non-guiding imaginings that are chosen. What we see with bodily actions, however, is that the kinds of actions that most likely advance one's interests (and improve one's epistemic standing) are the ones that are chosen, at least in the sense that they result from intentions in action. Indeed, there is no expectation that accidental or coerced movements will advance one's goals. Similarly, we should not expect all the imaginings that improve one's epistemic standing to be accidental or uncontrolled. We should expect very many of them to be chosen, in just the way that useful bodily actions are usually chosen. And, intuitively, this is the case. When we imagine taking a new route home, or how a friend will react to a gift, or to determine a scenario's possibility, these are mental actions that we choose to undertake, and over which we have control. They are not things that just happen to us—at least, not normally. This is not to overlook the tension that remains in the idea that we can choose a usefully guiding imagining. The point is just that we cannot sidestep the entire puzzle by holding that *only* non-guiding imaginings are chosen and controlled.

We can now see, however, that the most acute puzzle with respect to choosing imaginings concerns only a particular class of imaginings: those that are both chosen (in being subject to the will) and suitable for guiding action and inference. I will call these "Guiding Chosen" (GC) imaginings. Most of what follows will be an account of how there can be such a class of imaginings. I will argue that understanding Guiding Chosen imaginings requires positing three general features of their cognitive architecture. These are:

- 1) The initial involvement of "top-down" intentions for initiating imaginings (described in Section 2),
- 2) The use of (what I will call) "lateral" constraints in the development of an imagining (described in Section 3), and
- 3) The cyclical involvement of top-down intentions throughout the course of an imagining (described in Section 5, in response to a challenge raised against most existing accounts of imagination in Section 4).

The end result is a picture of GC imaginings that reveals them as a kind of continuously guided conditional reasoning. This conclusion is put to a larger end in Section 6, where I argue that the cognitive-architectural features posited to explain GC imaginings give us the tools we need to understand most other imaginings as well.

2. Accounting for choice

In what follows, unless otherwise noted, all talk of ‘imagining’ will refer specifically to our target phenomena: Guiding Chosen imaginings. To get started in thinking about GC imaginings, let us assume that paradigmatic instances of GC imaginings involve the endogenous triggering of a sequence of mental states. By “endogenous triggering” I simply mean that, normally, imaginings spring from factors internal to the organism. Here imagination is contrasted to visual perception, where the light currently reflecting off of nearby objects is a crucial part of the causal chain. In paradigmatic episodes of imagination, some endogenous cause leads to the tokening of a sequence of mental states which we can call: $i_1...i_n$. We can call the entire sequence an “imaginative episode,” and each i_x in that sequence an “imaginative state.” The idea is that, normally, a single imaginative episode will involve a sequence of imaginative states.

With these minimal assumptions in place, we can ask: in what sense does a person choose the $i_1...i_n$ that constitute an imaginative episode? The most general answer suggested above is that the imagining is initiated by an intention, where this may often be a non-conscious intention in action. When an imagining has no special relationship to one’s intentions, it is not chosen, just as unintended bodily movements are not chosen. That said, the intention that initiates an imagining should not be considered a part of the imagining itself, any more than the intention that initiates a raising of the arm is part of the arm’s motion. An imaginative episode is on a par with a bodily movement; only when it is initiated by an intention will it count as an *action* (in the case of imagination, it will be a *mental* action). This allows for some imaginative episodes (e.g. unbidden imaginings) that are not mental actions.

The next question to ask is *to what extent* the contents of $i_1...i_n$ (a particular episode of GC imagining) are determined by one’s intentions. In answering it will help to draw a familiar distinction between *propositional* imaginings and *sensory* imaginings (though not everyone

agrees the distinction is in good standing—see, e.g., Kind (2001)). There is much that can be said concerning how best (or if) to account for the difference between the two. Here a few cursory remarks will have to do. Propositional imagining occurs when a person imagines *that* thus and such. Imagining that the FBI is plotting to kidnap you is an example. It is typically thought that propositional imagining does not require the use of sensory imagery. Some support for this can be found in considering pretense. Imagining that *p* is plausibly the normal cognitive component of pretending that *p*. If a person can pretend that she is a tiger, or a mobster, or a snowflake, without using any sensory imagery, then it seems propositional imagination need not be imagistic. Sensory imaginings, on the other hand, are usually defined as requiring mental imagery, and are typically ascribed with non-propositional uses of ‘imagines.’ Unfortunately, I do not have space here to further defend or explain these distinctions.⁷ I introduce them because they are already widely accepted, and because different issues arise when conceiving of imagination as either propositional or sensory in nature.

2.1. Choosing Propositional Imaginings

Let’s look first at propositional imaginings and ask to what extent the contents of $i_1\dots i_n$ (a particular episode of imagining) are determined by one’s intentions, and therefore *chosen*. The most common view about propositional imaginings is that the i_x amount to a sequence of belief-like states, where being in those states amounts to taking the attitude of imagination toward a sequence of propositions (though this is not my view—see fn. 9 below). We can then ask: to what extent do we choose the content of those states? The most extreme answer—one I expect no one to endorse—would be to say that the content of each proposition is determined by an intention to imagine a proposition with that very content. This is what I will

⁷ Is *all* cognition that involves sensory imagery properly called sensory *imagination*? It seems the answer should be no, at the risk of counting ordinary episodic memories as exercises of the imagination (this question gets more extended treatment in Section 6). However, there are no widely accepted answers here. The relationship between sensory imagination and episodic memory is not well understood. Nor, for that matter, is the relationship between propositional and sensory imagination. If I form an image of a polar ice cap growing in size while imagining *that* global climate change has been reversed, am I engaging in two different kinds of imagination at once (employing two different faculties of mind)? Have I entered a third, hybrid state? For the purposes of this chapter, I will treat the two types of imagination as distinct, to avoid begging questions I will not have space to address.

call the Only Top Down approach, the idea being that intentions are “top down” influences on imaginings.

According to Only Top Down, when I propositionally imagine that p , that q , and that r (where these imaginings are stages of the sequence $i_1 \dots i_n$), it is because I have first had an intention to imagine that p , and then had an intention to imagine that q , and so on. Here imagination is, at bottom, a transfer of contents from one’s intentions to one’s (propositional) imaginings, during which the contents p , q , and r , are “extracted” from the intention to imagine that p , imagine that q , and imagine that r . This approach maximizes the sort of intentional control we have over imagination, while calling its usefulness into question. One ends up where one began, epistemically speaking. Explaining the capacity of one’s imaginings to usefully guide action and inference would amount to explaining one’s capacity to have a sequence of intentions of the sort that, given the process of “extraction”, result in useful imaginings. All of the heavy lifting falls on one’s intentions. One way of seeing the problem is that each i_x —that is, each successive imaginative state—does not causally influence the one following it. Rather, at every point, the content of each i_x is wholly determined by a top down intention.

As I said, I do not expect Only Top Down to be a popular view. But it is useful to have it on the table, as it forces us to focus on what the other options might be for explaining the apparent “chosen” nature of imaginings. It seems we must have somewhat less choice than the Only Top Down view envisions, even if our intentions may be relevant in initiating an imagining.

2.2. Choosing Sensory Imaginings

However, the Only Top Down approach might seem more promising with respect to sensory imagination (Cf. Searle (1983, p. 103)). Here the idea would be that the i_x of an episode of sensory imagination are individual mental images. And, for each mental image, we might choose its content in the sense that it is caused by a corresponding intention to generate an image with that content. The triviality that besets Only Top Down in its propositional form is to some degree avoided if one thinks that mental imagery, by its very nature, represents its contents in a more fine-grained way than one’s (presumably propositional) intentions. For

instance, my (coarse grained) intention to imagine my mother might result in the formation of a visual image of her face that represents various features in a way that outruns any linguistically expressible concepts I might have (and that might be constituents of my intentions). If there is a level of representational detail that mental imagery makes available and that is not present in one's intentions, then the usefulness of imagination may lie in our ability to willfully make use of that detail by having intentions to trigger related images (this would, however, still presume some pre-existing content-link between one's images and propositional intentions, such that one could reliably trigger the other).

This sort of approach to understanding the usefulness of sensory imagination coheres well with Peter Kung's (2010) conception of the role of imagination in justifying judgments concerning metaphysical necessity and possibility.⁸ Kung draws a distinction between the "basic qualitative content" of a imagining (roughly, what the image itself contributes) and "assigned contents," which we might think of as the elements of content contributed by one's top down intentions. For Kung, imaginings gain a measure of usefulness (toward making judgments of metaphysical possibility) to the extent that some of their representational aspects—their basic qualitative contents—are not explicitly chosen or "stipulated," in the manner of assigned contents. To the extent that assigned contents contribute to what is imagined, the process of imagining does not *itself* offer justification for judgments relating to those contents. Any justification relating to those contents must be inherited from elsewhere.

While this approach is a step forward in reconciling freedom with usefulness, it does not take us very far. As with Only Top Down when considered for propositional imagination, there is still no account of how successive i_x causally influence or constrain each other. Each image in an imagining is caused in a "top down" manner by a related intention. What determines the sequence of images will be a corresponding sequence of intentions (even if the intentions are all representationally coarse-grained by comparison). Imagination's usefulness now lies entirely in its filling in of visuo-spatial details to a basic narrative that is already fully mapped

⁸ Kung does not, however, endorse the view I will describe; it is only a view one could extract from his remarks; see also Colin McGinn, who emphasizes the transition between cognitive formats in explaining some of the usefulness of imagination (2004, Ch. 1)).

out in one's top-down intentions. While this is not a trivial kind of usefulness, it diminishes the amount of work that imagination can potentially do. It is normally thought that imagination is a cognitive faculty with its own internal logic or principles of operation that determine how imaginings unfold across time—that the entire diachronic sequence of images is not already set out in one's intentions. Ideally, we can both vindicate this traditional conception of sensory imagination *and* show that it has epistemic value beyond the filling in of visuo-spatial details. Also, we should keep in mind that Only Top Down gives us no account at all of the usefulness of propositional imagination. Thus, whatever adjustments we make in the case of sensory imagination can hopefully be extended to propositional imaginings as well.

To recap this section: the involvement of one's top-down intentions in setting (at least) the initial content of a sensory or propositional imagining seems necessary to explaining why it counts as being chosen. However, such intentions—or series of intentions—cannot be the whole story with respect to how the imagining unfolds across time, short of trivializing the imagining itself.

3. Adding in lateral constraints

What are needed to guarantee greater usefulness, both with respect to sensory and propositional GC imaginings, are some *lateral* constraints on the imaginings. If one's top down intentions are key to initiating an imagining—in, say, determining its general subject matter—then lateral constraints will be what govern how it then unfolds. So, for instance, if an intention to imagine that p is key to determining the content of the first i_x of the imaginative episode, the lateral constraints on the imagining will determine why that state leads to the subsequent $i_x...i_n$ that contribute to the total imaginative episode. I am calling the proposed “lateral” influences *constraints* because they help answer the question: why is *this* the next i_x , and not something else? On the Only Top Down account, this question was always answered by an appeal to a new intention. It preserved absolute choice at the cost of usefulness. Now the idea is that imagination—both propositional and sensory—has its own norms, logic, or algorithm that shapes the sequence of i_x after the initiation of an imagining by a top-down intention. These constraints might then play a role in explaining how the imagining is useful.

3.1 Lateral constraints in propositional imagination

Essentially this idea was put forward by Nichols and Stich (N&S) (2000) in an influential paper on the role of propositional imagination in guiding pretense (see also Currie & Ravenscroft (2002, Ch. 1)). On N&S's account, an imagining begins with the insertion of a proposition into the "Possible Worlds Box" (PWB). The PWB is to be understood functionally; for a contentful state to be "in" the PWB is for it to play a certain kind of functional role. We can think of this initiating proposition as the first i_x in some imaginative sequence $i_1...i_n$. Various "inference mechanisms" then determine how that initial proposition develops in imagination (or "in" the PWB). The crucial point for N&S is that these inference mechanisms are the same ones that shape and govern the inferences we draw within our ordinary beliefs. The key difference with the PWB is that it is not directly connected to action guiding systems. This makes it possible to (rationally) imagine propositions one disbelieves, without threat of the disbelieved propositions driving one's behavior. And this in turn allows us to draw out (rational) consequences from those (potentially disbelieved) propositions. On N&S's account, the inferences drawn in imagination are imported back into one's beliefs as consequents to a newly believed conditional, where the initial proposition that started the imagining is the antecedent. So, if "people colonize the moon" was first inserted into the PWB, and propositions q , r , and s , were then imaginatively "inferred" from that proposition (through the activity of one's "inference mechanisms"), then the end result might be a belief of the form: "If people colonize the moon, then q , r , and s ."

On this sort of view, propositional imaginings are "belief-like" in that they unfold more or less in accord with the norms that govern belief. The idea that propositional imaginings are belief-like in this way is widely accepted (though not by me⁹) (Currie & Ravenscroft, 2002;

⁹ I do not believe there is such thing as an "imagination box," or that there is an imaginative attitude that is distinct from belief (this makes me a "cognitive lumpner" in Liao & Doggett's (forthcoming) term). On the view of propositional imagination that I defend elsewhere (Langland-Hassan, 2012), the imaginative states that make up an imaginative episode are themselves beliefs, and not merely belief-like. How, then, can one can imagine a proposition one does not believe? My answer, in brief, is that imagining that p (supposing one disbelieves p) does not require entertaining (or believing) the proposition that p ; instead, it requires retrieving stored generalizations relevant to p -like situations, and using them to draw inferences about what would likely happen if p . On my view, then, one *chooses* the initial i_x in the sense that one chooses the topic of an internal query about what would

Doggett & Egan, 2007; Nichols, 2006; Weinberg & Meskin, 2006b). If true, it would explain why most imaginings do not develop in a completely arbitrary manner, but instead often match what we would come to believe if we believed the initiating premise of the imagining. At the same time, this approach promises to explain the usefulness of imagination: we can rely upon our imaginings to guide our behavior because our imaginings are constrained by the very same norms (or “mechanisms,” or “algorithms,”) that govern ordinary rational inference.¹⁰ The freedom to choose what one is imagining is retained as a freedom to, in effect, choose the subject-matter of the (imaginative) inferences.

There are quibbles, large and small, that one can raise for this picture of propositional imagination. However, the basic strategy of understanding of the lateral constraints on propositional imagination as being on a par with those operative among ordinary beliefs is widely accepted, and is granted by theories that agree on little else (e.g. Langland-Hassan (2012) and Nichols & Stich (2000)). Thus I will adopt it going forward. We can then understand the lateral constraints on propositional imagination to the extent—and only to the extent—that we understand such constraints with respect to belief.

3.2 Lateral constraints on sensory imaginings

Before addressing some difficult questions for this general conception of the lateral constraints on propositional imaginings, we can ask if there is any corresponding move that can be made with respect to sensory imagination. At first glance, it might seem that the answer is no (for their part, N&S limit their discussion to propositional imagination). The orthodox view in philosophy is that beliefs do not themselves involve mental images as constituents. Beliefs are most commonly (though not always (Prinz, 2002)) held to be “amodal” in nature, and (if there is a dominant view on this) to have a language-like constituent structure (Fodor, 1975). From this perspective, the mechanisms or principles that govern the inferential relations among

happen if p (and, of course, asking oneself a question does not require imagination). So, imagining that p can involve only beliefs and internal queries, while still not requiring one to believe that p . My (2012) has the sordid details, together with replies to likely objections. Here I do not assume the truth of that account, as the points I want to make do not require it.

¹⁰ These norms or principles of inference need not be explicitly represented; the idea is that the organism is constructed such that its inferential patterns *conform* to the rules or algorithms in question.

beliefs will not be suitable for governing the relationships among sequences of mental images, which are typically thought to have a different logical and syntactical form (occurring, e.g., in an “iconic” or “pictorial” format (Fodor, 2003)).¹¹ And, even if sensory imaginings are “percept-like” (Currie & Ravenscroft, (2002, Ch. 4)) in many ways, this does not offer any obvious clues as to how images develop in imagination. For, unlike the case of belief, the sequence of perceptions one enjoys is determined not by endogenous norms or principles, but by the actual state of the environment that one perceives. So there is no obvious quasi-perceptual analog to the rational norms governing inferential development among beliefs that might serve as lateral constraints for sensory imaginings.

Nevertheless, an analog may still be available. Several theorists have recently drawn on the existing motor control literature concerning the prediction and comparison mechanisms at work in ordinary perception, as a means to thinking about the kinds of capacities and constraints that might be operative in sensory imagination (Grush, 2004; Langland-Hassan, 2011; Van Leeuwen, 2011). It has long been hypothesized that during ordinary perception cognitive systems “predict” the sort of sensory input that will be received, given their current state and the particular motor command initiated (Sperry, 1950; von Holst & Mittelstadt, 1950/1973). The prediction can then be compared to actual “reafferent” input to determine if there is a match. This serves two purposes: first, it enables the organism to distinguish, in an immediate and non-inferential way, whether a particular sensory change was a result of its own movement or, instead, the movement of something in its environment. Second, it enables an organism to instantaneously register whether its desired action was carried out successfully, as the predicted/desired state can be compared to the final state at the moment that state is registered. This helps explain how organisms correct motor errors more quickly (200- 300ms) than would be possible if they had to rely upon ordinary visual or proprioceptive feedback (Miall, Weir, Wolpert, & Stein, 1993; Wolpert, Miall, & Kawato, 1998).

¹¹ The difference in format suggests a difference in the syntactical structure of the representations, and hence a difference in the mechanisms for processing the representations, as such mechanisms are usually assumed to be sensitive only to the syntactical features of representations.

In the contemporary control theory literature, the cognitive system whose role it is to generate relevant “predictions” is typically called a *forward model* (Blakemore, Wolpert, & Frith, 2002; Wolpert, Ghahramani, & Jordan, 1995). When a motor command is generated to begin an action, an “efferent copy” of that command is sent to the forward model, which generates a prediction of the resulting sensory input. That prediction state is then compared to the actual input. The capacity of the forward model to generate accurate predictions of sensory inputs requires the organism to have a kind of (perhaps implicit) knowledge of sensorimotor regularities and contingencies. This form of knowledge can be thought of as an implicit understanding of a set of rules of the form: given current sensory state c , plus motor command m , the subsequent sensory state should be s . Or, simplifying: If c and m , then expect s . It is not assumed such the rules are discursively represented, or explicitly represented at all; they may merely be conformed to, in the same way that a classical connectionist network might conform to a rule for detecting mines versus rocks (Churchland & Sejnowski, 1989).

The forward model can thus be seen as storing a set of principles for the “lateral” development of further imagistic states, given initial states and motor commands as input. The core working hypothesis of the control theory literature is that this kind of prediction goes on during most of ordinary perception. If, however, the forward model were under intentional control (to the extent that it could be fed inputs at will), we would have a way of seeing how it could account for lateral constraints for sensory imagination (Grush (2004) explicitly argues that the predictive states generated by the forward model are visual images). We simply need to assume that “efferent copies” of motor commands can be sent to the forward models when no such command is actually sent to centers that would carry out the command. In such cases a series of prediction states (in the form of visual images) could be generated in the absence of a related input.

Sensory imagination can then be seen as the purposeful use the forward model, in absence of relevant perception, to generate what are in effect “predictions” about the likely sensorimotor effects of certain actions. Because the forward model’s predictions are grounded in learned perceptual regularities and contingencies—ones that are relied upon to guide

ordinary perception—we have an account of the reliability and usefulness of imagination that is on a par with that considered for belief. And, importantly, it is an account that has a rationale and theoretical life independent of the present puzzle about imagination. The sequence of one’s sensory imaginings will be constrained by the sort of things one would expect to see, given some initial image and motor instruction, in much the way that one’s propositional imaginings are often held to be constrained by what one would come to believe if one believed the imagined premise. During sensory imagination, we can assume that the two “initiating” states (image and simulated motor command) are generated by one’s intentions. This remains the sense in which the imaginings are under intentional control and “chosen.”

Unfortunately, this tidy story about forward models cannot be all there is to the constraints governing sensory imagination. For we can usefully imagine the movements of objects and creatures in our environment even in situations where we ourselves are stationary, and where the prediction in question has nothing to do with the consequences of our own possible movements. For example, in visually imagining a basketball rolling off of a high bookshelf, we more or less automatically imagine it bouncing upon hitting the floor. The “prediction” that a falling basketball will bounce on hitting the floor results from stored generalizations about the behavior of different kinds of objects in different settings—and not from generalizations about how the appearances of things change as we actively explore them. An algorithm (or set thereof) allowing conformity to such generalizations will doubtless influence and constrain the development of sensory imaginings in addition to forward models. Whether conformity to these algorithms requires input from propositional background beliefs, or, instead, is something that occurs completely independently of propositional thought, is a difficult and important question. For now I can do little more than point to it.

This section has aimed to explain how imaginings can be relied upon to guide behavior, even if our top-down intentions set their initial topic or subject-matter. For each of propositional and sensory imagination, there is, in effect, one or more imaginative “algorithm” that constrains the development of subsequent stages in the imagining, after an initial “top down” intention starts the process by determining the content of the first state in the

sequence. The involvement of the initial intention accounts for the sense in which the content of the imagining was “chosen.” The algorithm in the case of propositional imagination is modeled on the inferential patterns operative on belief. The algorithm in the case of sensory imagination is realized partly by the operation of forward models, and partly by less well understood capacities for visual prediction. I turn in the next section to developing a challenge to this very general approach to explaining Guiding Chosen imaginings.

4. The “Deviance” Objection

The picture of GC imagination so far drawn gives rise to an immediate objection: imagination, even in its action and inference guiding instances, seems to be *less constrained* than what is being allowed. Sure, there may be cases where we imagine more or less what we would come to believe (or perceive) if we believed (or perceived) the initiating content. However, even in the case of GC imaginings it seems we imagine things that deviate radically from anything we would likely infer from the initiating proposition (or would likely come to see, given the initial visual image and simulated motor command).

This is most clearly seen when we appreciate imagination’s role in guiding creative endeavors. The fact that the behavior in question is writing a novel or creating a sculpture (as opposed to planning a route home), does not lessen the need to provide an account of the operative constraints. Creative imagination is not *random*, after all. But neither is it so predictable as the drawing out of a set of inferences from a single premise. Consider also pretense: the plots of most pretenses do not stick strictly to the kinds of things one would infer given some pretense-initiating premise. Often pretenses move in and out of silly, absurd, and unpredictable premises. The ability to flexibly engage in such pretenses, from early childhood on, is one of the key capacities theorists invoke imagination to explain. So any account of imagination must have something to say on this score. And it bears emphasis that artistic creation and pretense are rational, purposeful actions that are driven by imagination; so these imaginings fall well within the scope of GC imaginings. Finally, there is much to be said for the idea that imagination allows us to audition a *variety* of ways things might go, in order to choose

a best course of action. This would again point to GC imaginings having less than strict lateral constraints.

We can call this the “deviance” objection, as it focuses on the capacity of useful imaginings to deviate from the kinds of constraints outlined in the previous section. The general point behind the deviance objection is that, even for action and inference-guiding GC imaginings, there is never just one (or even just a handful) of ways that the imagining can unfold, given the way it begins. One way to deal with this is to appeal to what N&S call “scripts,” where these are “packets” or “clusters” of representations that “detail the way in which certain situations typically unfold” (2000, p. 126). These scripts can be conceived of as different sets of generalizations keyed to stereotypical contexts that, given an input, will output likely consequences within those contexts. One’s “scripts” are, in effect, proper parts of one’s lateral algorithm, as they partly determine what one will infer from what. While N&S limit their discussion of scripts to the kinds of situations we actually find ourselves in (e.g., dining at a fast food restaurant), the idea can be extended to include stereotypical narratives we encounter in fictions. For instance, I have acquired over the years a quiver full of clichéd ideas about the ways in which knights behave in duels. If a pretense requires me to behave like a brave knight, then the inferences I undertake in imagination may relate not to how I myself would act during a duel (run away!), but to how I would act *if* I were a knight of the sort portrayed in fairytales. If I believe some generalizations about how such knights behave, it will not be hard for me to draw out some inferences about how I would behave *if* I were such a knight. So, often when an imagining seems outlandish—deviating from any plausible constraints that might otherwise hold—it may be because the initial premise specifies that the context is of a stereotypical, fictional sort. One is not inferring what one would actually do in that situation given one’s actual personality, but rather what one would do if one were a stereotypical character of the sort portrayed in certain fictional narratives. Obviously, generalizations drawn from the movies about how you would behave if you were a superhero, or a zombie, will not fruitfully guide action in most everyday contexts. However, they can certainly be useful to guiding a pretense, and can potentially play a helpful motivational role during certain kinds of sincere action (e.g., imagining oneself in the Wimbledon Finals to inspire better play in a casual tennis match).

That said, there are still bound to be GC imaginings that diverge from any such scripts or generalizations. Nichols and Stich themselves emphasize that “pretense is full of choices that are not dictated by the pretense premise, or by the scripts and background knowledge that the pretender brings to the pretense episode.” The same will of course be true of the imaginings driving artwork creation. There is no set of lateral constraints or scripts that will generate *Moby Dick* from “Call me Ishmael.” Noting that they “don't have a detailed account” of the cognitive mechanisms that underlie this flexibility, N&S posit a component of mental architecture called the “Script Elaborator,” whose job it is to “fill in those details of a pretense that can't be inferred from the pretense premise, the (altered) contents of the Belief Box, and the pretender's knowledge of what has happened earlier on in the pretense” (2000, p. 127).¹² In essence, the job of the Script Elaborator is to account for whatever stages there may be in the sequence $i_1 \dots i_n$ that would *not* have been inferred if i_1 were believed. And while Nichols and Stich's view is put forward only with respect to propositional imagination, one can easily see how a similar sort of mechanism would be needed to account for the cases of sensory imagination where what one imagines deviates from what one would expect to see, given the initial visual image and motor command (assuming one wished to appeal to something like the “forward model” constraints described above).

While N&S admit that they “know little about how [the Script Elaborator] works” (p. 144), they see it as a virtue of their theory that it makes plain the need for such a mechanism or capacity. And, indeed, their positing of a Script Elaborator is the only serious acknowledgment of the problem that the deviance objection makes for any functionalist account of imagination (i.e., any account which seeks *ceteris paribus* generalizations about the way in which imaginings unfold across time). So, if the Script Elaborator represents a gap in their theory, it is equally a problem for everyone else who wishes to defend a broadly functionalist account of propositional *or* sensory imagination. Unfortunately, many theorists who have followed N&S in talking about imagination in functional/boxological terms simply out leave this necessary, if problematic, element (see, e.g., Doggett & Egan (2007) and Schellenberg (2013)).

¹² See also Weinberg & Meskin (Weinberg & Meskin, 2006a, 2006b) for accounts of propositional imagination that, following Nichols and Stich, posit a Script Elaborator.

As helpful as it is to acknowledge the need for *something* like a Script Elaborator, N&S still undersell the size of the hole it leaves in their account of propositional imagination (and, indeed, in anyone's account who posits an "imagination box"). For it is arguably the central claim of their theory that imaginings are "belief-like" in the patterns of inference that govern their development. This is interesting if it is true, because we have an independent understanding of belief; its extension to imagination promises to shed explanatory light. However, to the extent that the Script Elaborator interferes with and augments those inferential patterns, imagination ceases to be (importantly) belief-like. This means that, until we have a reasonably fleshed out account of the Script Elaborator—one that tells us when and why it intervenes—we really do not know the extent to which imaginings are belief-like. We are left with a theory that says: imaginings are belief-like...except for the many ordinary circumstances in which they are not. We lack precisely the *ceteris paribus* psychological generalizations that are supposed to warrant talk of "boxes" in the first place.

Thus, when N&S (and followers (e.g., Weinberg & Meskin, 2006b)) draw separate boxes in their diagrams for the "imagination box" and the Script Elaborator, it is a diagrammatic sleight of hand. For it suggests that imagination is well understood (it is strongly belief-like), and that it is only the Script Elaborator that remains mysterious. But there really is no functional characterization of imagination to be had independent of a functional characterization of the Script Elaborator. This makes the willingness of others to simply omit the Script Elaborator from their imaginative boxologies all the more perplexing.

Analogous points will apply for sensory imagination as well. If one posits a mechanism akin to the Script Elaborator to account for the cases where sensory imagination seems unconstrained by anything so pedestrian as a forward model or visuospatial generalization, we are left with a theory that says: one's sensory imaginings will be constrained by what one would expect to perceive in thus and such circumstances...except for the many ordinary cases when they are not. This leaves us without a genuine functional account of sensory imagination.

From the perspective of our puzzle concerning GC imaginings, the problem is this: until we understand which constraints (if any) govern the operation of the Script Elaborator (or

comparable entity), we will not understand how it is that its operation generates useable, non-random results of the kind that reliably guide action and inference. Nor will we understand how its operation is compatible with a person's choosing what she imagines (since it is not clear how the Script Elaborator interacts with one's intentions). Thus, the deviance objection simultaneously threatens explanations of GC imaginings and accounts of imagination in general.

5. Cyclical Processing

Here is a way forward: let us suppose that, when our imaginings deviate from the patterns set out by the proposed lateral constraints, it is because we have intentionally intervened in that processing. To intentionally intervene is to stop the lateral processing where it is and to insert a new initial premise (or image) to the lateral algorithm for more processing. What we might pre-theoretically think of as a single imaginative episode could in fact involve many such top-down "interventions." These interventions would allow for the overall imagining to proceed in ways that stray from what would be generated if one never so intervened.

Consider, as an example, Van Leeuwen's (2011) improvisational actors who pretend to mount pterodactyls while dueling (he presents the case as a challenge to N&S-style accounts of the constraints on imagination). Actor A may start by imagining that "I am a brave knight at a duel." This proposition is fed to the lateral algorithm which, we are assuming, is the same as that which governs inferential elaboration among ordinary beliefs. Actor A begins to infer (in imagination) things such as: "I am holding a sword...An opponent is trying to stab me...I hold one arm at my side." These are the kinds of thing he would come to infer if he believed the initial premise. These imaginings begin to guide his action (perhaps, as N&S suggest, in the form of an inferred counterfactual belief: "If I were a brave knight at a duel, I would be holding a sword, an opponent would be trying to stab me..."). At a certain point, this imaginative processing is interrupted by a desire for something more comedic to occur. Actor A decides that his riding a pterodactyl would be funny (more on this decision in a moment). This leads him to "intervene" on his prior imagining by feeding to the lateral algorithm: "I am dueling *while riding a pterodactyl!*" This allows him to draw some further imaginative inferences

concerning things that might happen if he were somehow riding a pterodactyl. For one thing, pterodactyls *fly*. So he imaginatively infers that he is dueling while *flying* on the back of a pterodactyl. Further interventions will likely follow. The idea is that, whenever an imagining diverges from the sort of thing that one would infer, or sensorily predict, from the currently imagined premises, this is because a new premise has been fed to the imaginative algorithm in a “top down” manner, from one’s intentions.

Guiding Chosen imagining, in its more freewheeling instances, then becomes a kind of cyclical activity, during which new and sometimes unusual premises are “fed” to a lateral algorithm at varying intervals. The output of the lateral “inferential” activity can then, at different intervals, be recombined with a novel element contributed by one’s intentions to begin the lateral processing anew (it is because of this recombination that I am calling the process “cyclical”). This allows the imaginative episode, as a whole, to both be constrained (by the lateral algorithm) and to freely diverge from anything one would have inferred from the initial premise alone. The mysterious work of the Script Elaborator has, in effect, been offloaded to one’s desires and intentions with respect to the task at hand. For it is one’s desires and intentions that will influence when and how one intervenes on the lateral processing.

Why, then, did Actor A insert a premise having to do with pterodactyls, and not something else? Well, he wanted to shift the pretense to something more surprising, funny, and unusual—to something that would suit his goals, *qua* improvisational comedian. But why *pterodactyls*, in particular? Here the answer must trace to specifics of his psychology: what has he recently thought of or seen? What kinds of things does he generally find funny or surprising? Did someone mention dinosaurs earlier in the performance? The important point is that the answer will not involve positing a novel cognitive *mechanism* or process. The cyclical interaction of one’s top down intentions with the constrained processing of the lateral algorithm is by itself enough to accomplish the work set out for the Script Elaborator. Coming to understand the work that N&S set aside for the Script Elaborator becomes part and parcel with understanding an agent’s goals, intentions, and decisions more generally. Developing an account of these is of course no mean feat; but at least we have a program for moving forward.

One may object that, during such imaginings, we are not typically aware of having a succession of intentions of this kind. However, I have already emphasized that the kinds of intentions being invoked are often intentions in action, of which we are usually only minimally conscious, if conscious at all. Just as we have a succession of intentions in action when getting a glass of water—to open a certain cabinet, to take a tall rather than short cup—without noticing them, so to may we have a succession during imagining without any real awareness of them.¹³

One might still point out that my arriving at a particular cabinet, in the case just described, will not *surprise* me, in the way that some GC imaginings can surprise us in where they lead. And this may seem to conflict with GC imaginings being under even this (minimally conscious) sort of intentional control. In response, surprise may come in the influence of the lateral algorithms themselves. They are what take the imagining beyond one's intentions. And while they do indeed conform to our ordinary means of drawing inferences and, in a way, embody our expectations, we can nevertheless be surprised at the inferences we would draw from different unusual imagined premises. In the same way, one can be surprised at the answers generated by a familiar mathematical formula, when the variables are of an unusual sort.

Summarizing where we now are, I have described and argued for three main features of GC imaginings that help explain how they can be both “chosen” and improve our epistemic standing. First, they are initiated by top-down intentions; second, they are developed in a constrained manner by lateral algorithms; third, through a process of continual and cyclical intervention by one's intentions, they can appear to deviate from those lateral algorithms, while nevertheless remaining reliable guides to inference and action.

Of course there is much, much more that still needs to be understood concerning these features of imagination. The point in identifying them is to give a general sketch of how the

¹³ And anyway, results from empirical psychology suggest that we have very little introspective insight into the nature of our own cognitive processes (Gigerenzer, 1991; Gigerenzer, Todd, & Group, 1999; Johnson-Laird & Byrne, 2002; Nisbett & Wilson, 1977). Discovering what those inferential patterns and heuristics are is a project for empirical psychology, not introspection.

paradoxical freedom and usefulness of imagination can best be explained, while suggesting where research should focus going forward. With respect to the latter goal, I will argue in the next section that understanding the nature of GC imaginings should give us the tools we need to understand most other imaginings as well.

6. The Primacy of GC imaginings

The kind of cognitive architecture I have described to explain GC imaginings (involving top-down intentions, lateral algorithms, and cyclical processing) can be extended to explain a wide variety of other imaginings as well. I will divide the territory up into four mutually exclusive (and exhaustive) classes of imaginings: Guiding Chosen (our main topic), Guiding Unbidden, Misguiding Unbidden, and Misguiding Chosen. My goal in this section is to show how many, if not all, imaginings of each class can be assimilated to the general architecture already laid out for GC imaginings. This should help reinforce the idea that, in studying imagination in general, we do well to maintain focus on GC imaginings.

6.1. Guiding Unbidden Imaginings

Consider first “unbidden” imaginings—songs stuck in the head, obsessive negative imagery, and the like. There are not likely to be very useful, as a rule. I will consider such “misguiding” unbidden imaginings below. But first note that it is certainly possible that there would be cases where an unbidden imagining nevertheless ended up improving one’s epistemic standing. We could call these “Guiding Unbidden” imaginings. Is there a way of seeing these as drawing on the same architecture as GC imaginings? Given our account of Guiding Chosen imaginings, it is certainly possible that the kind of processing associated with the lateral imaginative constraints might sometimes be triggered by something other than a top-down intention (that is, by something other than its normal cause). The result would be an imagining that is constrained in the manner of GC imaginings, but that was not under intentional control. Provided the context nevertheless happened to be right for the imagining to play an action-guiding role, we can see how many Guiding Unbidden imaginings could simply be Guiding Chosen imaginings with non-standard causes.

With that in mind, we can consider another candidate Guiding Unbidden imagining. An idea recently (re)gaining steam is that imagination occurs during most of ordinary perception. Bence Nanay (2010) argues that the occurrence of mental imagery accounts for the “phenomenal presence” of the occluded parts of perceived objects (see also Macpherson (2012)). The basic idea is that, when seeing an object, a person automatically generates mental imagery that represents the occluded side of the object, and that this accounts for why occluded sides seem “phenomenally present.” Since the phenomenal presence of occluded sides of objects is not something over which we have intentional control, these putative exercises of imagination could be considered unbidden, yet also useful (assuming there is an epistemic use for phenomenal presence).

It is possible that such imaginings (if they indeed occur) draw on the same predictive “forward models” discussed earlier with respect to GC sensory imaginings. For in predicting one’s sensory input given a particular motor action, one must typically represent a currently occluded aspect of the object—namely an aspect that one expects to come into view, given one’s planned movement. I have some reservations over whether this kind of processing ought to be considered a form of imagination (as opposed to an imagistic component of perception). But, however we settle that issue, we can see such Guiding Unbidden imaginings as closely related to GC imaginings at the cognitive architectural level.

6.2 Misguiding Unbidden Imaginings

Still to be discussed, however, is the large class of imaginings that are *not* reliable guides to action or inference. We can call these “Misguiding” imaginings. These may have both chosen and unbidden instances. Consider first Misguiding Unbidden imaginings. These are token imaginings that are neither reliable guides to action and inference, nor under intentional control. Unbidden and distracting sensory imagery are typical examples. No doubt the commonsense notion of imagination counts such phenomena as imaginings. But as we peer through the fog of platitudes about imagination and, squinting, make out the solid outlines of a more robust theoretical conception, we can ask whether all such imaginings should indeed by

counted as exercises of the imagination. For unbidden misguiding imaginings are already borderline cases of imaginings, due to their not being under intentional control.

One answer as to why Misguiding Unbidden imaginings should be counted as exercises of the imagination proper could be that they involve the use of the same basic architecture as Guiding Chosen imaginings. The lack of intentional control could be explained the same way as for Guiding Unbidden imaginings (i.e., there is an unusual cause), while the explanation for why the imagining was not epistemically useful (given the lateral constraints involved) could be that it was irrelevant to—and even distracting from—the subject’s present situation and goals. Also possible is that there are some defects in the nature of the lateral algorithms that lead to bad inferences in some cases. If this is our explication of Misguiding Unbidden imaginings, then we are again in a situation where the architecture described for Guiding Chosen imaginings is that in terms of which other mental acts can be understood as imaginings as well.

Of course, this does nothing to rule out the possibility of Misguiding Unbidden Imaginings that have no close connection to GC imaginings. However, it is worth emphasizing that any putative imagining of that kind faces the question of why the imagistic (or propositional) cognition in question should be construed as an exercise of *the imagination*, and not something else (e.g., cognitive noise). For the use of sensory imagery in a cognitive act is not generally considered *sufficient* for imagination.¹⁴ And uncontrollable and epistemically fruitless propositional thought is not *ipso facto* propositional imagining. Why then should imagistic cognition with the same traits necessarily qualify? As we seek a tighter account of the cognitive basis of imagination, we should be prepared to leave such phenomena behind. In many cases (such as with unbidden and distracting sensory imagery) this can be done without completely fracturing the picture of imagination as it exists within folk psychology.

6.3 Misguiding Chosen Imaginings

Last to be discussed are Misguiding Chosen imaginings. On the face of it, these are more centrally related to the imagination than Guiding Unbidden and Misguiding Unbidden

¹⁴ This much is accepted even by some (e.g., Kind, 2001, p. 100) who hold that sensory imagery is a necessary component of imagination.

imaginings, and so more difficult to simply assimilate to the Guiding Chosen architecture. Misguiding Chosen imaginings—under intentional control, but ill-suited to guide action and inference—include much of ordinary daydreaming and fantasy, which are paradigmatic instances of imagination as it is normally conceived. However, given the understanding of Guiding Chosen imaginings developed above, it is clear that the underlying architecture of GC imaginings can itself be at work in much of the cognition we associate with daydreaming and fantasy. Many Misguiding Chosen imaginings will not be useful or action-guiding for simple contextual reasons, and not because they employ fundamentally different cognitive capacities than GC imaginings. It may just be that their subject-matter—e.g., what one would say upon winning an Oscar—is irrelevant to the attainment of any present goals, or to the realization of any nearby possibilities. Also, it could be that the imagining is not guiding because, while it involves use of strict lateral algorithms, one is misguided due to learning errors or oversimplifications in the algorithms themselves (e.g. one might use an algorithm grounded in “folk physics” to wrongly predict the relative rates at which a feather and bowling ball will fall in a vacuum). Still, they would involve the same basic architecture as Guiding Chosen imaginings.

The most resistance to assimilating Misguiding Chosen imaginings to the (constrained) architecture for GC imaginings will likely come from considering imaginings that seem ill suited to guiding action or inference in *any* context. But even here the cognitive difference between the two may often be only skin deep. To see this, consider the following Misguiding Chosen imagining, which I take to be paradigmatic: I imagine that I drop a glass and that, as it hits the floor, it shatters; the shards then meld together into the shape of a bird, which flies away. Fantastical though it is, most of the imagining is tightly constrained: the way the glass both falls and breaks, and the way the bird is shaped and flies are all determined by lateral constraints that are grounded in background beliefs about the relevant kinds of objects. What about the moment where the glass shards turn into a bird? This moment in the imaginative project can be accounted for by a top-down intervention by a new intention in action—specifically, an intention to imagine what would happen if the glass shards turned into a birdlike creature. This intervention is not a conscious choice, necessarily. But it is still a top-down choice, in the way that everyday actions, such as unlocking one’s car door, are choices.

Some may still feel that the account leaves Misguiding Chosen imaginings too tightly constrained. However, it is hard to see what a better account of the glass-to-bird imagining would be that still renders it a Misguiding Chosen imagining. For suppose it is not a top-down intention that intervenes on lateral algorithms at the moment the glass shards turn into a bird-like creature. What then happens instead? If no *choice* was made for the shards to turn into a bird, and if that change was not dictated by any lateral algorithm, then it would seem that the change is unbidden and, for all intents and purposes, random. But it cannot either unbidden or random and remain a Misguiding *Chosen* imagining. It would become instead a Misguiding Unbidden imagining, which have already been discussed. Many Misguiding Unbidden imaginings are just GC imaginings with non-standard causes. Those that are not may slip into the realm of cognitive noise.

What if instead we dial back on the degree of control we have over a Misguiding Chosen imagining, choosing only the first imaginative state in the sequence? I do not see any reason to deny that we have a capacity to initiate a random sequence of mental states (though I'm not sure I can do it). However, it would be a mistake to consider such a capacity to be a cognitive *faculty* (the faculty of imagination). This sort of capacity (supposing we have it) is not something that explains crucial cognitive differences between humans and other animals, or that could be relied upon to guide pretense, facilitate aesthetic understanding, plan actions, understand other minds, reveal nearby possible worlds, or any of the other activities associated with imagination. And, again, if random sequences of propositional thoughts (where the content of the first is chosen) do not count as exercises of the propositional imagination, it is hard to see why random sequences of mental images should constitute examples of sensory imagination. In both cases we have something like cognitive noise. Cognitive noise no doubt occurs. But a philosophical, psychological, and cognitive-scientific theory of imagination should not *also* aim to be a theory of cognitive noise.

The last possibility to consider is that some Misguiding Chosen imaginings are subject to lateral constraints of a kind, such that to call them "noise" would be unfair, but where the constraints are not of the (broadly rational) kinds described with respect to Guiding Chosen

imaginings. This remains a possibility. One might think that extremely broad constraints, such as logical or conceptual possibility, govern the unfolding of some imaginings. This would make them quite free, but not yet random. Yet note first that this would not enable a kind of imagining where subjects have more *control* over their imaginings than they do for GC imaginings. Nor would it enable imaginings that were better suited than GC imaginings to explain how imagining is useful to the kinds of acts in which imagination is typically implicated. Its principal attraction would seem to be that it might satisfy the intuition that genuine imagining can take place that is not subject to strong constraints, yet which is also not randomly generated—mere cognitive noise. But the kinds of constraints being considered—logical or conceptual possibility—do not take us far past randomness. There is virtually no limit to the propositions that are logically or conceptually compatible with an arbitrary initiating premise. So it will again be hard to see why a capacity to generate a sequence of contentful states so “constrained” should be viewed as an important cognitive *faculty*, as opposed to cognitive noise.

The upshot of all this is that once we understand the basic cognitive architecture required for Guiding Chosen imaginings—in a way that explains *how* they are both chosen and epistemically advantageous—we have the tools needed to understand many other kinds of imaginings as well. And, if our theoretical conception of imagination may ultimately exclude some phenomena that get lumped in with imagination at the level of commonsense psychology, a theory of the cognitive underpinnings of GC imaginings may form the core of a theory of imagination *tout court*.

7. Conclusion

It is natural to despair at ever establishing a comprehensive theory of imagination. As Walton lamented in his seminal work on make-believe, “it is not easy to see what behavioral criteria might throw light on imagining, or what the relevant functions of a functional account might be” (1990, p. 20). For Walton, the term ‘imagining’ simply served “as a placeholder for a notion yet to be fully clarified” (p. 21).

A decade or so later, Nichols and Stich took up the challenge of providing the needed functional account, using pretense to generate a set of behavioral criteria that might “throw light on” imagining. As discussed above, large questions remained open in their account concerning the capacity of imaginings to deviate from ordinary belief-like patterns of inference, and concerning the (crucial) role of mental imagery in imagination. In particular, no clear details were given concerning how imaginings could, as a matter of course, deviate from belief-like patterns of inference and still be reliable guides to action and inference. Their “Script Elaborator” was a means of marking the problem, still to be addressed.

By taking the simultaneous usefulness and “chosen” nature of Guiding Chosen imaginings as an explanandum, I have outlined what I see as the best general framework for moving forward in the quest to understand imagination in functional terms and, indeed, as a faculty of mind. I have argued that a theory of Guiding Chosen imaginings will give us the basic pieces we need to understand imagination in general. The three general features of this architecture are: 1) top-down intentions that initiate an imagining, 2) lateral constraints that govern the development of the imagining, and 3) the possibility of cyclical interventions by one’s intentions during a single imaginative episode. Whether it is propositional or sensory imagination, one begins with a stipulated content and draws out a variety of inferences, shaped by one’s background beliefs and sensori-motor expectations. Where an imaginative episode seems to deviate from such constraints, it is due to ongoing sub-conscious interventions on the part of one’s intentions to consider new premises.

Seen in this light, imagining is a form—perhaps the central form—of conditional reasoning. The development of a functional and computational account of conditional reasoning remains an important and contentious project within empirical psychology (Byrne, 2005; Johnson-Laird & Byrne, 2002; Over & Evans, 2003). Part of my aim has been to show how those theories might themselves be filling in the crucial details of a philosophical theory of imagination. For that link can only be made by first reconciling the freedom of imagination with its constraints.

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