

Imagining How

Imaginar Cómo

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Abstract

In this paper, I examine the issue of how to provide an account of what I will call *imagining-how*, imagining how something can be done. After surveying the prospects of propositional, interrogative and what I will call objectual approaches, I argue that an objectual approach where imagining-how is taken to be an attitude directed towards a way directly (under the guise of being relevant to a question about how to do something) is to be preferred. I argue that imagining under constraints can be informative, and that it can play a role in learning how to act.

Keywords: imagination, imagining-how, know-how, learning-how.

Resumen

En este ensayo, examino el problema de cómo podríamos proveer una teoría de lo que voy a llamar *imaginar-cómo*, es decir, imaginar cómo puede hacerse algo. Después de examinar la viabilidad de enfoques proposicionales, interrogativos y objetuales, argumento que un enfoque objetual, en el que el imaginar-cómo es una actitud dirigida directamente a una manera de actuar bajo la apariencia de ser relevante a una pregunta sobre cómo hacer algo, es preferible. Propongo que la imaginación bajo restricciones es informativa, y que puede jugar un rol en el aprendizaje de cómo actuar.

Palabras clave: imaginación, imaginar-cómo, saber-cómo, aprender-cómo



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The -how/-that distinction, made famous through the literature on know-how (cf. Pavese 2021), is also relevant when we think about the imagination. To imagine *that* one succeeds in an endeavour does not seem to be the same as imagining *how* one succeeds at it. And yet, in order to devise a plan to succeed, or to learn how, or to come to know how, one will often have to imagine how, that is, devise a plan or design. What does it mean, then, to imagine how something can be done?

As it turns out, it could mean a number of things. To imagine how to do something could be a way of having a certain attitude towards a complex propositional structure that describes a way to act (one would imagine that one would be able to do the action by performing a number of steps, for example)—call a view of this kind *propositionalist*. Or it could be a way of having an attitude towards a question (namely, the question of how to do the action)—call a view of this kind *interrogative*. Or it could be a way to be in a relation to a certain procedure, method or way to act, understood as a kind of object in itself—call a view of this kind *objectualist*.

In this paper, I will argue in favour of an objectualist, interrogative account of imagining how. According to this view, imagining how is to have an imaginistic cognitive relation to a way to act, under the guise of it being the answer to a question concerning how to do something. I will also argue that this view can be useful to account for the role of imagination in our acquisition of knowing-how.

My plan is as follows. First (section 1), I will give a brief overview of the debate concerning the distinction between knowing-that and knowing-how, discuss what should be expected from a theory of knowing how, and examine the issue of the sources of knowing how. Imagining how to do something emerges as a potential source of knowing how. Accounting for it requires that we first deal with the issue of describing imagining how as a kind of contentful attitude. I will examine how we can account for imagining how in propositional (section 2), interrogative (section 3), and objectualist frameworks (section 4). I will then move on to the issue of how imagining-how can be a source of knowing-how. In section 5, I will give a preliminary defence of the idea that our imagination can be one of our sources of knowing how, drawing from the general literature on imagination as a source of knowledge (cf. Kind & Kung 2016), to suggest that the imagination can play this role as long as it is subject to certain constraints. Then, in section 6, I will explore the broader issue of how imagining-how can inform our knowing-how, that is, how the relevant imaginings can be turned into dispositions to act in the ways we have imagined (as in an anti-intellectualist framework), and how the content of the relevant imaginings can be incorporated into our stock of knowledge-that (as in an intellectualist framework).



1. Knowing-how and its sources

At least since Ryle's (1949) arguments against the reduction of knowing-how to knowing-that (which he called intellectualism), there has been considerable interest about knowing-how as a distinctive type of knowledge, with intellectualists claiming that knowing-how is a species of knowing-that, and anti-intellectualists claiming the opposite (on this debate, see Fantl 2008, Bengson & Moffett 2011, Carter & Poston 2018 and Pavese 2021). While Ryle's anti-intellectualism was enormously influential, the recent literature has developed sophisticated intellectualist positions that partially answer Ryle's criticisms. This debate has focused on the *nature* of knowing how, or more specifically, it has attacked this problem from the angle of giving an account of the conditions under which it is appropriate to claim that someone knows how to do something (the *attribution* problem). The question of how we acquire knowing-how (the *acquisition* problem) has received less attention, although part of the classical debate between intellectualists and anti-intellectualists hinges on the point. In particular, there are the issues of:

- a) how propositional knowledge can inform our know-how—for example, how we can learn chess at least in part by learning from propositions about the game (cf. Snowdon 2013)—and,
- b) how we can acquire reliable dispositions to behave in particular ways (cf. Farkas 2018).

Some recent literature has explored the question of whether it is possible for knowing-how to be transmitted through testimony (if it could not, that would constitute another argument against the reduction of knowing-how to knowing-that, since the latter *can* be transmitted through testimony) (cf. Hawley 2010 and Poston 2016).

One reason people may not have treated the acquisition problem at length is that they might not have had antecedent expectation that there is anything particularly special about how we acquire knowing-how, when compared to other forms of knowledge. If we explore this idea, however, we will see that when thinking things through, it is clear that addressing the acquisition problem is necessary. All the usual candidate sources of knowledge are in principle viable sources of knowing-how: deductive reasoning, perception (either by the perceptual pickup of affordances for action, or through bodily feedback), inductive inference, testimony, the imagination, and so on. Additionally, pluralism about the sources of knowing-how is plausible; there is no reason to pick between these candidate sources—any of them will do. Rather than focusing on any of them in particular, we should shift our attention towards architectural concerns, the ways in which these different sources coordinate in order to produce know-how. What sorts of relations are there between these sources? Do any depend on any others, and how? Are any of these sources more fundamental for the overall architecture of knowing-how?



There is a lot to say about these questions, but one important thing to notice is that, at least for the purposes that beings like us have, any plausible architecture for know-how acquisition will require some kind of *offline* component, disconnected from online perception. It is not sufficient that we learn how to do something as we go on trying to do it, or even that we learn how to do it on the basis of our knowledge of past performances of those tasks. There is pressing need to anticipate how we can act, even when we have no previous experiences available to draw on. Sources such as the imagination will consequently be of particular importance for this. But then, dealing with the acquisition problem will matter, because we will need to be able to treat the products of these sources as inputs to more complex processes through which we acquire know-how. Supposing that the imagination can inform us about how to do something, how does that lead to the acquisition of know-how? What we need is a mid-level account of this process (mid-level, because this account will be in between the high-level description that imagination is a source of know-how, and the low-level description of the specific cognitive mechanisms that implement that). An account of this kind will have two main components:

- a) A description of the nature of imagining how: what goes on when someone imagines how to do something, what kind of state it is to imagine how to do something, and what kind of contents this state can have; and
- b) A description of the process through which someone's imagining how informs their knowing-how.

The same holds true of the account for any other source; I will return to this point in the conclusion, once we have more fully sketched an account of imagining how and of learning how from the imagination, since that will raise some additional issues to consider more broadly. In the following sections I will take on the issue of how to account for the nature of imagining how.

2. Imagining how as a propositional attitude

An initially promising way to understand imagining how is to treat it as a propositional attitude, a mental attitude directed to some proposition. The approach would work roughly the same as what has been proposed by so-called intellectualists in the case of know-how. According to these theories, holding a relation to a proposition is a necessary condition for knowing how to do something:

INTELLECTUALISM-NECESSITY *s* knows-how to *p* only if there is a proposition *p* such that *s* holds a relation to *p*

For a subject to hold a relation to a proposition in the sense meant here, *s* has to be in a mental state associated to some dispositional profile that would be at least partially explained if the subject possessed some grasp of the information provided by this proposition. The

paradigmatic case is that of believing: someone who believes a proposition is typically disposed to assent to a claim that expresses the proposition, to make certain inferences taking the proposition as a premise, and so on—these dispositions can be explained by the subject having some grasp of the information provided by the proposition. For example, someone who believes that it is raining would typically agree to a claim made by someone else that it is raining, and this can be explained because they grasp the information that it is raining (and they understand that this information is relevant to the claim that the other person is making, where understanding can also be accounted for in terms of having some grasp of a proposition).

In the case of know-how, the propositional-attitude account says that for someone to know how to do something, they need to hold a specific type of relation to a proposition. The more traditional way to spell this out is that someone who knows how to do something, knows a proposition concerning how to do it (Stanley & Williamson 2001, Stanley 2011). Other possibilities are that knowing how to do something is a type of understanding (Bengtson & Moffett 2011), or a type of justified belief about how to do it (Cath 2011). For the sake of simplicity, I will only consider the knowledge-based version in what follows.

Typically, this kind of proposal goes along with a proposal about how to analyse know-how attributions. According to the propositional proposal, then

REDUCTION S knows how to do $X = S$ knows that ... X ...

The blanks here represent the context of the proposition in relation to X which is appropriate for the reduction to work. For example, it could be the proposition that, for some way of acting w , w is *a* way or *the* way to X . This spells out which proposition is relevant to the reduction. In fact, a common way to argue for this kind of account is to notice that natural language correlates the two types of expressions ('knows how' and 'know that') systematically. For example, one may question whether someone knows how to bake a cake by asking whether they know that one should preheat the oven, and then do a series of steps. And if one accepts this kind of reduction, one should expect for every know-how ascription to be correlated to an appropriate knowledge ascription.

In the case of imagining how, one may think that the situation is analogous. Imagining how would be a way to hold a relation to a proposition about, for example, a way to do something—namely, what one imagines how to do. Following the scheme for know-how:

PROPOSITIONAL IMAGINING-HOW S imagines how to do X iff S imagines that there is a way to act, w , such that w is a way or the way to X

Note that w may not be as a matter of fact a way to do X (someone can imagine how to swim incorrectly).

The verb ‘to imagine’ can take different complements: objects (‘Sophie imagines a green triangle’), arrangements of objects (‘Sophie imagines a green triangle over a yellow background’), situations (‘Sophie imagines that a green triangle is placed over a yellow background’), etc. In the latter case, ‘to imagine’ takes a propositional complement. Sometimes people distinguish between imaginistic and propositional imagination; I will understand this as a debate about the format of the content of the attitude (roughly, an imagining is imaginistic if it relies on sensory contents, and propositional* (note the star) if it uses some kind of verbal encoding—i.e., if the proposition is encoded in a string of linguistic symbols), rather than as a debate about the kind of content itself. Thus, I will distinguish between imaginistic propositional and propositional* propositional imagination, depending on whether the relevant propositions are encoded imaginistically or verbally; for example, Sophie’s imaginistic imagining of a green triangle over a yellow background involves the same proposition as Sophie’s propositional* imagining that a green triangle is placed over a yellow background. We can thus construe imagining how along the lines of the propositional account, regardless of the format of particular imaginings. In any case, the propositional account of imagining how reduces imagining how to this kind of propositional imagining.

The propositional account so sketched needs to be elaborated on further. What is it, precisely, to imagine that some way to act is a way to do something specifically? In other words, what is one to imagine in order to imagine a way to do something?

Propositional models of the imagination typically model imagining as the relation between states of information (that represent the epistemic state of the subject who imagines) and possible worlds where what is imagined holds. This is roughly the same approach taken in the case of epistemic operators such as knowledge, where some p is known at a world iff p holds at every world that is accessible by an appropriate relation between worlds (for example, a relation of informational compatibility). This is the approach that has usually been taken in the literature on the so-called logic of imagination (with various implementation differences). Niiniluoto (1985), taking a hint from Hintikka’s (1962) work in epistemic logic, modelled imagining that p in a way that p is imagined in a world if and only if p holds in *every* world that is accessible in the appropriate sense. In Costa-Leite’s (2010) model, p is imagined if and only if p holds in at least *some* accessible worlds. Wansing (2015) argued that in order to capture the logical behavior of imagination properly it was necessary to adopt so-called neighborhood semantics, in order to deal with undesirable properties for imagination, such as a kind of logical omniscience (in Niiniluoto’s model, for example, every logical validity is imagined). Berto (2017) has recently developed a logic of the imagination that makes use of the device of impossible worlds, treating imagining as what is in effect a type of conditional (his basic construction for imagination operators, $[A]B$, should be read as ‘it is imagined in an act whose explicit content is A , that B ’). This final move is intended to capture further hyperintensional behaviour of imagination (see Berto 2018 and Badura 2020).

Part of Niiniluoto's initial proposal was to account for the semantics of expressions such as 'Peter imagines Mary' in terms of expressions of the form 'S imagines that P'—that is, he intended to reduce apparently non-propositional forms of the imagination into propositional imagination. For example, 'Peter imagines Mary' gets (*prima facie*) analysed as $\exists x I_P(x = \text{Mary})$. What one imagines is something that is identical to Mary in every imagination-accessible world. This kind of strategy should plausibly apply also to imagining-how, a possibility that Niiniluoto himself seems to fully endorse:

It seems to me clear that *imagining-how* is also reducible to imagining-that. For example, to imagine how it feels to dance with Marilyn Monroe, I imagine that I dance with Marilyn—with feelings. (Niiniluoto, 1985, 221)

It is worth noticing that Niiniluoto's example differs from the kind of case we are interested in here; imagining how something feels is different to imagining how to act, in ways that we do not have space to address here. Regardless, the example illustrates a problem that will also affect a naive reduction of imagining-how-to act to imagination-that. Even if it could be true that whenever we imagine how it feels to dance with Marilyn we imagine that we dance with her, and we attach feelings to this imagining, it is not true in general that any feeling will do. There is an ambiguity here between imagining how something feels and imagining how it *could* feel—and it is not clear what, precisely, is the propositional content that we are supposed to have (remember Nagel's (1974) observations about the limits of the imagination with respect to what it is like to be in a certain way, subjectively). In the case of imagining how to act, we can trivially say that whenever we imagine how to do something we imagine that it is done in a certain way, but this is not yet a way to specify in what way that is or even could be done. So we need a way to make these distinctions and, ideally, to be able to give an account of the range of propositions that are admissible.

Here is a proposal to supplement the view in this regard: in order to imagine how to do X, what one needs to imagine is that X is done after some conditions are satisfied or by the satisfaction of certain conditions. The disjunction tries to capture the point that actions can be telic or atelic, depending on whether there is some determinate point where we can say that the action has been performed (cf. Rothstein 2004). Suppose that we wanted to imagine how to clean a ball bearing. This action is telic: once the ball bearing is clean, the action has been performed. In order to imagine a way to perform this action, one needs to imagine some sequence of actions that lead to this result. Now, suppose that we wanted to imagine how to pretend we are a friend of ours. This action is atelic: there is no particular state where one has pretended enough, but there are, certainly, ways to do it. For example, one may mimic the friend's voice and mannerisms, or figure out what they would say in different circumstances. In this case, imagining those things is how we could imagine how to pretend to be this friend.

To make this a bit more precise, let us introduce the notion of a state-structure, which will be useful to model ways to act (the notion will be useful later outside the context of propositional accounts of imagining). A state-structure is a directed graph, where every vertex represents a state, and every edge represents a transition between states (alternatively, take the vertices of the graphs as actions, or allow vertices to be both actions and states, and assign types to edges to indicate what kind of relation/transition they represent: state-state, state-action, action-state, etc.). Telic state structures must obey the condition that no vertex v must be connected to a vertex v' that is in a path that includes v , unless it is also connected to a vertex that is in a path that does not include v . In a telic state-structure, every path that does not loop back into itself must reach a vertex that is not connected to any other, the *join*. The join represents a state where an action has been successfully performed. In an atelic state-structure, there is no join (see figure 1). A *walk* (a sequence of edges in the graph) through a state-structure constitutes an *execution* of a way to act. A telic action is fully executed when a walk through the corresponding state-structure reaches the join. An atelic action is fully executed when a walk has reached a contextually sensitive condition. In either case, a walk can be interrupted at any vertex. A walk that is strictly included in a walk that fully executes a state-structure is a partial execution of the state-structure.



Figure 1. Examples of telic and atelic state-structures

Let us then say that a world models a state-structure if it is true at that world that (full or partial) walks of that state-structure are part of the history of the world: in other words, if the state-structure has been (fully or partially) executed at that world. Then, imagining how to do something is to imagine that a world or set of worlds model an appropriate state-structure. This gives us a framework to make distinctions; for example, we can distinguish between imagining how something is done and imagining how something could be done by requiring that the relevant state-structures are modelled in all, some, or particular sets of accessible worlds. We can also check if state-structures are possible or impossible ways to do something depending on whether the worlds that model them are possible or impossible (for example, by checking that the transitions between states in the state-structures are possible or not; we do not want to say that, for example, we can cure malaria by looking at the sun—in a certain sense, that is an impossible transition between states that should be ruled out).

3. Imagining how as an interrogative attitude

The propositional account captures the idea that imagining how seems to be a way to relate to certain information that we can later use to execute a task. Something that may be objected to the propositional account is that it fails to capture that imagining how can itself be the result of a kind of action that is typically executed in response to engaging with a question.¹ One way to develop this point is to propose that imagining how is a kind of interrogative attitude, namely, an attitude one can have with regard to a question, rather than to a proposition.

How far away this model is from the propositional account depends on what account of questions (and propositions) one adopts. In a possible worlds framework, a very popular model for questions is to identify them with sets of sets of worlds—more specifically, with partitions of logical space. This approach dates back to Hamblin (1958) (cf. Karttunen (1977). These sets of sets of worlds can also play the role of topics (Lewis 1988 and Yablo 2013). Each cell in the partition represents a proposition that is a possible answer to the question. Using the account of state-structures from the previous section, we can take a question-how as a partition of logical space, where every cell contains worlds that model state-structures that correspond to possible answers to a question about how to do something. A constraint we may want to impose on the relevant logical space is that each world models the satisfaction conditions for the relevant structures (this way, we rule worlds that could not contain possible answers to a question-how because the goal is never reached—for example, when considering telic actions, we do not need to consider worlds where the goal is not satisfied).² However, in general we will also want to be able to connect questions with each other (for example, what is the link between the question ‘how to cook’ and the question ‘how to cook Indian food?’), so this constraint may be relaxed (for example, by making it sensitive to the context) or abandoned altogether. In any case, because the underlying structures representing questions are propositional, there is the worry that it could be reduced to some version of the propositional account. While questions themselves do not have truth conditions, there are truths about there being a question or the other: logical space is divided one way or another. The question here is whether some of these truths are part of the content of imagining-how.

In any case, when we apply these ideas to the case of imagining how, we need to distinguish between at least two ways to reconstruct imagining-how as a question-directed attitude:

- a) Imagining-how as imagining an answer to a question-how. In this case, we could imagine that a certain proposition is an answer to a question. This can be construed either as having a relation to a proposition about a different proposition being the

¹ As a counterexample, daydreaming how to do something might not be the result of engaging with a question.

² We do not need to require that worlds are possible if we also want to capture ways in which someone could mistakenly believe something could be done.

answer to a question, or as a ternary relation between a subject, a question, and a proposition. Call this *local imagining-how*.

- b) Imagining-how as imagining a question-how. In this case, we imagine a question and its possible answers (essentially, this is like imagining the structure of logical space that corresponds to the relevant question-how). This can be construed as a binary relation between a subject and a question. Call this *global imagining-how*.

The local and global senses of imagining-how come apart. If we request someone to imagine how to fix a piece of furniture, part of what we are usually asking is that they find an answer to the question of how to fix the furniture, and this answer must be specific and relevant in the current context. If we imagine just one potential answer, we would not necessarily say that we have also imagined the question in the global sense (unless we also imagined the question as only admitting a single answer). So we can imagine how in the local sense without imagining how in the global sense. On the other hand, if we imagine several possible answers as answers to the question, we must imagine the question in a global sense (even though it is not necessarily the case that we have imagined the totality of the available logical space and the way it is divided in answer-cells). We can also imagine the question having irrelevant answers without imagining relevant answers, so we can also imagine a question in the global sense without imagining it in the local sense. However, in this case we can also describe the situation as one where we imagine how in the local sense wrongly. A better instance of imagining how in the global sense without imagining how in the local sense is the case where we imagine the overall structure of logical space in regard to a question without imagining any particular answer in mind. This kind of global imagination is required for imagining how in the local sense: otherwise, we could not say that someone imagines an answer to a question rather than just a proposition. By imagining that Helen has a tattoo on her back, I imagine something that answers a certain number of questions (for example, whether Helen has tattoos), but I do not thereby imagine something *as* the answer to a question. In order to do that, I need to have some kind of attitude towards the question.

Recent work has explored the possibility that certain attitudes, like those we are considering here, can have *sui generis* first-order, non-propositional interrogative contents. This idea has been explored by Friedman (2013), Whitcomb (2010), Carruthers (2018), and Drucker (2020), among others (there are other frameworks, such as Ciardeli et al's 2019, where there is both informative and interrogative content). Friedman in particular rejects both first-order and higher-order propositionalist accounts of what she calls interrogative attitudes, such as wondering, inquiring, and suspending judgement. To give an example: when one wonders whether one has turned off the stove, one has a *sui generis* first-order attitude that has a question (namely, whether one has turned off the stove) as its content. Wondering is not having an attitude towards a proposition, or to a proposition to the effect that one does not know a certain proposition about a topic. Likewise, one may reconstruct global imagining-how as having a particular imaginistic attitude towards a question, and local imagining-how as having a particular imaginistic attitude that is (at least) partially directed towards a question.

Friedman (2017) argues that it is characteristic of interrogative attitudes that they are associated with wanting to know, and that they are typically made impermissible by knowing the answer to a question: if one knows whether the stove is on, one ought not to wonder whether the stove is on, for example). This does not seem to be applicable to the case of imagining-how. One may well know how to do something and be permitted to imagine how to do it (*pace* Archer 2018 and Masny 2020). So either imagining-how does not belong in the class of interrogative attitudes, or Friedman's characterization of the class is problematic. It is important to realize that problems with particular accounts of specific interrogative attitudes does not undermine the viability of the hypothesis that there are *sui generis* first-order non-propositional interrogative attitudes, but it undermines part of its motivation (namely, that propositionalist accounts are faulty). The hypothesis is appealing, but it is not clear that its theoretical cost is worth paying yet. The link between imagining-how and the attitudes we may have towards the relevant questions might be accounted for differently (I will return to this point at the end of section 4).

4. Imagining how as an objectual attitude

Neither the propositional nor the interrogative accounts of imagining how are fully satisfactory. There is yet another kind of approach one may take in regard to the issue: one can treat imagining-how as an objectual attitude, that is, as an attitude one can have towards a non-propositional object (in a generic sense, propositions are also objects). The interrogative approach already moved in this direction: treating imagining-how as a relation between a subject and a partition of logical space can be seen as a special case of the approach. Of course, in that case the object itself may be treated as already having propositional structure (a partition of logical space being a set of propositions). The obvious next step to take is to look for relata that are neither propositions nor composed of propositions. The general scheme for this will be:

OBJECTUALISM S imagines how to X iff S imagines O, where O is an object in a suitable relation R to X.

This kind of account requires some notion of non-propositional objectual imagining (cf. Yablo 1993). There is a natural sense in which any account of imagination needs to provide something like this. Ordinary imaginings are usually described in objectual terms: we imagine a blue bird, a landscape, a face, and so on. It is not necessary that we frame these objects in a propositional manner (to imagine a face is not *necessarily* to imagine a situation that we can describe propositionally, although imagining objects by imagining situations involving those objects is of course possible); so there is no force in requiring that we reduce objectual imaginings into propositional imaginings.³ There is no space here to give a full account of non-

³ This does not mean that the relevant kind of imagining has to be 'imagistic' (for example, it is not immediately clear what kind of images could be useful to imagine how to do something), but we can treat objectual imagining

propositional objectual imagining, so it must suffice to suppose that there is a way to make sense of it.

The next question we need to consider is: what types of objects could fit the bill? There are two main options:

- a) Imagining how as *imagining an action*, or a structure composed of actions. Roughly, imagining how to X would be imagining X-ing. Call this *Action-Based Objectualism about Imagining-How* (AOI for short)
- b) Imagining how as *imagining a way*. Roughly, imagining how to X would be imagining a way w that is a way to X. Call this *Way-based Objectualism about Imagining-How* (WOI for short)

I will not claim this is exhaustive of the possible options, but I don't see other alternatives as viable at the moment.⁴

The first proposal has some appeal. In some sense, it's the simplest theory of imagining how to X one could have. When we imagine how to X, according to the theory, we simply imagine X-ing—if we understand what X is, and if we know how X can be represented, we can imagine how to X. One reason one may have to endorse this is that it may seem that you cannot imagine X-ing *concretely* without imagining a way to X—that is, without imagining something that could provide an answer to a certain question-how.⁵ Suppose we imagine someone performing an action. Can we know that their action is, for example, playing tennis, rather than crocheting, without having a way to distinguish from the phenomenal content of the imaginings that this person is doing one thing rather than the other—that is, by the content of their imagining representing a way to do one thing rather than something else? If that is not possible, then imagining X-ing would be at least sufficient for imagining how to X.

An opponent of this version of the view could appeal to assigned-content models of the imagination, where part of the content of imaginings can be simply assigned (cf. Kung 2010). Imagining X-ing could involve having vague phenomenal contents (for example, a vague image of someone acting) and precise assigned contents that label this action as belonging to the type of X. If so, the link between imagining actions and imagining ways to act cannot

as encompassing many instances of imagistic imaginings. For the role of images in imagination, see Kind (2001).

⁴ There could be possibilities that build on these kinds of objects. For example, one could construe imagining how as an imaginative relation to a choice-structure, which would amount to a set of action-structures that are available as options for achieving a goal or condition. I will not explore these options thoroughly here, although my own proposal (see below) can be understood in this way.

⁵ Another piece of evidence in favour of the view is that ordinary language seems to allow constructions of the form 'S imagines X', where 'X' is an infinitive ('S imagines washing his car'). But as we will see, this is compatible with propositional accounts.

be a reason to endorse AOI—there would be cases where imagining X-ing is not sufficient to imagine how to X. So explicating imagining how to X in terms of imagining X-ing seems to fail to distinguish between cases in which we simply imagine X-ing from cases in which we imagine how to X. One way to deal with this is to distinguish between the attitudinal component of simply imagining X-ing and the attitudinal component of imagining how to X (the content would be the same, but the attitude would be different). I am not sure about this response; it may be counter-objected that even making this distinction the content could be different.

A different problem is that imagining X-ing *could* perhaps in turn be reduced to some form of propositional imagining: for example, imagining X-ing could be reducible to imagining that someone X-es. To defend the view from this worry one would have to explain how one can imagine an action without imagining that it is executed—and it is not clear that this is possible. This bears on the plausibility of the necessity of imagining X-ing for imagining how to X: depending on what, precisely, imagining X-ing amounts to, the necessity claim will be more or less plausible. The view is not sufficiently developed in this point.

In any case, if the thought behind AOI is that in at least some cases (such as when we try to come up with a specific plan of action) we imagine how to X by imagining ways to X, perhaps we should rather say that imagining how to X consists in imagining those ways. This is in effect what WOI proposes. Go back to the idea of state-structures. These represent ways to do something (sequences of actions), but they are not themselves propositions. So if instead of explaining imagining how in terms of imagining that these structures are realized we explain it in terms of imagining these structures directly, we can manage to avoid one way to reduce imagining-how into imagining-that. We can also distinguish between imagining X-ing and imagining how to X: imagining the former is to imagine a realization of a state-structure for X, but imagining a state-structure is not a way to imagine X-ing. Now, it is important to notice that it is not essential for the model to make use of state-structures; we could equally well say that there are action-structures that represent ways, and that imagining those structures is imagining how something could be done.⁶ What is important is that in the model there is some kind of object that is imagined that represents a way to do something, and that imagining how consists in this kind of imagining.

This kind of account can be expanded and enriched in several ways. In the previous section we saw that we would like an account of imagining how to explain the connection between it and certain questions-how, and I drew a distinction between local and global imagining how. We can recover these distinctions if we introduce interrogative content to the

⁶ It must be noted that if we introduce action-structures, we could also say that imagining X-ing, where X is an action, is something like imagining a realization of an action-structure, and imagining how to X is imagining an action-structure for X.

model. Then, local imagining how would be a ternary relation between a subject, a way, and a question: local imagining-how is imagining a way as an answer to a given question-how. Global imagining-how would be imagining the space of possible ways to answer a given question-how.

Elsewhere (Morales Carbonell, manuscript), I draw from my own model of the content of understanding states (Morales Carbonell 2023) to develop an account of know-how as involving contentful non-propositional graph-like cognitive states. According to this view, a graph-like state can be characterized by a triple $\langle G_I, G_E, D \rangle$, where G_I is an ‘internal’ set of graphs of epistemically accessible ways (these graphs can be either state-based or action-based), G_E is an ‘external’ set of graphs of environmentally given ways, and D is a dispositional profile (that includes the ability to manipulate internal graphs, produce realizations of them depending on what capacities the subject has, and so on). Drawing from this proposal, we could adopt this general approach and characterize imagining-how as a graph-like state where the content of G_I is imagined in the objectual sense described above, and where the dispositional profile is associated with the ability to perform certain imaginative acts.⁷ Note that the thesis that imagining-how is graph-like in this sense is independent of the thesis that know-how is graph-like, so this move does not commit us to adopt a graph-like account of know-how, although adopting both theses should be an attractive ‘package deal’ since it would systematize the link between imagining-how and know-how.

With the addition of interrogative content, the view can be summarized as follows:

GRAPHICAL IMAGINING-HOW S imagines how to X iff S is in a know-how-like state of imagining some set G_I of graphs, each of which represents a way to X by modelling an answer to a question of how to X .

This can be called the narrow view of imagining how as a know-how-like state. The overall or broad state of a subject who imagines how to do something is also coupled to there being a set of environmentally available ways to X , against which the subject’s imagining can be measured. We may want to check, for example, if the ways that they imagine X could be performed could actually be performed, although that they are is not a condition for them to imagine how to perform X (what *is* a condition for imagining how to X is that what one imagines is in an adequate relation to the question of how to X ; imagining a graph-like structure that does not provide an answer to a question-how is not a way to imagine-how).⁸

⁷ The account of know-how this is based on is intended to work for individual and collective subjects (in the collective case, know-how-like states are ways to collectively grasp practical graphical structures). In the case of imagining how, we can extend the view to account for collective imagining how as a case of collectively imagining a way to act. On collective imagination, see Walton (1990, p. 18-19).

⁸ One could relax the conditions for something to provide an answer to a question-how, for example by allowing graphs that encode information that at least partially answer the question.



What of the dispositional profile of someone who imagines how to do something? The characteristic dispositional profile of imagining-how is linked to the subject's underlying capacities to imagine—we can suppose that this includes things such as being capable to impose constraints, imagine similar things, remember what one imagines, and so on. Because of this dispositional profile, someone who imagines how is in a position to *learn* how to do something on the basis of their imagining. Explaining this in full will be my purpose in section 6. But before moving on to that, it may be worth spending some time considering the epistemic status of the imagination, and whether imagining can indeed put us in a position to learn anything.

5. Imagination as a source of knowledge

It is important to address the question, because while imagination has been appealed to as a potential source for modal knowledge (for example, as a source of knowledge of possibilities), it has not traditionally been thought of as apt to serve a role for the justification of non-modal empirical belief, and there is no universal assent with respect to whether imagination is a viable source of justification in either the modal or the non-modal case. Here, we ask if imagining-how can enable us to *learn* how to act, that is, to acquire know-how. Since we haven't defended a particular account of know-how, we should be careful to notice that depending on what we may think knowing how consists of, the relevant kind of justification could be either modal or non-modal. According to certain propositional accounts, for example, knowing-how could be construed as at least involving some kind of modal knowledge (particularly, knowledge that it is possible for one to do something in a certain way). For example, Stanley (2011) suggests that the infinitives in know-how constructions have the modal force of certain ability modals. Thus, 'Hannah knows how to ride a bike' is roughly equivalent to 'Hannah knows how she could ride a bike'. In other accounts, perhaps we could construe know-how as a kind of non-modal empirical knowledge. For example, assuming that the subject has the requisite dispositions, their know-how could consist of their empirical knowledge of how something or the other *works* (for example, Lisa may know how to brew coffee by knowing, among other things, how her coffee machine works).

In any case, many objections to the thesis that imagination is a viable source of justification apply whether what is justified is modal or non-modal. One worry about the role imagination may have for the relevant kind of justification is that imagination is not tethered to the world in the way that other sources of justification, such as perception, are. For many actual truths, we can imagine exactly their opposites (either knowingly or unknowingly). A second worry, related to the first, stems from the imagination's subjection to our will: we may have too much control over what we imagine. In both cases, the underlying worry is that imagination does not have enough of what Sher (2013) calls *epistemic friction*. A different issue is that the imagination may not be reliable enough to be acceptable as a source of justification. Our imagination could be subject to many distorting biases that can make judgments based on the imagination doubtful.

Recent work on the epistemic status of imagination has looked at imagination in a more positive light, and offered several answers to these worries (Myers 2024). Williamson (2016) has argued that our ordinary capacity to imagine has developed in evolutionary terms in ways that make it sensitive to facts. Myers (2024) offers a general argument in favour of optimism about the epistemic status of imagination: there is evidence that the imagination is involved in the formation of beliefs in a broad range of cases, so if pessimism about the imagination was true, a very wide range of beliefs would be undermined. To avoid the implausible sceptical consequences of pessimism, we should endorse optimism.

A different strategy that has been widely endorsed recently to explain the capacity of the imagination to provide justification is to appeal to the idea that in different contexts it is possible to impose constraints on the imagination in order to generate epistemic friction (Kind & Kung 2016). This undercuts the arguments against optimism because this shows that imagination can be sensitive to reality in the appropriate sense, even if it is under voluntary control. Constraint-based accounts typically distinguish between different types of constraints: either voluntary or automatic/architectural (depending on whether the subject who imagines imposes the constraints willingly or not), internal or external (depending on whether the constraints are imposed by the subject or by the environment or the world), and so on.

In the case of imagining-how, my suggestion will be to adopt a constraint based account of how imagining-how can be informative. When the task demands it, we try to imagine how to do something under constraints that make the result of our imaginings more reliable. In general, someone may think that something like a similarity-to-reality constraint will matter for imagining-how generically, but we should distinguish further between more fine-grained constraints that can work more or less independently of each other:

- a) *Subject constraint*: we imagine how a task-relevant subject (and not just any subject) could perform the task. For example, we could restrict imagining how to do something to imagining how we ourselves could do it.
- b) *Ability constraint*: we imagine the relevant subject as having roughly the same abilities as they really have. For example, we could restrict imagining how to do something under the constraint that we are the relevant subjects and that we have the same abilities that we know we have.
- c) *Circumstance constraint*: we imagine the subject under circumstances that are not too far away from some relevant set of conditions. For example, we imagine the circumstances unchanged from the actual ones.

These are not general constraints for the imagination: they are in place only in the context of imagining how to act, and each of them concerns a particular parameter about how something could be done that could be important to consider. While it may be tempting to treat these constraints as automatic and innate, I think it is better to think of them as something that is imposed on imaginings as the result of gaining skill in imagining-how—they are the



kind of constraint that we may need to consider explicitly at first but that we eventually apply fluently.

Note that these constraints may not be useful in every case even when the task is to imagine how to do something. For example, in some cases we may want to know how to do something that we currently lack the ability to do, and in those cases we need to imagine how to do it dropping the ability constraint (it is easy to see that there are situations where we may want to drop the other constraints too). Knowing when to drop these constraints is important for imagining how to be useful in a general sense. In many cases the use of imagination is neither purely instructive nor purely transcendent; in these cases we need a reasonable balance between epistemic friction and freedom.

6. The dynamics of learning how

Suppose, then, that we can imagine how to do something and that we can expect these imaginings to be informative, as long as they are suitably constrained. How does this ability contribute to our know-how? How does imagining-how work as a source of know-how? That is, how do we learn-how by imagining-how?

Having an answer to the issue of the informativeness of imagining-how is not sufficient. The issue is that learning how to do something requires that one *integrates* the information one has about how to do it into one's system of dispositions to act. In many cases, this will require that one manages to gain control over one's ways of bodily comportment (where the relevant actions are bodily enacted). Consider the example of learning to dance or play a musical instrument. In these cases, the best way to acquire pertinent control is to try to engage in the required bodily actions; at least for being such as ourselves, to give an example, learning to dance is not something that we can simply learn by acquiring information about what dancing takes. When it comes to the imagination as a source for knowing how to do something, it is implausible that merely imagining how to do something would suffice to acquire the required control, no matter how informative/accurate what one imagines is, at least in the case of learning to perform actions that involve bodily movement. One does not become a good dancer by imagining how to dance—even though imagining how to dance, we suppose, *can* play a role in becoming a good dancer.

The issue, however, is not limited to the case of imagining how to perform bodily actions. The real problem is that the contents of our imaginings are often quarantined, prevented from guiding our action (Gendler 2003). This issue will also affect cases where we learn how to perform mental actions. Suppose that we are trying to come up with an algorithm to perform a calculation, and that we do this by imagining that we perform a series of steps. What we imagine may or may not be a true way to perform the calculation, but regardless, having imagined it does not mean that we have adopted it as a way to perform the calculation hereafter.



Now, this is precisely the reason why imagining-how may play an indispensable function for learning-how. Faced with problems, we look for ways to solve them—we engage in what we may call practical inquiry (here, I take ‘practical’ in a broad sense). The goal of practical inquiry is the acquisition of reliable ways to act—practical inquiry aims at practical success. To test what works naively, it is often necessary to try to do it according to some method, or experiment trying something similar. However, this strategy is expensive, and in many cases it will be impossible to try beforehand. Imagination provides a medium for engaging in experimenting on what could work, that is quarantined from behaviour (taking ‘behaviour’ in a broad sense).

We can reconstruct the dynamics of learning how through imagining-how if we distinguish between the process through which we come to imagine a way to do something, and the process through which we come to learn how to do something by imagining how to do it. Using the graphical framework earlier, we can describe this as the difference between a process through which a graph-like state of imagining-how is achieved, and a process through which a graph-like state of knowing-how (with its own dispositional profile, linked to behaviour) is achieved. These two processes are distinct because in general no transition from a state of imagining-how to another state of imagining-how necessarily causes a change in the underlying know-how state (this is quarantining). Nonetheless, the *contents* of imagining-how states can be *upgraded* to being contents of know-how states: what one imagines how to do can become what one knows how to do.

The most fundamental way for this to happen is that the content of imagining-how is encoded and stored in procedural memory (on the link between imagination and memory, see Berninger & Vendrell 2022). This puts you in a graph-like know-how-like state with a certain dispositional profile which includes the ability to recall the procedure later. This kind of state does not need to be well integrated into our behaviour except in the minimal sense that it in principle makes the relevant information available. Learning-how consists in developing the dispositional profile of states of this type.

There is some subtlety concerning the issue of how this information can be encoded in procedural memory. There is an online pathway to encode procedural information from executing bodily movements during a task. In our case, this pathway is not immediately available. Either there is a pathway to go directly from imagined procedures to other representations of procedures that are encoded in a way that can later be executed, or there is a way to encode imagined procedures into executable instructions which can later be encoded into a directly executable format. In the latter case, in between imagining how to do something and having a know-how-like state about it there is an intermediate step of trying to execute the procedure, which is not *yet* an instance of having a know-how-like state, or much less having learned how to do something. As an alternative, it may be allowed that simulation could serve

as an intermediate step: in this case, what one has imagined as a procedure is then executed through simulation, which is then encoded in the format that direct execution requires.

The changes to one's dispositional profile that are required to learn how to do something come from exercising certain actions that are made possible by us having know-how-like states whose content is transferred from our attempts at imagining how. This can be described as a process of habituation to recognizing the circumstances in which one should act in one way or other, and the different ways in which one may tackle a goal. The role of the imagination in this process is to provide us with something that we can develop further. Farkas (2018, p. 108-110) argues that coming to know-how requires that we reflectively guide the process of acquiring the relevant competences. The proposal given here can be taken to relax the requirement that the process should be reflective: it suffices that the process is guided by the right constraints. On imagination and skill, see Kind (2020) and Goldwasser (2024). Goldwasser considers how the skill of imagining requires know-how, but not how know-how can make use of the imagination.

7. Conclusion

In this paper, I have given an overview of the problems for an account of imagining-how, and sketched an objectualist account, where imagining how is taken to be an attitude directed towards a way directly (under the guise of being relevant to a how-question), which I think is promising as it manages to capture more than propositional and interrogative accounts, and avoids some of their pitfalls. I have shown that, when combined with certain ideas about how the imagination can serve an instructive role, this account is useful for a theory of learning how. Imagining how informs our knowing how by yielding possibilities of how to act, which are in a first place isolated from our standing disposition to act in any given way, but which are upgraded to standing dispositions through several means. Imagining-how can be a source of learning-how; indeed, it may be indispensable.

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