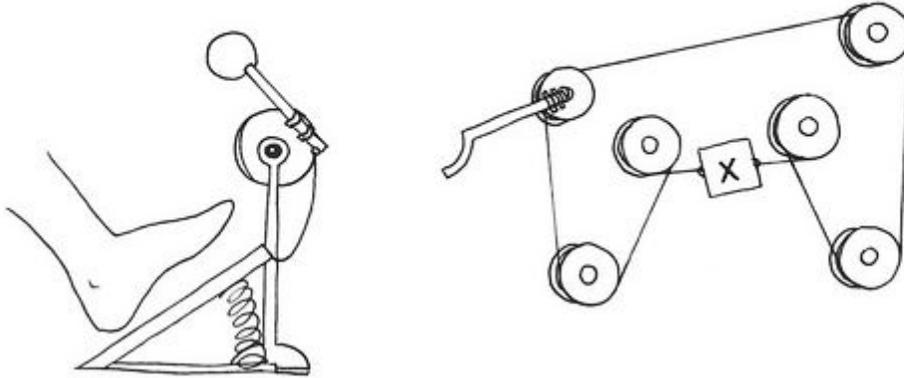


The Unique Utility of Imagination

S. Ortiz-Hinojosa

Pulley. Will box X in the pulley system below move left or right when the pedal is pressed?



How do we figure this out?

One response is that we *use our imaginations*. According to what I will call the *naïve view*, sometimes when we use our imaginations we can acquire *new knowledge*. The naïve view comes with a metaphor that helps explain the way imagination helps us acquire new knowledge in cases like *Pulley*: we are ‘seeing’ the pulleys move ‘in our heads’.

However, there is an argument which concludes that imagination is *irrelevant* or *superfluous* to knowledge acquisition. Let us call those that endorse this argument *pessimists*. The pessimist argues as follows. What we imagine depends on *us*, not the world. This means that imagination is not restricted to telling us about what is currently true or what might be true given some presuppositions. For example, we can imagine what we *wish* were true. Therefore, unrestricted imagination is inadequate to help us acquire knowledge. If we *do* want to target what is currently true or what might be true in our imaginations, we have to restrict what we imagine. For example, we might presuppose only what we believe is true, or only imagine up consequences to our beginning assumptions that follow naturally by logical or inferential rules. But if we restrict what we imagine there is a different problem. It begins to seem as if it is our

restrictions on what we imagine that are doing the work of getting us new knowledge. Therefore, either our imaginings are inadequate to knowledge acquisition because they are insufficiently restricted, or they are inadequate to knowledge acquisition because it is our restrictions on them rather than the imaginings themselves that help us acquire knowledge.

We thus have a puzzle. If the pessimist is correct, the naïve view seems to be incorrect. If we are not willing to give up the naïve view, there are two broad strategies available with which to vindicate it. Those I call *reductionists* believe that both the naïve view and the pessimistic conclusion are on the right track: it turns out our imaginings *just are* inferential processes, so that when imaginings gets us knowledge, it is because it they are getting us knowledge in the same way inferences do, and have no particularly unique further role. On the other hand, those I call *optimists* choose to reject the pessimist's conclusion: there is some further reason, beyond the proposed restrictions, that imagination can sometimes help us acquire knowledge.

I am in the optimist camp. I argue that the optimist view is the correct view. In the next section I quickly clarify our target and our terminology. In Section 2, I elaborate on the pessimist as well as the reductionist positions, both of which I then go on to reject on the basis that they leave out salient alternative explanations of the phenomena. In Section 3, I outline a number of non-reductionist strategies with which to respond to the pessimist. I critique these strategies in order to make room for my own optimist account. In Section 4 I argue that there is a candidate non-inferential process that we often make use of in imagination that explains knowledge acquisition via imagination. I call this process a *combinatorial* process: it is what allows imaginings to generate new knowledge using resources we already have. These resources act as *restrictions* which *guide* the combinatorial process, while the combinatorial process is what permits us to *test out* the plausibility of possibilities that these restrictions leave open. This is how imaginings can allow us to eliminate possibilities we could not eliminate before.

I. Some Preliminaries

Some housekeeping is in order. Imaginings seem like a heterogeneous class of activities.¹ Let us establish that a basic *imaginative state* is a state that at least partially represents a state of affairs that is not immediately perceived by an imaginer, while an *imagining* is a succession of such states. For example, I can *imagine* a troll (which I am not perceiving) jumping up and down on my bed (which I am perceiving). I will remain neutral on whether the proper *target* of imaginings are objects, propositions, or activities. For simplicity, in this paper I will focus on a *subset* of imaginative states, *sensory imaginings*. I describe these as imaginings that centrally involve sensory imagery, such as visual, auditory, gustatory, tactile, olfactory, vestibular, or proprioceptive imagery. Sensory imaginings are often contrasted with *conceivings*, which need not centrally involve imagery. However, the focus is pragmatic only. I do not at present want to be taken as limiting any applications of the present account to sensory imaginings.

We should also clarify what the pessimist means when she objects that unrestricted imaginings cannot get us *knowledge*. She might well agree that I could to acquire knowledge *about the possibility* that Martians exist by merely imagining Martians.² However, the pessimist as I have characterized her is not after knowledge of *broad* possibilities (call these broad modal truths). She means that imagining cannot get us knowledge of more quotidian contingent truths, like whether anyone will come to my birthday party if I schedule it at 11:00 pm, or whether I would be less stressed out now if I had made time yesterday to vacuum my apartment. Call the kind of knowledge we are after knowledge of *quotidian modals*.³ We want to show that we can, by careful imagining, acquire knowledge of what could or could have empirically happened.

¹ See Amy Kind, "The Heterogeneity of the Imagination," or Tamar Gendler, "Imagination", §1.

² On this issue, see, e.g., Stephen Yablo, "Is Conceivability a Guide to Possibility?", and Alex Byrne, "Possibility and Imagination".

³ Terminology borrowed from Jonathan Jenkins Ichikawa (forthcoming).

II. The Pessimists

Allow me to first go over the pessimist's argument in more detail.⁴

- P1.** What we imagine is determined by *us* (at least in part), not the world.
- P2.** (From 1) Imaginings are not restricted to representing what is true, likely to be true, or even what is counterfactually true. E.g., we can imagine what we *wish* were true.
- P3.** (From 1, 2) Unrestricted imaginings are inadequate to help us acquire knowledge.
- P4.** When we *do* want to aim at representing what is true, likely to be true, or what is counterfactually true in an imagining, we must *restrict* what we imagine, e.g.:
 - a.** One option is to rely on only what we already know or believe in constructing imaginative states;
 - b.** Another option is to use only logical or inferential reasoning in determining the progression of an imagining.
- P5.** If our imaginings are restricted, then either they are sufficient for representing what is true, likely to be true, or counterfactually true, or they are not.
- P6.** If our restricted imaginings are *insufficient* for representing what is true, likely to be true, or counterfactually true, they cannot be used to help us acquire knowledge.
- P7.** If our restricted imaginings are *sufficient* for representing what is true, likely to be true, or counterfactually true, then it is the *restrictions*, rather than the act of imagining, which are responsible for any knowledge acquired as a result.
- P8.** (From 3, 5, 6, 7) Imaginings are inadequate to help us acquire knowledge.⁵

The first premise seems to follow naturally from the definition of 'imaginative state' given in the last section. One worry might be that the the origin claim, 'determined by us', rules out mental states like hallucinations that are not properly said to be determined by either 'ourselves' or 'the world' but do seem to be a kind of imagining. There are two ways to fix this: either we restrict what we mean to those states that are engaged *voluntarily*, or we understand 'determined by us' to mean *determined by our mental states*, rather than determined by states of the world, where

⁴ Jean-Paul Sartre (2004), Ludwig Wittgenstein (1967), Alan White (1990) are examples of pessimists: they do not use my terminology but instead argue, among other things, that imaginings are incapable of *surprising* us. I have joined their arguments together and taken the most compelling parts for this reconstruction. For a different take on their argument against imaginative knowledge, see Balcerak Jackson (forthcoming).

⁵ Note that this argument is neutral between evidentialism and reliabilism. For an evidentialist reading, interpret 'inadequate' as 'unable to provide us with evidence [that the relevant proposition is true]'; for a reliabilist reading, interpret 'inadequate' as 'unreliable'.

the requisite mental states can be conscious or unconscious. Because voluntariness has little to do with the epistemic status of a mental state, I take the latter interpretation.⁶

The second premise follows naturally from the first. If our non-factive mental states are among those that can determine the content of our imaginings, then we will not be restricted to imagining states of the world relevant to determining what quotidian modals are true. We will not be able to rule out any possibilities for how the world is. For example, we can imagine sentient mountains, flying cars, vampires, and all manner of fictional entities, states, and activities; and this tells us nothing straightforward about entities we can actually see, states we might actually be in, and activities we might actually do. The third premise then follows easily.

The second part of the argument must therefore be where all of the action lies. The fourth premise leaves some options open for an opponent. For example, there may be other means besides those listed for restricting the progression of imaginings so that they only represent states of affairs that are relevant to the truth of quotidian modals. Alternatively, an opponent could challenge the truth of the sixth and seventh premises. For example, an optimist could hold that an imagining might not *completely* determine what quotidian modals are true, while still claiming that imagining can substantially contribute to the project of narrowing down what quotidian modals are true.

The **reductionist** as I am understanding her accepts that it is *restricted* imaginings which help us acquire knowledge, but denies that this means that they have no capacity of their own to generate knowledge. The beneficial restrictions *inhere* in imaginings, because restricted

⁶ This is easy enough to show. Consider that there are many voluntary states that DO aid us in knowledge acquisition (e.g., reasoning is engaged voluntarily) and many involuntary states that DO NOT aid us in knowledge acquisition (e.g., hallucination). Magdalena Balcerak Jackson (forthcoming) discusses the epistemic significance of the voluntariness worry as it is understood by paradigm pessimists such as Sartre and Wittgenstein. She points out that one *might* have thought voluntariness is problematic insofar as some sources of knowledge (perception, testimony) can only grant us knowledge if they are unadulterated by our volition. However, this worry turns out not apply cleanly to imaginings.

imaginings are covert *inferences*.⁷ If restricted imaginings reduce to inferences (leaving open for now what ‘inference’ means), then imagining itself can be responsible for knowledge acquisition.

I am disenchanted by this view for partly reasons I share with the pessimist. Take for example how Sartre, a pessimist, disparages mental rotation as a means of acquiring knowledge:

If you turn a cube-image in thought to amuse yourself, if you pretend that it presents its various faces to you, then you will not be more advanced at the end of the operation: you will not have learned anything.⁸

Sartre believes that we can only imagine what we *already know*. We can imagine a cube rotate, according to Sartre, only because we already know what it looks like. If this is true, then what we imagine won’t help us learn anything, because it won’t help us *rule any possibilities out* we could not already rule out with the information we had. Our prior knowledge will sufficiently determine both what possibilities are available and what we can imagine. So, in a strict sense, imagination will not help us acquire knowledge.

The Sartrean complaint applies almost equally to a reductionist view of knowledge gained by imagining. If imaginings that bring us knowledge are just inferences, our prior knowledge should be sufficient to account for any knowledge we gain. The starting assumptions plus the rules of inference will alone determine what possibilities are available. But that means that as soon as we begin imagining a scenario, what we can imagine will be fixed for us. It turns out on this account that imaginings will only help us discover what our prior knowledge or assumptions were *ruling out all along*.⁹ Imaginings will be, in some ways, redundant.¹⁰

⁷ John Norton (1996) argues something like this regarding thought experiments: the pictorial aspect is just masking an underlying argument structure, and it is the argument structure that makes the thought experiment work. Nichols and Stich (2000) have the cognitive scientific version of this view. Roy Sorensen (1992) shares this view to an extent, except that he argues that thought experiments are much more like *real experiments*, such that we might place him in the optimist camp.

⁸ Jean-Paul Sartre, *The Imaginary*. (2004: p. 9)

⁹ This can be put in other terms, although they are more loaded, viz.: Imaginings may be able to *generate beliefs*, but they will not generate *propositional justification*, only generate *doxastic justification*. Alternatively, imaginings may be *enabling* us to access our evidence, but they will not acquaint us with *new evidence*.

This is not, of course, as bad as imaginings not having *any* role to play in knowledge acquisition. But it does seem disappointing. It turns out that the reductionist is not playing the same game as the pessimist. The pessimist takes ‘acquiring knowledge’ to mean ‘becoming able to eliminate from consideration possibilities for how the world might be *that were not previously eliminated*’. I openly admit this is not an objection to the reductionist view. Instead, the problem is that the reductionist position is not a robust *reply* to the pessimist.

There are further reasons to reject the reductionist view. To begin with, when the reductionist says imaginings *just are* inferences, she cannot mean that *all* imaginings are inferences. She cannot even mean that all *restricted* imaginings are inferences. As Peter Langland-Hassan (forthcoming) has pointed out, if all imaginings – even all restricted imaginings – proceeded inferentially, we would be unable to explain many of their features. For example, suppose we set out to imagine a baseball game. If we proceeded inferentially, we should expect to imagine a baseball diamond, a number of players standing in certain positions, et cetera. But when we imagine a baseball game, we often imagine things that are not inferentially determined. For instance, we may be able to answer the question, “What color are the player’s jerseys?”, although the answer does not follow from a rule of inference. If the reductionist replies that the color of the jerseys is randomized, or determined by some further cognitive process, she is in trouble: imaginings will turn out to be *not* just inferences

Timothy Williamson (forthcoming) also rejects reductionism. He points out that while inferences are traditionally understood as operating on *belief-states*, imaginings should not be so understood. If imaginative states were belief-like, they would have to be able to act as the antecedents of a conditional, the way beliefs can. But according to Williamson it is clear that imaginative states cannot be conditional antecedents. Consider the case of updating our beliefs

¹⁰ This might depend on what we believe inferences are. If we believe they are *mental actions* (see Boghossian, “What is inference?”) then this complaint will not apply. My argument does not ultimately rest on this point.

after using our sensory perception. When “new information ... derives from sensory perception, we are hard put to articulate it verbally in its full specificity, to be the antecedent of a conditional” (ibid., p. 11). However, we are able to integrate this new sensory information into an imagining. So imaginings cannot be masking some covert inferential process, unless we mean to be using the term ‘inference’ in “a sense so loose as to be entirely unhelpful,” (ibid., p. 13).

Williamson point us to further disanalogies between imaginings and inferences. Conducting something like an inductive inference requires remembering past instances of some type of event, while conducting an imagining successfully does not depend on our remembering relevant past experiences. I could come to know that I can kick a soccer ball into the goal net without having kicked any soccer balls before, for example. Furthermore, while running through an inferential argument requires assembling the premises of the argument, we need not assemble any premises to conduct an imagining. For example, while I can easily imagine a kettle boiling over if I keep it on high heat for too long, in order to set out to imagine a kettle with boiling water I do not first have to list my beliefs about kettles and heat and boiling. Lastly, while successfully completing an inference requires us to formulate a conclusion, we need not form any conclusion when we imagine something. As I am running away from a fierce predator, I can imagine leaping over a ravine up ahead before doing so, without this seeming to me like I have *concluded* anything in particular.

The reductionist does get the following thing right: imaginings *are* subject to rational norms, according to Williamson. This does not require that they be classified as inferences.

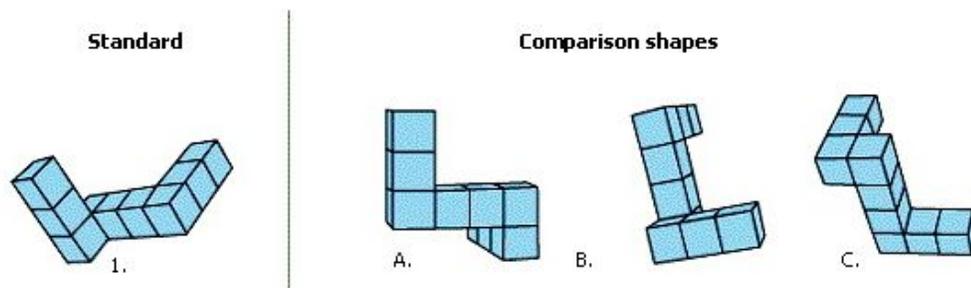
Considerations like these show that restricted imaginings cannot simply reduce to inferences. They also, I believe, show that inferences do not sufficiently explain the epistemic powers of imaginings. In short, we have ruled out the strict reductionist view and explained what imagination *is not*. In the next section, we will explore theories of what imagination *is*.

III. The Optimists

We have ruled out the reductionist view. We have two options left: we either find some problem with the pessimist's argument, or we give up on the naïve view.

Let us reexamine why it would be bad to reject the naïve view outright. If we reject the naïve view, but do not like the reductionist picture, we need an alternative explanation for why it *seems* to us in cases like *Pulley* that we really are learning something. One alternative explanation would be to say that imaginings are only decorative. We could say imaginings are parallel to, but not identical to, other mental processes that do the work of helping us to acquire knowledge. But this explanation is woefully inadequate. Consider the following problem:

Rotation. Which of the figure(s) on the right is/are congruent to the figure on the left?¹¹



There is no clear non-imaginative way of solving the problem. When we solve this problem by mentally rotating the figure on the left, our mental rotation is not merely decorative. And mental rotation is an act of imagining.

So there must be a problem with the pessimist's argument. What are our options? One thing we can do is reject the supposition that the only ways to restrict our imaginings are to either use our prior knowledge or reason inferentially. This is roughly the **simulation** reply strategy. Another thing we can do is reject the premise that if the restricted imaginings do not

¹¹ From Shepard & Metzler, "Mental Rotation of Three-Dimensional Objects." Only A is congruent.

completely determine the truth of a quotidian modal, then they cannot aid in knowledge acquisition. I will call this the **corroboration** reply strategy. We could also reject the claim that if restricted imaginings *are* sufficient to determine the truth of a quotidian modal, then the *restrictions* rather than the imaginings are responsible for any knowledge gained. I will call this the **apportion** reply strategy. These strategies are not incompatible, and many optimists adopt more than one. Let us examine each in turn, and see if they cannot be improved upon.

3.1 The Simulation Strategy

What I call the simulation strategy says that imaginings bring us knowledge because imaginings are *simulations*. This strategy bases itself on a **simulationist** model of imagination. The simulationist model originated as an answer to the question of how we get knowledge of other people's minds: roughly, we can 're-create' or 'enact' the mental states others might be in within our own minds.¹² Because we share some mental architecture with other people, such as that which enables us to make decisions on the basis of a certain set of cognitive and conative states, we can use 'simulated' versions of other people's mental states to discover what they might do, believe, or desire, et cetera. We generate belief-like states or desire-like states to mimic the other person's, and then allow our existing cognitive architecture to operate on them to produce a decision-like or behavior-oriented state. For example, I am wondering how a close friend will react if I send her flowers for her birthday, so I pretend I have her preferences. I notice that when coupled with a pretend belief that I have gotten flowers for my birthday, my pretend preference leads to a pretend delight. So I conclude flowers are a good gift for my friend.

Optimists use simulationism to show that there are things *besides* our prior beliefs or knowledge or our use of logical or inferential rules that can produce reliable predictions about

¹² Proponents of simulationism include Gregory Currie and Ian Ravenscroft (2002) and Alan Goldman (2006). For the opposing theory of mindreading, see Shaun Nichols and Stephen Stich (2000).

the world. Rather than rely on *states* or *rules*, we here rely on *processes* that are already present in our mental architecture. For example, we can engage our *perceptual processes* while we are not directly perceiving the world, or our *decision-making processes* when we are not ourselves trying to make a decision. Our extant cognitive architecture will ensure our simulations remain within the realm of what is true, could be true, or could have been true: it functions as a restriction on imagining.

One immediate problem for the simulation strategy as a response to the pessimist is that many optimists about the epistemic power of imagination use this theory to argue for the epistemic value of simulation in realms *besides* predicting others' mental states. For example, many theorists contend that past perceptual experiences can train the mind such that a person could successfully simulate, in imagination, what will occur next in a certain physical causal sequence, given a certain starting perceptual or quasi-perceptual state. The problem is that there is a disanalogy between the realm of mental prediction and the realm of physical prediction.

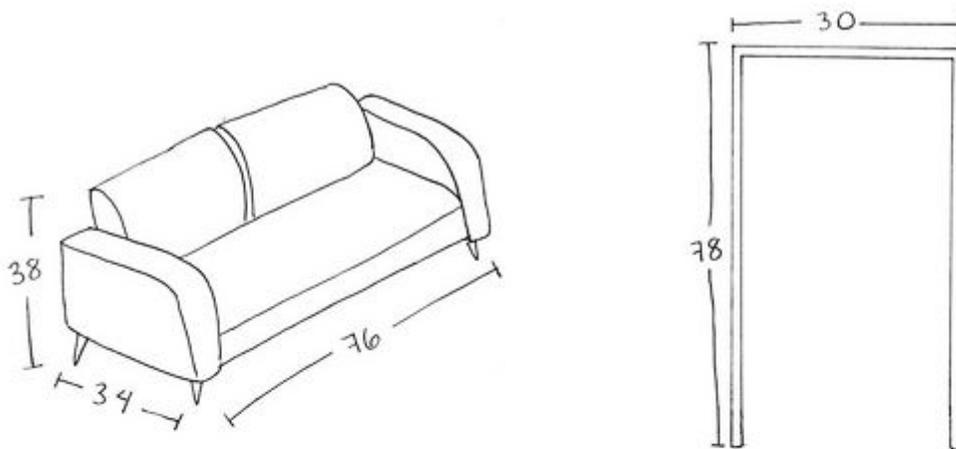
In mindreading simulations, the *simulator* and *simulated* share a causal structure, the mental architecture for decision-making. This makes the mindreading mechanism a very good predictor of what mental states others might be in. Our situation is different in the case of other kinds of prediction, such as non-mental causal prediction. Here the simulator is made up of mental states linked to each other in ways that depend on the order of activation of prior mental states, while what is simulated is made up of states of the world whose sequence is entirely *independent* of the way prior mental states have been activated in the simulating subject. The analogue between mind and world is less optimal than the analogue between mind and mind. We thus lose a powerful predictive link between simulator and target.

The simulationist *could* contend that, barring general skepticism about the validity of induction, as long as I have not been not widely misled in my previous perceptions my

imaginings *are* reliable predictors of ways the world might be. Some theorists suggest that perceptual predictive processes can be used reliably in imagination.¹³

But this begins to look like nothing more than an associationist model of inductive inference.¹⁴ On this model, it will turn out that imagination is just an imagistic or picturesque analogue to inductive inferential reasoning. The main difference between the epistemic function of imagination and other inferential processes will turn out to be based on *what kinds of representations* imagination operates upon: optimists will have to contend that imaginings cannot be reduced to inferences just in case imaginings manipulate one kind of representation and inferences operate on another. The debate that concerns this issue is called the ‘imagery debate’.¹⁵ But we should not want our ultimate anti-pessimist, anti-reductionist stance to depend on the outcome of *that* debate. Here is a quick argument why. It is plausible that the following problem can be solved by means of an imagining:

Couch. Can this couch fit through this doorway?¹⁶



¹³ Williamson (forthcoming), Kind (forthcoming), and Balcerak Jackson (forthcoming) all rely on this strategy.

¹⁴ David Hume is the most salient proponent of such a view. See Hume, *A Treatise of Human Nature*.

¹⁵ For contributions to this debate, see Block (1983), Tye (1991), Pylyshyn (2002), Kosslyn et al. (2006)

¹⁶ (Solution in the Appendix)

Text from <http://mathwithbaddrawings.com/2013/08/30/the-humor-writers-and-the-too-big-sofa/>.

However, many of the elements of the problem are given in different symbols: numerical, pictorial, and verbal. If we base our optimistic position on the supposition that the representational basis of imagination and inference are different, we will have pronounce on undecided issues. Is there some further process that is converting each of these kinds of symbol into one common mental format (and will this encoding rule in favor of or against the reductionist)? Is there one unitary kind of mental representation?¹⁷ That debate should remain orthogonal to the present one. In spite of what our commitments in the imagery debate might be, we are in agreement that the given examples, such as *Couch* and *Pulley*, centrally involve imaginings, regardless of whether they involve inferences.¹⁸

3.2 The Corroboration Strategy

One way of vindicating the simulation strategy would be to couple it with the corroboration strategy. Recall that the corroboration strategy tries to show that imaginings might make significant epistemic contributions without thereby *completely determining* the truth of quotidian modals: imaginings *corroborate* their truth. An excellent example of this strategy is Magdalena Balcerak Jackson's reply to the pessimist. According to Balcerak Jackson, when we simulate perceptual states in imagination, perhaps by using extant perceptual architecture or perceptual predictive processes, we gain direct information about 'the way things look or could look', what she calls "phenomenal evidence".¹⁹ This is contrasted with "physical evidence," which is evidence about how things *are*, and which we get directly through perception. The phenomenal evidence provided by imagination can grant us *prima facie* justification for beliefs

¹⁷ This might be a problem with Williamson's rejection of reductionism in the previous section. However, I have offered multiple other reasons to reject reductionism, and the best rejection of it will be the positive account given in Section IV.

¹⁸ Alex Byrne (2007, p. 135) also considers the debate orthogonal; although he is concerned with knowledge of broader modal truths, and is not attempting to refute the *reductionist* picture as I understand it here.

¹⁹ Balcerak Jackson (forthcoming), p. 16

about the structure of human experiences and even, indirectly, metaphysical possibility. Coupled with perhaps some additional presuppositions or additional inferences, it might be able to guide us as to how things *are*; but the abilities of the imagination alone are more limited.

This is a concessive strategy and avoids many of the pitfalls of the stronger version of simulationism. She does not fall prey, for example, to the complaint that simulating minds and simulating the world are distinct. Moreover, she can account for part of our sense that imagination is operating as more than an inductive process: on her picture we *gain evidence* as well as make use of evidence we already have, and this is evidence about *appearances*, rather than evidence about causal relations.²⁰

Additionally, on Balcerak Jackson's view imagination comes with a distinctive *method of inquiry*. Methods of inquiry are ways to acquire and engage with evidence: for perception they include observation and data collection. Being a distinct capacity, imagination is used with a distinct method, the 'method of imaginative variation,' "in which one forms a series of imaginings that systematically recombine elements of perceptual contents in order to test hypotheses about the structure of one's experience".²¹ We can use imaginative variation, for instance, to rule out the possibility of an object being both green all over and red all over. Balcerak Jackson allows us to say that insofar as we *are* repurposing any information we had from perception or memory, we are directly learning, not about the objects we imagine, but about *how we represent* those objects.

²⁰ The validity of induction is often thought to depend on a presupposition like that *there is regularity in the world*, which is what licenses the conclusion that *Y will follow X in the future* when we have evidence that *X has followed Y in the past*. However, Balcerak Jackson's phenomenal evidence tells us *things will look this way in the future* when *things have looked this way in the past*; it relies not on a world-regularity principle, but rather an appearance-regularity principle, which is something that is granted (if it is) only by the structure of experiences as such, rather than the structure of the world. So *even if* what she describes is an inductive process, it is not the same one we use in non-imaginative circumstances. This is an improvement.

²¹ Balcerak Jackson (forthcoming), p. 19

At least one question remains unanswered by her view, however. We must still explain what the difference is between this role for imagination and the role typically ascribed to introspection, which is also meant to inform us about the structure of our experiences. If the two turn out to be the same, she has not found a unique role for imagination.²² She does not have a reply on hand, so we can only speculate. Perhaps, as her ‘distinctive methods’ reply hints, she believes that imagination supplies a method of inquiry to apply to the *objects* of introspection, and that this method enables us to form conclusions about matters that go beyond our *own* idiosyncratic experiences. We need this in order for imagination to get us knowledge of experiential perspectives more generally, which we can then use with other resources to acquire knowledge of broad modal truths and quotidian modal truths. Alternatively, perhaps she believes that the introspection and imagination are in fact more closely linked or are somehow equivalent. I would invite her to elaborate on this question. If imagination and introspection share the role of informing us about the structure of our experiences, this would be surprising. The naïve view had suggested imaginings targeted objects in the world.

One final thing to say is that although this view as sketched is a reasonable defense of the intuition that imagination gets us knowledge, it is much weaker in its scope than the apparent scope of the naïve view we presented at the outset. This is perhaps a general feature of corroboration strategies against the pessimist, as corroboration strategies will all rely on additional mental capacities to explain cases of knowledge acquisition in quotidian modal realms. If it were available, a stronger view with a wider scope would be preferable.

²² If the two *did* turn out to be the same, then imaginings would be processes of introspection, and nothing more. This is a much weaker claim than that which we set out to prove. Additionally, it would be harder to see how this process could justify beliefs even in broad modal truths: it is not obvious that regularities that I could detect in my experiences should have any relationship to necessities or possibilities. The attraction of Balcerak Jackson’s view is meant to be that it is something about *perspectives in general* that we learn through imagination, not something about the contingent features of my mind.

3.3 The Apportion Strategy

The final strategy that I will consider before introducing my new proposal wholeheartedly rejects the pessimist's assumption that, if any restrictions are used on imaginings and this results in knowledge, it is the restrictions that do all of the epistemic work. The pessimist wrongly *apportions* responsibility for knowledge acquisition. In my mind, this strategy is entirely correct. However, I think the one clearest proponent of this strategy fails to make use of its full potential.

Amy Kind is someone who thinks responsibility should be better apportioned by the pessimist. Like Balcerak Jackson, she relies on simulation theory as part of her response. Her particular pessimist espouses what she calls the 'charge of epistemic irrelevance': the accusation that imagination can aid in discovering new possible truths, but not in confirming their truth.²³ On her opponent's view, imagination can generate ideas, but not justify our believing them.²⁴

Kind rejects this form of pessimism on the grounds that it ignores an essential role of imagination in knowledge acquisition. She argues that when we're trying to solve a problem we need a *way* to "bring the prior beliefs to bear on the current situation".²⁵ For example, a successful inventor and layperson might both have a similar collection of beliefs about gears and valves, but the insight of the inventor comes in the form of a *capacity to bring those beliefs to bear* on engineering problems. The engineer can 'see' how a particular arrangement of gears and valves will produce a useful machine. The value of imagination is thus in *how* it can bring beliefs to bear on problems. This capacity supports a justificatory role for imagination.²⁶

²³ Kind (forthcoming)

²⁴ Shannon Spaulding (forthcoming) argues along these lines. According to Spaulding, we need other cognitive tools, which she calls 'knowledge-plus', to justify beliefs generated from imagination.

²⁵ Kind (forthcoming), p. 13

²⁶ Spaulding herself does not reject the idea that imagination is useful in *some* way; however, she thinks imagination is irrevocably dependent on other processes in order to get us knowledge, and so it cannot be thought principally responsible for justifying belief.

This is an interesting insight. However, more needs to be said about the ‘capacity to bring to bear’. As the description stands, the capacity to ‘bring beliefs to bear’ seems to *bolster* the reductionist and pessimist approaches. Making information available for use is an important cognitive role. But it is unclear that this role as currently described is unique to imagination. Inferential reasoning can also ‘bring beliefs to bear’ on problems. What we need to show is that imagination is epistemically important *independently* of non-imaginative mental processes.

We could take Kind to be suggesting that the imaginative capacity is one that can somehow make use of beliefs that are otherwise *inaccessible*, either because the beliefs resist access (they are implicit beliefs, or are held by a different fragment of the self), or are of a particular type (say, they are kinds of imagery, rather than being propositional²⁷). This could be an important epistemic role indeed. But the result seems much weaker than we had initially hoped it would be. Unless we wanted to get into some substantial argument about what counts as implicit knowledge and generated knowledge,²⁸ we would be giving up on the claim that imagination can get us *new* knowledge.

There must be a better way to make use of the apportion strategy.

3.4 In Short

All of the strategies we have seen so far have failed to address salient and important questions about the operations of the imagination, and how imaginings allow us to gain knowledge *in a way that differentiates them from other mental processes*. I will remedy these issues with the optimist account in the next section, which relies most heavily on an apportion strategy to reject the pessimist’s consequence.

²⁷ We earlier gave reasons to resist diving into the imagery debate. I will continue to resist doing so.

²⁸ For the purposes of this paper, I do not want to delve into that argument. There is a workaround.

IV. My Proposed Solution

There is a better way to reply to the pessimist without succumbing to reductionism. Could we turn the tables on the pessimist and show that our prior knowledge plus our inferential capacities were *themselves* jointly insufficient for accounting for knowledge gained via imaginings? This would show imaginings are sometimes *essential* to our acquiring knowledge.

We could start by showing what we can represent in an imagining is *underdetermined* by our prior knowledge plus the rules of inference. For example, we can imagine a person eating a chicken. We can also imagine a chicken eating a person. Both imaginings require us to use our knowledge of chickens and humans and eating. However, each of the two imaginary situations do not represent the same states of affairs. While we might have seen people eating chicken, we probably have not seen chickens eating people. The syntactic or *format* properties of these imaginings are underdetermined: and it is just these properties we can modify by imagining, while using the exact same knowledge as a base.

We have shown that it is possible for resources we already possess to *restrict* our imaginings without fully *determining* them. This will only solve part of the pessimist's challenge, however. We must still show whether and *how* shifting the format of what we represent and already know about can ever get us knowledge of quotidian truths. If our format manipulations do not reveal anything *true* about the world, they will be worthless in our current pursuit. But I do think imaginings can provide us with knowledge on the basis of changing the *arrangement* of what we represent.

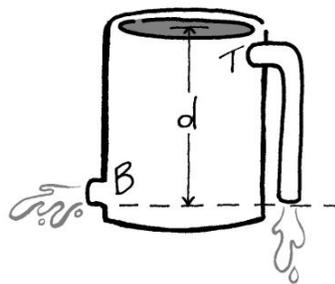
As we have shown, we can keep what we are representing in imagination constant (chickens, humans, eating), but change the format of our representations. Now we just need to give an example where this reformatting gets us *knowledge*:

Frames. I have a collection of frames that I want to hang on my wall. I know their sizes and shapes. In my past home, they were hung all in a row on a wide wall. The wall in my new home, however, is taller than it is wide, and I want to know the best way to hang them in the new space.

There are many *possible* arrangements of frames compatible with the sizes of frames I have, that is, compatible with my knowledge. Put another way, my knowledge alone does not *determine* one best arrangement, and does not *determine* what I will come to know. Still, when I swap the frames around, my knowledge of their sizes *is* restricting my options. It is disciplining my imagining. For example, I know the frames can't all be hung in a row if the wall is too short, and that they cannot overlap or float in mid-air.

Now, can the imagining serve to *eliminate* possibilities the prior knowledge alone could not? Yes it can. After imagining the possible arrangements of frames, I can *come to know* which arrangement I prefer over the others that are possible, as well as discover which arrangements I disprefer.²⁹ Here is another example:

Outpouring. A tank of water has two holes of equal area, one at top and one at bottom. The top one leads to a downspout, so that both holes discharge their water at the same level. Ignoring friction, which hole produces the faster flow of water?³⁰



²⁹ Plausibly, one can also formulate this in terms of objective aesthetic properties: which arrangement is *most appealing*? I have chosen the preference attribution form for convenience. If there were objective aesthetic properties, however, it might be that imagining and perceiving them would be singular ways to grasp them.

³⁰ Image and text from <http://www.futilitycloset.com/2012/07/19/outpourings/> by way of Roy Sorensen's *Thought Experiments*, originally from Lewis Epstein's *Thinking Physics Is Gedanken Physics*.

In constructing this example, it turns out that the explicit suppositions I use to restrict what I imagine are *insufficient* to determine the correct answer. The correct answer is that *neither* hole discharges water at a faster rate. Here is the explanation. Assume that one of the two holes produces a faster flow. If we connected the two holes (as below), then we could produce perpetual motion inside the tank, and that would not make sense.



It turns out that imagination operating on the format or arrangement of what is represented (a *disconnected* spout and a hole versus a *connected* spout and hole) can reveal aspects of a problem or a solution that might have remained unseen. This previously unseen aspect can then serve to *refute a presupposition* we were holding onto. It can eliminate a possibility that was open to consideration. Even if inferential processes or explicit knowledge must be used in addition to the imaginative process to determine the answer to a tricky problem, *the imaginative process is essentially contributing* to the knowledge that is gained. In our example above, if we had not reformatted the problem, we could not have obtained a solution to it. This is the apportion strategy in action.

In fact, we have clarified part of the way in which imaginings can 'bring beliefs to bear' in a *unique* way, one that while disallows that the examples might be equally explained by a purely inferential process. This format-changing is *not* something that can be easily done in a purely inferential process. The format change must be explained by something else, something particular to the imaginative process. I will elaborate on this next.

4.1 The Details

On my view, the imaginative process at its core is a *combinatorial process*.³¹ In imagination, we can rearrange, compare, join and disjoin physically separate and logically distinct elements. This is what makes imagination unique, both what allows us to dream up fantastical creatures and locations and to more mundanely reconstruct scenes from information stored in our memory banks. Most importantly, the combinatorial process is what allows imaginings to generate new knowledge using resources we already have. These resources act as *restrictions* on the combinatorial process, while the combinatorial process is what permits us to *test out* the plausibility of possibilities that these restrictions leave open. This is how imaginings can allow us to eliminate possibilities we could not eliminate before.

Let us go into a bit more detail, first about what restrictions are, and then about how they interact with imaginings. The pessimist is right about there being at least two primary kinds of restrictions. Firstly, as we have just illustrated, the knowledge and beliefs we already have can limit the space of possibilities under consideration; but this does not fully determine what we will come to believe or know. Secondly, *rules* can be applied to imaginings that limit how imaginative states can change over time. The rules can come from either explicit reasoning, such as inferential reasoning, or from other cognitive resources, like perceptual or motor processes that predict perceptual outcomes or motor movements.

Lastly, the simulationist is correct to assert that a subject's cognitive architecture itself can serve to restrict what we can imagine. This is what explains why we might sometimes be unable to imagine what might *in fact* possibly occur or exist: for example, we cannot imagine ourselves undergoing the Müller-Lyer illusion, or visualize a polygon with a thousand sides.

³¹ Albert Einstein in his collected *Ideas and Opinions* describes his thought process in similar words: "Combinatory play seems to be the essential feature in productive thought" (1958: pp. 25-26) .

Now, how does the combinatorial process interact with other processes? Other cognitive resources serve to *guide* the combinatorial process. The effect of applying inferential reasoning to an imagining should be clear. If I believe my apartment is flooding, I can and do assume my floor is getting wet, and I cannot rationally (or easily) imagine my apartment flooding without my floor getting wet. I can also apply predictions from perceptual or motor processes to guide an imagining. *Forward modeling*, for example, is a process which prepares us for how objects will appear when we move in relation to them. We could say that forward models are why we are sometimes surprised when interacting with a sculpture constructed using forced perspective: what we in fact see or feel in these cases does not match what our forward model predicts.³² Sculptors probably make use of these predictive processes, by imagining these sculptures and the audience's reaction to them before they are built. Finally, we are further guided and restricted in what we can imagine by our own cognitive architecture, as in simulating other minds.³³

Note that the combinatorial process operates separately from all of these other cognitive elements. Imagination on the present view is the capacity to change the *formats* of the representation (call this a **format change**) or change *what is represented* in a scene (call this a **unit change**) either automatically or at will. Inferential processes, by contrast, can only advance an imagining deterministically: particular states of affairs being represented will necessitate or instigate that other particular states of affairs be represented next. Also, when

³² It is possible that these processes are available for use in perceptual or motor contexts and are *not* available in imaginative contexts, in which case we cannot use them to restrict what we imagine. This is something that would be determined empirically, however.

³³ Successful restriction does not mean *all* available resources must be employed for each imagining. What must be preserved in imagining for successful guidance varies. For example, say I were to ask you to count how many times you turn left on your route to work. It doesn't matter to answering this question that you represent the streets' real length when you imagine your trip to work. What matters is that you include all of the streets or all of the turns, that you remember the *whole* trip, that you do not add to your imagining any movements that are from a different route to a different location. In this case it is episodic memory, memory of crossing each and every one of the streets, that must operate actively on the imagining. The picking and choosing of what information has to be preserved or relied upon must often be effortful.

knowledge, belief, memory, or supposition guides an imagining, it informs *which* representations or *which* representational formats will be permitted in the imagining. However, in most imaginings, this will leave free the possibility of switching between allowed representations and allowed formats: these presupposed states will *not be sufficient* to limit us to a single imaginative event. Lastly, our cognitive architecture may restrict what can be imagined more broadly, but in most cases it will *underdetermine* what imaginings will be most informative for a quotidian problem. I might not be able to imagine six-dimensional figures due to the way my mind is built, but this seems irrelevant to my solving, say, our *Couch* problem.

Let me also say more about these format and unit changes. Format changes preserve what objects are represented while changing their represented relationships. Imaginings call for format changes when object properties are compared or when we imagine ourselves moving through space. For example, we might wonder whether two distant objects are the same size, and this requires us to mentally ‘move’ the objects for comparison. This kind of change has been demonstrated in our *Frame* and *Outpouring* examples. A unit change, on the other hand, preserves what *relations* between objects are imaginatively represented, but changes the *objects* or object properties that are represented. For example, when we imagine painting our walls a new color without throwing away our old furniture, we are making *unit changes* in our imaginings. In a unit change we can substitute one object for another in a scene, like testing out flower types in a flower arrangement, or replacing elements in a recipe.³⁴

Imagination preserves justification through such changes when any format change does not necessitate a unit change, or when a unit change does not necessitate a format change. As long as we keep representing things at their real size, for example, we can mentally compare our

³⁴ Frameworks that might accommodate this format and unit distinction are given by theorists who support all sides of the imagery debate. They include Gentner’s classic (1983) paper on structure-mapping theory (or Gentner and Smith 2012 for a contemporary summary) and Barsalou (1999) on perceptual symbol systems. For a general discussion of the plausibility of maplike or non-sentential representations, see Camp (2007).

couch to new possible coffee tables without fear of getting things wrong. Sometimes this kind of preservation of represented properties is tricky to do, and this is when imagination fails to get us knowledge. For example, if we try to swap out a component in a recipe imaginatively, but the old and new ingredients have different chemical reactions to each other, we will incorrectly predict the taste of the food. Other failures of getting knowledge through imagination will be due to failures in *other* processes. For example, we could fail to remember the exact color of the couch when buying new living room curtains. With all of that said, however, when things go right – when we represent the objects and their relations right, no matter which objects and relations we happen to be imagining – the pessimist is wrong: we *can* gain knowledge through imagination. Indeed, we can gain knowledge *about the way the world is*, or the way it could be or could have been; and not just about ourselves, or about what is distantly possible.

4.2 Summary

Here is the proposal, in full: imaginative *states* are mental states which at least partially represent states of affairs the subject is not currently perceiving. What states of affairs are represented by an imaginative state may depend on any number of things, including the imaginer's memory, prior knowledge, and held belief, along with the her behavioral goals, desires, and emotional state. What is represented may be *restricted* by what we know, by predictive processes that we use in reasoning and in perceptual and motor contexts, as well as by our own cognitive architecture. However, what is represented can be directly modified by the primary imaginative process, which is *combinatorial*. This means that it can operate, within given restrictions, to test out the possibilities that are *not* ruled out by those restrictions. In some cases this testing will lead us to *eliminate* possibilities we had not formerly ruled out: and

this is a paradigm way of acquiring knowledge. Simply put, imaginings can centrally contribute to knowledge acquisition.

The possibility of preserving justification through combination and recombination in imagination shows both how it is epistemically important and how it is distinct from the cognitive states and processes that it can rely on to discipline the bounds of what might be imagined on a given occasion. Although gaining knowledge from an imagining will often crucially depend on the contribution of other mental states and even other mental processes, it is possible for the imaginative process to contribute to knowledge acquisition *uniquely*.

Thus, I adopt both *corroboration* and *apportion* strategies to reply to the pessimist. The corroboration strategy argues that even if an imagining is *insufficient* for definitive knowledge acquisition, it is making an epistemic contribution; moreover, it is not an epistemic contribution that is the same as that made by the restrictions that may be applied to it. The *apportion* strategy shows that if an imagining is sufficient for knowledge acquisition, this does not mean that the restrictions required to arrive at knowledge are thereby wholly responsible for knowledge acquisition, to the exclusion of the imaginative process.

It is of course possible for *no* combinatorial processes to be used in an imagining. Think, for example, of how you answer the question, “How many times do you turn left on your route to work?,” where episodic memory seems to, on its own, wholly determine what knowledge can be gained by the imagining, and where no format or unit changes are being imposed on it. However, this simple possibility does not mean *all* imaginings fail to contribute to knowledge whenever restrictions are applied. Indeed, in many cases, it will turn out that we cannot get knowledge in any other way. I think our introductory example, *Pulley*, is one such case. In order to solve it, we need to imagine the direction of movement of the distinct elements; that is something we simply cannot do with non-imaginative mental processes.

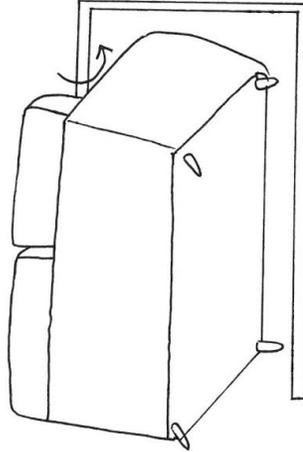
3.3 Conclusions

Ultimately, the present account shows how imagination is *not* the same as the process that generates new beliefs from our old beliefs. Inferences operate on imaginative states in distinct ways from the imaginative process, which is combinatorial. And imagination *can* plausibly generate knowledge we did not possess before, as we demonstrated. In giving this account, we hopefully vindicated plausible intuitions about the reliance of imagination on other processes, the sense in which imagination can follow rules, and the sense in which imagination might be able to replicate predictive processes from perception. We have also explained what it means for imagination to ‘bring beliefs to bear’ on problems and what might enable us to use the ‘method of imaginative variation’.

A striking upshot of the present view is that at least one central properly imaginative process is distinct from both perception and inferential reasoning. The states it generates, however, can interact with states generated by many mental processes. In the future I would like to explore what possible models of mental representation might be compatible with the predictions of the present view, as well as whether these models will support the vision of cognitive taxonomy I have tried to argue for here on philosophical grounds. I would also like to explore whether the present account might be a good starting point for a unifying account of the many heterogeneous activities we call imaginings.

Appendix

Couch: The solution is to tilt the couch so the longest side is vertical, and then manoeuvre it by rotating it through the doorway:



References

- Balcerak Jackson, Magdalena (forthcoming) "Knowing by Imagining," *Perceptual Memory and Perceptual Imagination* (eds. F. Dorsch / F. Macpherson), Oxford University Press.
- Barsalou, Lawrence W. (1999) "Perceptual Symbol Systems," *Behavioral and Brain Sciences*, 22(4): 577-660.
- Block, N. (1983) "Mental pictures and cognitive science," *Philosophical Review* 93: 499- 542.
- Boghossian, Paul (2012) "What is inference?" *Philosophical Studies* 1: 1-18.
- Byrne, Alex (2007) "Possibility and Imagination," *Philosophical Perspectives* 21 (1):125-144.
- Camp, Elisabeth (2001) "Thinking with Maps," *Philosophical Perspectives*, 21: 145-182.
- Chalmers, David (2012) *Constructing the World*. Oxford University Press.

- Currie, Gregory and Ravenscroft, Ian (2002) *Recreative Minds: Imagination in Philosophy and Psychology*. Clarendon Press.
- Davies, Martin and Stone, Tony (1998) "Folk psychology and mental simulation," in Anthony O'Hear (ed.) *Royal Institute of Philosophy Supplement, 43*, Cambridge: Cambridge University Press. 53-82.
- Einstein, Albert (1958) *Ideas and Opinions*. New York: Three Rivers Press.
- Gendler, Tamar Szabó (1998) "Galileo and the Indispensability of Scientific Thought Experiment," *The British Journal for the Philosophy of Science*, 49(3): 397-424.
- "Imagination," *The Stanford Encyclopedia of Philosophy* (Fall 2013 Edition), Edward N. Zalta (ed.).
<http://plato.stanford.edu/archives/fall2013/entries/imagination/>
- Gentner, Dedre (1983) "Structure Mapping: A Theoretical Framework for Analogy," *Cognitive Science*, 7: 155-170.
- Gentner, D. & Smith, L. (2012) "Analogical reasoning." In V. S. Ramachandran (Ed.) *Encyclopedia of Human Behavior (2nd Ed.)*. pp. 130-136. Oxford, UK: Elsevier.
- Goldman, Alan (2006) *Simulating Minds: The Philosophy, Psychology, and Neuroscience of Mindreading*. New York: Oxford University Press.
- Hume, David (1977/1777) *An Enquiry Concerning Human Understanding*, and "A Letter from a Gentleman to his Friend in Edinburgh," Steinberg, Eric (ed). Hackett.
- Hume, David (2000/1739) *A Treatise of Human Nature*, Norton and Norton, (eds). Oxford University Press.
- Jenkins Ichikawa, Jonathan (forthcoming) "Modals and Modal Epistemology," in Amy Kind and Peter Kung (eds.), *Knowledge Through Imagination*, Oxford University Press.
- Jones, O. R. (1985). "The Way Things Look and the Way Things Are," *Mind* (94)373: 108-110.

- Kind, Amy (forthcoming). "How Imagination Gives Rise to Knowledge," in Fabian Dorsch and Fiona Macpherson, eds., *Perceptual Memory and Perceptual Imagination*, Oxford University Press.
- (2013) "The Heterogeneity of Imagination," *Erkenntnis* 78 (1): 141-159.
- Kosslyn, S. M., W. L. Thompson, and G. Ganis. (2006). *The Case for Mental Imagery*. Oxford: Oxford University Press.
- Langland-Hassan, Peter (forthcoming) "On Choosing What to Imagine," in Kind, Amy and Unger, Peter (eds). *Knowledge Through Imagination*. Oxford University Press.
- Macpherson, Fiona (2012). "Cognitive Penetration of Color Experience: Rethinking the Issue in Light of an Indirect Mechanism," *Philosophy and Phenomenological Research*, 84: 24-62
- Nichols, Shaun and Stich, Stephen (2000). "A Cognitive Theory of Pretense," *Cognition* 74:2, pp. 115-147.
- Norton, John D. (1996) "Are Thought Experiments Just What You Thought?" *Canadian Journal of Philosophy*, 26 (3): 333-366.
- Pylyshyn, Z. (2002) "Mental imagery: In search of a theory," *Behavioral and Brain Sciences* 25: 157-82.
- Sartre, Jean-Paul (2004) *The Imaginary: A Phenomenological Psychology of the Imagination*. Translated by Jonathan Webber, Routledge.
- Sorensen, Roy (1992) *Thought Experiments*. New York: Oxford University Press.
- Shepard, R and Metzler. J. (1971) "Mental rotation of three dimensional objects." *Science* 171(972):701-3.
- Tye, M. (1991) *The Imagery Debate*. Cambridge, MA: MIT Press.
- White, A.R. (1990) *The Language of Imagination*. Oxford: Basil Blackwell.

Williamson, Timothy (forthcoming). "Knowing By Imagining," in Kind, Amy and Unger, Peter (eds). *Knowledge Through Imagination*. Oxford University Press.

----- (2007). *The Philosophy of Philosophy*. Blackwell Publishing. pp. 165-7.

Wittgenstein, L. (1968) *Philosophical Investigations*. English Text of the Third Edition. Translated by G.E.M. Anscombe, The Macmillan Company.

Wittgenstein, L. (1967) *Zettel*. Edited by G.E.M. Anscombe and G.H. von Wright, Translated by G.E.M. Anscombe. University of California Press.

Yablo, Stephen (1993) "Is Conceivability a Guide to Possibility?" *Philosophy and Phenomenological Research* 53 (1): 1-42.