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1 Introduction

Both imagination and creative thinking are typically implicated in a vast array of activities – from the domains of art, music, and literature to those of technology, medicine, and science. Moreover, both imagination and creative thinking are typically seen as essential to the success of these activities. When we're talking about renowned artists like Michelangelo or renowned scientists like Albert Einstein, we often point to their capacities for imagination and creative thinking as the key drivers behind their tremendous achievements. Or consider Leonardo da Vinci, a true Renaissance man whose many celebrated contributions range from art to anatomy, from architecture to astronomy. Heralded as one of the world's greatest geniuses, da Vinci is generally said to have had prodigious powers of imagination that were well ahead of his time. As philosopher Alan White has written, "Great thinkers are often imaginative thinkers because they can free themselves from the rut of the actual and ride on the uncharted trails of the possible" (White 1990, 186).

This Element explores the mental activities of imagination and creative thinking in an effort to gain a better understanding of what they are and how they work. That said, this is not a how-to guide. If you're looking for *Ten Life Hacks that Will Make You More Imaginative!* or *How to Become a Creative Genius Overnight!* You'll unfortunately have to look elsewhere. Leaving the world of clickbait behind, we'll instead dive into the philosophical literature in an attempt to address several interrelated questions: What is imagination, and how does it fit into the cognitive architecture of the mind? What is creativity? Is imagination required for creativity? Is creativity required for imagination? Is a person simply born either imaginative or not (and likewise, either creative or not), or can imagination and creativity be cultivated? And finally, are imagination and creativity uniquely human capacities, or can they be had by nonbiological entities such as artificial intelligence (AI) systems?

2 What Is Imagination?

Imagination can be thought of as a speculative mental activity. It allows us to speculate about how matters might in some way be different from how they in fact are. As Shen-yi Liao and Tamar Gendler define it in their entry on imagination in the *Stanford Encyclopedia of Philosophy*: "To imagine is to represent without aiming at things as they actually, presently, and subjectively are" (Liao and Gendler 2019). We see similar definitions in the psychological literature. To give just one example, Marjorie Taylor characterizes imagination as "the capacity to mentally transcend time, place, and/or circumstance" (Taylor 2013, 3).

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To help us better understand the nature of this speculative mental activity, it will be useful to have some examples before us. Let's start with three vignettes:

> *Pretend Pirates*. Penny and Priya are climbing one of the play structures in the park when they decide to pretend to be pirates. All of the play structures become pirate ships, and the kids climbing on the other structures become members of rival pirate gangs. The grass becomes the ocean, and the sandbox becomes an island where they think the treasure has been buried. They talk to one another excitedly: How much treasure do you think there is? How can we get there before the other pirates?
>
> *Decorating Decisions.* Dave's in the process of making redecorating plans for his living room. Having collected paint chips and furniture catalogs and measured the space, he now reflects on the important decisions he has to make and turns the issues over in his mind. Which shade of cream-colored paint would be a better choice for the walls, natural calico or almost oyster? Should I purchase a loveseat or a chaise lounge? Would it look better if the tall bookcase were positioned against the south wall, or should it stay against the north wall?
>
> *Empathetic Explorations.* Emily is making her lunch in the kitchen at work when she witnesses a tense exchange between her coworkers Ellen and Eddie. Looking at them, she tries to understand what they're each feeling. Does that expression on Eddie's face mean he's angry or upset? How would I feel if Ellen had made those critical comments to me?

In each of these vignettes, imagination seems to play a crucial role in the activities being undertaken. When Penny and Priya are taking the sandbox to be an island, it's likely that they do so by imagining it as such. In thinking about the buried treasure, they are likely imagining a treasure chest, bursting at its seams with golden coins. Likewise, a natural way for Dave to decide which paint to choose would be on the basis of imaginatively comparing the living room walls covered with the two different colors. And finally, the way that Emily figures out what Ellen and Eddie are feeling is most likely by way of imaginative projection. She puts herself in each of their shoes, so to speak.

Pretending, decision-making, and empathizing are just some of the many everyday activities in which we rely on imagination. We also use imagination to engage with fiction, to problem solve, and to try to figure out where we left our car keys! An athlete might call upon imagination to better prepare for their next competition, while a chef might use imagination to decide which spices to add to the dish they're preparing. In fact, once we start to think about it, we're naturally led to a sense that imagination is ubiquitous. It's hard to see how even a day could go by without its use.

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But these ubiquitous uses of imagination differ from one another in various ways. Sometimes we imagine that a certain scenario is true, as when Penny and Priya imagine that the play structures are pirate ships. But sometimes we simply imagine objects, as when Penny and Priya imagine the buried treasure. This suggests that there are structural differences among imaginings, that is, differences relating to the way the content is structured. Imaginings also differ in terms of their modality. In the first two of our vignettes, for example, the imaginative acts employed seem naturally understood as acts of visual imagination. In using the playground structures as props in their imaginings, Penny and Priya visually imagine them to look different from how they in fact do, and they also form mental images of the treasure they take to be buried beneath the sand. Likewise, Dave forms mental images of the walls painted with the alternative paint colors. In the third vignette, however, the imaginative acts don't seem to be visual in nature. Instead, they're most naturally understood as acts of emotional or experiential imagination. Emily imaginatively recreates the kinds of emotions and experiences that her coworkers might be undergoing.

As these brief remarks suggest, imagining comes in importantly different varieties. But let's also note an additional way that we can distinguish imaginings from one another. In the first vignette, Penny and Priya are engaged in a fanciful activity with no real practical purpose. They're aiming to escape from the reality in which they find themselves. But the activities in the second and third vignettes are not fanciful. They do have practical purposes. Both Dave and Emily are aiming to understand something about the reality in which they find themselves. So not only does imagining come in different varieties but it can also be employed with importantly different aims. In what follows, we'll explore each of these differences in turn.

2.1 Varieties of Imagining

Philosophers working on imagination have adopted numerous different taxonomies in an effort to understand its nature.[1] In fact, when trying to make sense of the different taxonomies on offer, one might be tempted to conclude that there are as many taxonomies as there are philosophers working on imagination! Nonetheless, the following division of imagination into two broad types should be relatively uncontroversial.

[1] To give just a couple of examples, see Neil Van Leeuwen's distinction between constructive, attitudinal, and imagistic imagination (2013) or Gregory Currie and Ian Ravenscroft's distinction between creative and recreative imagination (2002).

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2.1.1 Propositional Imagining

First we have what's typically called *propositional imagination*. As part of the scenario depicted in our Pretend Pirates vignette, Penny and Priya might each imagine that the rival pirate gang is going to beat them to the buried treasure. Worried about how he is going to pay for his living room renovation, Dave might imagine that he wins the lottery as part of the scenario depicted in Decorating Decisions. In each of these imaginings, the content of the imagining is a proposition. Propositional imagining is thus classified as a propositional attitude akin to other propositional attitudes such as belief, desire, and intention. As a general matter, one can take many different attitudes toward the same propositional content. So just as Dave might imagine that he wins the lottery, he might also believe that he wins the lottery, desire that he wins the lottery, hope that he wins the lottery, and so on.

Philosophers have had lots to say about what distinguishes propositional imagining from other propositional attitudes (see, e.g., Gendler 2003; Nichols 2004). In doing so, they have concentrated most of their attention on differences between propositional imagination and belief. Though these differences may seem obvious – in line with William James' remark that "Everyone knows the difference between imagining a thing and believing in its existence" (James 1889) – it will nonetheless be helpful to make these points explicit.

Some of the differences can be cashed out in functional terms, as imagining and believing tend to play different functional roles in our overall mental life. For example, when someone imagines that there are dangerous pirates on the playground, they are unlikely to call for help or seek out the police. Matters would be different were they to *believe* that there are dangerous pirates on the playground. So imagining and believing have different functional roles with respect to action guidance. They also seem to play different roles with respect to our affective systems, that is, with respect to emotion. Imagining that there are dangerous pirates on the playground is unlikely to cause someone to be terrified. Again, matters would be different were this proposition to be believed rather than imagined.

One might also distinguish imagination and belief in terms of their voluntariness. Consider the exchange that ensues in Lewis Carroll's *Through the Looking Glass* after the Queen tells Alice that she's over 100 years old (to be precise, that she's "one hundred and one, five months and a day"):

> "I can't believe that!" said Alice.
>
> "Can't you?" the Queen said in a pitying tone. "Try again: draw a long breath, and shut your eyes."

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> Alice laughed. "There's no use trying," she said: "one can't believe impossible things."
>
> "I daresay you haven't had much practice," said the Queen. "When I was your age, I always did it for half-an-hour a day. Why, sometimes I've believed as many as six impossible things before breakfast."[2]

Philosophers tend to side with Alice here: One can't make oneself believe something by sheer force of will. If you don't believe that you are at a tea party with a talking rabbit, you can't make yourself come to hold that belief simply by closing your eyes and trying harder, no matter how long you try or how much you practice (see, e.g., Williams 1973). But now compare imagining. It's remarkably easy to imagine that you are at a tea party with a talking rabbit. In fact, I bet that many readers did so just in virtue of having read the previous sentence. (If you didn't, re-read the last sentence and try again.) Imagining, unlike belief, is a voluntary activity. It is subject to the will.[3]

This point about voluntariness relates to a further distinction between imagination and belief concerning their relationship to truth. Belief is often said to have a special connection to truth, namely, that it aims at the truth. That's not to say that we can't have false beliefs. Alas, many of us have far too many of those. But as a general matter, when it comes to belief formation we try (or should try) to acquire only true ones. Likewise for belief maintenance. When we discover we have a false belief, we discard it. Matters are quite different with respect to imagining. Even when there are no pirates on the playground, there's nothing wrong with Penny and Priya each imagining that there are. Granted, we may and often do imagine true things. When trying to find my lost keys, I might imagine that they are hidden under some papers on my desk – and, lo and behold, sometimes that imagining gets it right! But we may and often do imagine false things as well, even things we know full well to be false. Unlike belief, imagining does not seem to have any special connection to truth one way or the other.[4]

Despite these differences between propositional imagination and belief, there's at least one important respect in which the propositional imaginings we've thus far considered seem to be more like belief than like other propositional desires such as desire and hope. This can be best understood by way of the philosophical notion of *direction of fit*. Attitudes like belief have what's called *mind-to-world* direction of fit, whereas attitudes like desire have what's

[2] The full text of *Through the Looking Glass* is freely available through Project Gutenberg at www.gutenberg.org/files/12/12-h/12-h.htm

[3] Dorsch (2012) develops an agency-based theory of imagination on which its voluntariness plays a crucial role.

[4] For further discussion, see Sinhababu 2016.

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called *world-to-mind* direction of fit. For beliefs, we try to fit our mind to the world; for desires, we try to fit the world to our mind. When forming a belief, our aim is met when the representational content matches with the world. (As should be obvious, this point connects very closely to the point just made about the special connection between belief and truth.) In contrast, when forming a desire, our aim is met when the world matches with the representational content. Propositional attitudes with world-to-mind direction of fit, including desires but also hopes and intentions, cannot be appropriately described in terms of truth and falsity. These notions don't apply to them. Rather, these propositional attitudes are more appropriately described as either satisfied or unsatisfied. When the world fits one's mind, the desire (or hope or intention) is satisfied; when the world does not fit one's mind, the desire (or hope or intention) is unsatisfied.

As we've seen, propositional imaginings differ from beliefs in that they need not aim to represent the actual world around us. But they nonetheless seem to be more like belief than like desire when it comes to direction of fit. We can see propositional imagining as having something like a mind-to-world direction of fit, perhaps, if we take the relevant world to be a particular imaginary world (or a particular possible world). Alternatively, we might be better able to capture the relevant similarity between propositional imagination and belief, and their difference from attitudes like desire, in terms of a distinction drawn by Nishi Shah and David Velleman (2005). On Shah and Velleman's view, we can best understand attitudes like belief and desire in terms of a distinction between attitudes that treat their contents as *true* and attitudes that treat their contents as something that is *to be made true*. Imagining and belief both fall into the first class, whereas desire falls into the second. Though an imagining need not aim at the truth, it nonetheless treats its content as true – or at least, true for the purposes of the relevant imaginative exercise.

Recently, some philosophers have argued that we should also recognize a different kind of propositional imagining that is more like desire than like belief. This kind of imagining is sometimes referred to as *desire-like imagining* (Currie 2002) and sometimes as *imaginative desire*, or *i-desire* for short (Doggett and Egan 2007). The basic idea is something like this: Just as we sometimes explore beliefs that we don't really hold by imagining their content in a belief-like way, we also sometimes explore desires that we don't really have by imagining their content in a desire-like way. For example, when Penny and Priya are pretending to be pirates, just as they might have a belief-like imagining that the other kids are pirates, they might have a desire-like imagining to kill all the other pirates in a sword fight. It's this desire-like imagining that causes them

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to yell things like, "Die, evil pirates, die!" and to thrust the tree branches they're holding (i.e., their swords) at the other kids. Supposing that Penny and Priya are good, non-homicidal children, it seems unlikely that they really want to kill all the other kids in a sword fight. Rather, according to proponents of i-desires, this is just something that they *imaginatively want*. Importantly, imaginatively wanting something isn't meant to be imagining (in a belief-like way) that you want something; it's being in an imaginative state of wanting.

The existence of i-desires is highly controversial. I myself am skeptical about their existence, as I think there are all sorts of ordinary desires that we can invoke to explain what's going on with Penny and Priya without having to postulate i-desires (Kind 2011; see also Spaulding 2015). For example, Penny and Priya want (actually want, not imaginatively want) to act like pirates. They also want (actually want, not imaginatively want) the pretense to incorporate the murder of the other pirates. To my mind, we can explain everything we need to explain about Penny and Priya's actions – why they yell what they do, why they move as they do – without needing any recourse to i-desires, and the postulation of this novel kind of propositional imagining thus strikes me as unmotivated. But I won't explore this debate any further here. Our main goal in this Element is to explore the connections between imagination and creativity. For this purpose, desire-like imagination would not be particularly relevant even were it to exist.

2.1.2 Sensory Imagination

The second type of imagination we will consider is sensory imagination. To understand sensory imagination, it will be helpful to focus first on what's often referred to as *imagistic imagination*. Let's return to our Decorating Decisions vignette. When Dave asks himself which shade of cream-colored paint would work best on the walls, the imaginative act in which he engages to answer the question will likely proceed by way of visual mental imagery. He visually imagines the walls painted in natural calico, then visually imagines them painted in almost oyster, and mentally compares the two in an effort to come to a decision.

In referring to this kind of imagining as imagistic imagination, we need to be careful. Though the notion of "image" often has a visual connotation, in the sense here intended it is meant to apply across sensory modalities. Dave's imagining is a visual one, but there are parallel imaginings corresponding to all the other senses as well. A musician working on composing a sonata might auditorily imagine how the notes in a given measure sound. A novice perfumer might be presented with various formulas as part of their on-the-job training and

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tasked with olfactorily imagining how they smell. A parent doing some online shopping for clothing for a child with sensory sensitivities might tactilely imagine how the shirt they are considering for purchase feels against the skin. It's thus important to be clear that we can talk of auditory, olfactory, gustatory, and tactile images along with visual images.

As this brief discussion suggests, while propositional imagination was best understood on analogy with belief, imagistic imagination is best understood on analogy with perception.[5] One way to bring out the analogy is to consider the phenomenology of both activities. Imagistically imagining a basketball has a similar phenomenal feel to seeing a basketball. There are differences of course. Hume (1739/1985) famously described the difference in terms of force and vivacity – the imagining is said to be less forceful and/or less vivid than the perceptual experience.[6] But they nonetheless share a significant degree of phenomenal similarity – so significant, in fact, that in rare cases one of these mental activities might even be mistaken for the other (Perky 1910).

Of course, the analogy to perception is not a perfect one. Like propositional imagination, imagistic imagination is subject to the will. Typically, all one has to do in order to imagistically imagine a given object or scenario is to set oneself the task of doing so. But just as this feature of will-dependence sets propositional imagination apart from belief despite other ways in which they are analogous, this feature of will-dependence sets imagistic imagination apart from perception despite other ways in which they are analogous. Though I can't make myself perceive a monkey simply by willing myself to do so, I can make myself visually imagine a monkey simply by willing myself to do so.

There's one important caveat. As first noticed by Francis Galton in the late nineteenth century, some individuals find themselves hard-pressed to produce detailed or clear mental imagery, and some even claim to be completely unable to produce voluntary mental imagery (Galton 1880). This phenomenon, now often called *aphantasia*, is still not very well understood, despite having received increased attention in recent years (see, e.g., Zeman, Dewar, and Sala 2015). But insofar as an individual has a deficit with respect to the voluntary production of mental imagery, they will have a corresponding deficit with respect to imagistic imagination and will not necessarily be able to engage in acts of imagistic imagination simply by willing themselves to do so.

The will-dependence of imagistic imagination goes hand in hand with another feature of it, namely, its lack of world sensitivity. Here again we can contrast imagination and perception. Perception is world-sensitive. When the

[5] For a helpful discussion comparing and contrasting imagination and perception, see Nanay 2016.
[6] See Kind 2017 for reservations about this way of putting the point.

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sights and sounds of the world around you change, your perceptions will change accordingly. Perception tracks these changes. It is sensitive to them. Imagination, in contrast, is not. Suppose that I am looking at my dogs who are sleeping on the couch. When the doorbell rings, they perk up, jump off the couch, and run to the front door. I no longer perceive them sleeping on the couch – I can't, as they're not there. But I can imagine them sleeping on the couch. Though my perception of them changes as their activity changes, my imagining of them need not. In line with our opening characterization of imagination, imagistic imagination allows us to represent things or situations other than as they in fact are. This point is often put by connecting imagination with possibility or, more specifically, by drawing a useful analogy: Imagination is to the possible as perception is to the actual.

With this sketch of imagistic imagination before us, now recall our third vignette, Empathetic Explorations. When Emily overhears the argument between Ellen and Eddie, she tries to imagine how each of them is feeling. This involves imagining emotions and other affective states. At other times she might also imagine feeling cold, or feeling pain, or feeling hungry. These kinds of imaginative exercises don't seem to be directly analogous to either belief or perception. Rather, they seem to be analogous to experience. To handle these cases, it looks like we should posit a third form of imagining, *experiential imagining*, that contrasts with both propositional and imagistic imagining.

Though it is important to include experiential imagining within our conception of imagination, philosophical discussion often treats experiential imagining within the same category as imagistic imagination. In practice, then, the three-way distinction that holds between propositional, imagistic, and experiential imagination generally collapses into a two-way distinction between propositional imagination and the other two combined. One reason that it's natural to group imagistic imagination and experiential imagination together, and to contrast them with propositional imagination, is that neither of these forms of imagining takes a propositional form.

Some philosophers have attempted to further motivate this grouping by suggesting that imagistic imagining is a subtype of experiential imagining. In Decorating Decisions, for example, Dave's imagistic imagining of his living room walls might be thought of us as an imagining of the experience of seeing them. This way of viewing the relationship between imagistic imagination and experiential imagination is common among those who adopt a simulationist approach to imagination, that is, those who see all imaginative states as simulations of other mental states (for one influential defense of simulationism, see Currie and Ravenscroft 2002).

Personally, I prefer a different way of motivating the practice of grouping imagistic and experiential imagining together. Recall that we have already

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stretched the notion of mental image so that it extends beyond the visual case. In my view, there's no harm in stretching it a bit farther, moving beyond the sensory domain so that we can think of pain imagery, emotional imagery, and other kinds of "feeling" imagery as being involved in experiential imagining. Once we do that, we can treat experiential imagining as a subtype of imagistic imagining. I will adopt this practice in this Element, and going forward I will refer to them both under the category of *sensory imagination*.

Before closing this discussion of sensory imagination, I should note some commonalities it shares with propositional imagination. Two of the key features of sensory imagination that we have discussed – its voluntariness and its lack of world sensitivity – are also features of propositional imagination. Just as we come to engage in sensory imagining by sheer force of will, and just as that imagining need not track the features of the world around it, we can come to engage in non-world-sensitive propositional imagining by sheer force of will. I can imagine two peacefully sleeping dogs, and I can imagine that two dogs are sleeping peacefully, even if the dogs I am imagining are in fact maniacally jumping up and down and barking at the front door. These two features are also indicative of a third commonality, namely, that both propositional imagination and imagistic imagination are mental *activities*. The fact that imagining is subject to the will shows us that imagining is something that we do, not something that just happens to us.

In my view, there is an additional commonality as well. As is widely agreed among philosophers of imagination, images are often involved in some way in propositional imaginings as well as in sensory imaginings. When Penny and Priya imagine that all the play structures in the park are pirate ships, they will likely mentally superimpose pirate-paraphernalia on the play structure as they look at it – a flag with skull-and-crossbones, loaded cannons, barrels of rum, and a giant tattered sail. The way that they imagine the relevant proposition, in other words, is by producing mental images of what the proposition represents. Are these mental images merely incidental to the act of propositional imagining? Could they make do equally well without them? Many philosophers would answer in the affirmative. Such philosophers believe that imagination – in particular, propositional imagination – can occur without imagery. (See, for example, Walton 1990; Van Leeuwen 2013; Stokes 2019.) I disagree. There are many ways to speculatively consider a proposition. One might propositionally imagine it, but one also might suppose it or conceive it. What makes the speculative consideration an act of imagining rather than one of these other mental activities? To my mind, the best way to answer this question is to invoke mental imagery (Kind 2001; see also Brann 1991). What differentiates propositional imagination from sensory imagination is not that imagery is essentially involved in the one and not the other but

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