Penultimate draft, to appear in The Philosophy of Creativity. Ed. E. Paul and S.B. Kauffman (Oxford: Oxford University Press). Please do not cite without permission.

The role of imagination in creativity

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It is perhaps an uncontroversial truth that the imagination is important for creative thought. The terms 'creative' and 'imaginative' are often used interchangeably, at least in popular contexts. And volumes have been written on the imaginations of creative artists, not to mention poems, films, paintings, and other depictions of the same phenomenon. Kant recognized a connection between imagination and creativity.

> So the mental powers whose combination (in a certain relation) constitutes *genius* are imagination and understanding. One qualification is needed, however. When the imagination is used for cognition, then it is under the constraint of the understanding and is subject to the restriction of adequacy to the understanding's concept. But when the aim is aesthetic, then the imagination is free, so that, over and above that harmony with the concept, it may supply, in an unstudied way, a wealth of undeveloped material for the understanding which the latter disregarded in its concept (Kant [1790]1987: 185).

A number of important insights can be gleaned from this passage. Consider Kant's distinction between imagination used for conceptual understanding and imagination used for artistic ends. By way of this distinction, Kant intimates two features of imagination endorsed today. First, imagination provides a kind of cognitive freedom important for creative thought and action.[1] Second, imagination can be used in more or less constrained ways. Kant's thesis is about aesthetic ideas and the special service that imagination provides for that particular kind of mental engagement but it can—contrary to what Kant suggests—be

[1] Imagination for Kant was, by most interpretations, something different than it is for philosophers and psychologists today. The Kantian imagination was the activity of both apprehending and reproducing the ideas and percepts from the manifold of experience. So 'imagination' for Kant, it seems, denoted what today we would probably call understanding and perceptual belief, in addition to imagery and propositional imagination.

generalized. Indeed, the thesis generalizes both beyond the aesthetic to creative scientific theorizing and problem solving, and beyond radical creativity or genius to more mundane, everyday creativity.

The thesis advanced here is that imagination is important for even the most minimally creative thought. This general claim may also be a truism. But it would be nice to have in hand some reasons for thinking it so. Very few philosophical analyses have been offered to this or some similar end. And though psychologists have researched both imagination and creativity, studies which attempt identification or testing of a link between the two phenomena have been sparse.[2]

So, how might creative thought and imagination be connected in an architecture of the mind? This paper addresses this question, centrally from the perspective of philosophy, but with empirical assistance from cognitive and developmental psychology. In addition to illuminating the connection between the two phenomena, consideration of recent work on imagination helps us to better understand creative processes.

I. Artistic creativity and truth-boundedness

Kant was right: imagination, when used to aesthetic ends, provides a free play of ideas, a "wealth of undeveloped material for the understanding." And contrary to Kant, imagination has this feature whether or not it is used for aesthetic ends. With respect to the

[2] Philosophical exceptions include Carruthers 2002 and Polanyi 1981. For analysis from psychology, see Cacciari 1997; Ward 1994. Worth special mention is a paper by Berys Gaut (2003). Gaut provides an analysis that explores and advances insights from Kant, in particular on artistic creativity and aesthetic ideas. The analysis offered below is generally compatible with Gaut's, since Gaut too argues that imagination is important to "active creativity" (he claims the connection to be an *a priori constitutive* one). However, Gaut's analysis is distinct in at least the following ways: (a) he focuses on rich creativity, explicitly committing to a value condition for creativity; (b) he focuses very little on non-artistic creativity, e.g. creativity in theory or science; (c) he focuses on metaphor-making as a paradigm of the creative use of the imagination, maintaining that study of the former is especially revealing of the structure of the latter. As the reader will discover, the present analysis is distinct from Gaut's analysis in at least these three ways.

range of contents that one can take a certain cognitive attitude towards, imagination enjoys a freedom that most (perhaps all) other attitudes or capacities lack.[3] One can imagine situations that have not and will never happen. One can imagine the truth of propositions of which one is uncertain. One can imagine consequences to an action before performing it. And so on. This cognitive play is important if not essential to creative art making. This is for the simple reason that creative things are, in part, new things. And new things are, sometimes, new combinations of old things, combinations of concepts, ideas, skills, knowledge, and so on. Or stronger, creativity may involve thoughts or actions that are radically novel, not merely conceptual combinations of existing materials. It may involve a radical transformation of a conceptual space (Boden 2004). The strongest traditional account of novelty and creativity endorses a *creation ex nihilo* thesis: truly creative ideas come from nowhere. Whatever the case, a capacity like imagination—even as sparsely described here—is needed for this kind of conceptual combination, transformation, and formation.

Consider Bach's famous work, *The Well-Tempered Clavier*. The work consists of Book I and Book II, each one comprising a set of one prelude and one fugue devoted to each of the twelve major and minor keys. Grant a few simple assumptions. First, this is a creative work of art, whatever other properties one may or may not attribute to the work. Second, Bach was responsible for this creation; it was not, as ancient and romantic theories might have it, merely a product of a muse or divine inspiration. Finally, part of Bach's goal, as evidenced by the title of the work, was to explore the possibilities of two musical technologies new to his day: tempered tuning for keyboard instruments and the tonal scale system.[4] Conjoining these assumptions: this is an instance of rich creativity, but one that was highly constrained in

[3] This is not to imply that imagination is always unconstrained. A more precise clarification of imagination, including this qualification, is offered in section IV below.
[4] In fact, some theorists hold that he created these works for largely didactic purposes (Tomita 1996, 1998).

identifiable ways. A natural question to ask is, simply, how did Bach do it? Tough question. One way to make headway on such a question is to identify the constraints on the artist and what sorts of cognitive manoeuvring these constraints necessitated (in order for the work to be created). As will become clear, even in constrained circumstances the creative process required the cognitive play mentioned above.

Bach knew a lot about the tempered tuning technologies and, more broadly, music technologies. But he didn't know everything (he was a genius but he was, after all, human). So let's imagine a *Super-Bach*, one who knew *everything* there was to know—both in terms of all of the facts and all of the relevant skills—about the clavier, tempered tuning, and the twelve-tone scale. This would not have been sufficient for the creation of *The Well-Tempered Clavier*. Indeed, Super-Bach might be an omniscient being, with complete knowledge of all of the music-theoretical space of the time and would not yet have knowledge of the musical structure of *The Well-Tempered Clavier*. Super-Bach's knowledge (just like actual Bach's knowledge) of the space would indeed constrain his composition, but this knowledge alone would not amount to, afford, or even imply the musical work in question. This is for the simple reason that there is nothing in this conceptual domain, or cluster of domains, that includes or entails (by itself) *The Well-Tempered Clavier*. The general point is about how far states like knowledge (or justified true belief, if one prefers) can take us towards thinking creatively. And the suggestion is this, any cognitive state that functions to faithfully represent the information of some conceptual space—be that cognitive state a true belief, propositional or procedural knowledge, a memory—can at best play a necessary but insufficient role in the thinking required for an accomplishment like *The Well-Tempered Clavier*.

Truth-bound cognitive states, as they will be called here and as will be clarified below, are rarely sufficient for creative thought.[5]

The same point can be made in simple terms of information. Given some set of information {I}, different agents will acquire different knowledge about {I}. The content of the *knowledge* had with respect to {I} derives solely from {I}, since to be knowledge of {I} some belief or skill will have to accurately represent some element of {I}. Of course, not all thoughts about {I} amount to knowledge. Some will be false beliefs, some true but unjustified, others false and unjustified. Still others will be non-doxastic: one might have entertainings, desires, intentions, curiosities, doubts, and imaginings, among other states, with respect to {I}. Among these latter states, many are *non* truth-bound.

'Truth-boundedness' denotes the accuracy function of a class of cognitive state. And so 'truth' is here used in a broader, stipulated sense since, in addition to propositional states, it must accommodate procedural kinds of knowledge or skills—one learns more or less *accurately*, not truly, how to make an omelette or fix a flat tire.[6] Beliefs of course can be false, and we can inaccurately learn skills. But when properly functioning, these kinds of states accurately represent whatever features of the world they aim to represent. They are essentially inflexible in this way.[7] The same goes, on recent philosophical accounts, for remembering and seeing. This implies a working schema for truth-boundedness.

> *Truth-boundedness:* A cognitive state **Φ** is truth-bound if a proper function of **Φ** is to accurately represent (some part of) the world.

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[5] This claim is apparently supported by empirical study on practice and expertise. See Meinz and Hambrick 2010; Campitelli and Gobet 2011; and Hambrick and Meinz 2011.

[6] We might instead say 'accuracy bound' or 'accuracy functioning', but these terms simply aren't as snappy. And there are a number of terms in current philosophical usage: 'factive', 'truth-aptness', 'truth-functional', 'truth tracking', 'truth committal.' Each of these terms may be related to the notion that 'truth-bound' aims to capture. But each is certainly distinct, and with connotations that would likely distract from present purposes. So, 'truth-bound' it shall be.

[7] For one important discussion of this feature of belief, see Velleman's 'The Aim of Belief' in Velleman 2000.

This definition, although perhaps unhappily imprecise, provides a sufficient mode of distinction, useful enough to demarcate two classes of cognitive states and capacities. Any type of state that satisfies this condition is truth-bound. States that do not satisfy the condition, that lack this representational function and are relevantly flexible, are *non truth-bound*.[8]

Although not a complete catalogue, the following states all appear to be non truth-bound: imaginings, suppositions (many philosophers take supposition to be just an impoverished form of imagining), curiosities, desires, hopes, wishes, fears, and many other emotions. Perhaps all of the states just mentioned lack a (exclusive) mind-to-world direction of fit. Desires, hopes and wishes, for example, instead have a world-to-mind fit (Searle 1983). But to be clear, 'non truth-bound' does not just mean states with world-to-mind fit, as opposed to the mind-to-world fit of doxastic states. Following some cognitive accounts of emotion, we might think of emotions as having both directions of fit, since (on such accounts) the emotional state is (partly) constituted by both a belief and a desire-like state (De Sousa 1987; Oatley 1992; Oatley and Johnson-Laird 1987). Fear, for example, may be constituted by a belief that there is some danger to oneself and a desire to remove oneself from that very threat. So fear would be characterized by both mind-to-world and world-to-mind fit.

[8] We might hesitate to call many skills 'states', let alone 'cognitive states.' And their being truth-bound, even in the broad way specified, implies they are representational to some degree. This is somewhat orthogonal, since we are primarily interested in creative *cognition*, which will surely involve representational cognitive states if anything does. But to be clear, one only need grant that in learning and executing some skills, certain states of the learning or executing agent represent features of the environment. In learning how to read music, I form beliefs and acquire concepts which represent the musical theory and notation before me. These representations may not exhaust the skill, but they are partly constitutive of it. And even an apparently "non-cognitive" skill, can be similarly described. In practicing my tennis backhand, my motor actions (aim to) mirror those of my instructor (and I certainly think about it this way, as I practice). This skilful activity *may* be explained without appeal to mental representation, but nonetheless some states of the system, namely my physical body, mirror features of my environment (even if those states are described in purely physiological, non-mentalistic terms). And so on. The point is just that some skilful activity involves states which function to represent their environments, where these states may be more or less accurate in performing this function.

Imaginings are not inherently constrained in either direction, instead possessing a direction of fit (or not) relative to the context of imagination. So, for example, if one is reading a fictional narrative and one is attempting to follow the imaginative prescriptions of that narrative, one will imagine just the propositions that the story makes (fictionally) true. One's imaginative states, in such instances, have a kind of mind-to-world fit, where the world is just the fictional world of the story (Walton 1990). Alternatively, if one thinks that some imaginative states can be desire-like, then perhaps they enjoy a (fictional)-world-to-mind direction of fit (Currie 2002; Currie and Ravenscroft 2002; Stokes 2006; Doggett and Egan 2007). So the notion of truth-boundedness is not captured by simply distinguishing directions of fit.

In Kant's terms, then, non truth-bound states are not "subject to the restriction of adequacy to the understanding's concept." These states are necessary for richly creative thinking—for novel conceptual combinations, transformations, and formations—since truth-bound states fail to do the relevant work. Non truth-bound states do not function to accurately represent the world; these states potentially, and without malfunction, involve (at least) minimal manipulation of the information they carry or (re)present. Put another, hopefully familiar, way, these states (by contrast with truth-bound states) do not aim for objectivity. As such these states do not purport to tell us about the mind-independent world (or the facts about some subject matter), and so do not "go wrong" when they do not match the world (or those facts). Creativity, it should be no surprise, is not after all an intrinsically truth-seeking enterprise.[9]

[9] A couple of important qualifications need to be made. First, the claim is that imagination is not truth-bound, in the sense that imagination does not *qua* imagination, properly function to accurately represent the world. This is compatible with the claim, maintained by many modern and contemporary philosophers, that imagination can be *used* to determine or reason about modal truths. Indeed, if one maintains the strong position that imagination is, by its nature, bound to provide information about modal truth, then the mention of 'world'

All of this motivates hypothesizing a certain functional role as part of creative cognition. Creativity, at least of the sort that Kant had in mind and of which Bach provides one example, requires non truth-bound cognitive states in the process that enables it (or just is it). Call this the *cognitive manipulation role*. It specifies not just the *allowance* for but indeed the *need* for non truth-bound states in the creative process.[10] This is the lesson of the Super-Bach thought experiment: all of the relevant musical-theoretical knowledge (all of the relevant truth-bound states) would not suffice for the composition of *The Well-Tempered Clavier*.

Imagination serves this cognitive manipulation role. Bach presumably imagined, working from within the constraints that he imposed upon himself, how certain musical combinations and structures would achieve certain goals. He did not, as it were, simply read off or abstract from the relevant music-theoretic information. He had to manipulate, by use of the imagination, that information (and perhaps add to it) in ways unbound to accurately representing it. This oversimplifies Bach's creative process, but the general point should be clear. There is, for richly creative achievement in the arts and sciences, a cognitive manipulation role, and imagination serves it well. This is part of Kant's insight. This insight is extended to more mundane creativity in §II, and then made more precise in §III and §IV.

II. Minimal creativity and cognitive manipulation

in the definition of 'truth-boundedness' becomes importantly operative: present interest is in a distinction between mental states that are bound vs. not bound to accurately represent truths about the *actual* world. (A reason to doubt this strong position is that, as some have argued, imagination in the context of fiction appears to allow for contradiction, incoherence, and incompleteness. See Walton 1990: 57-67). The second qualification concerns the claim that creativity is not intrinsically truth-seeking. One may worry here about creative processes and products in the theoretical and scientific domains. The scientist is, after all, aiming at truth. Does the present account preclude her thoughts and behaviours from being creative? This concern raises big issues about discovery vs. creation, some of which will have to be skirted here. But the first thing to say is that some of scientific discovery is presumably not creative. However, much of it is creative, and the present analysis is committed to the claim that when theorizing *is* creative, even if the broad enterprise is a truth-seeking one, *some* of the process that leads to the theory or result will involve cognitive manipulation and, necessarily, inclusion of non-truth bound states. This implication will hopefully become clearer in the sections that follow.

[10] This role will be further characterized in section II.

A reason for thinking that creative processes require cognitive manipulation is that the creativity of Bach and other geniuses involved a *cognitive breakthrough* (or several). Bach began with a conceptual space—in this case a new music-theoretic space—and had to *do* something with it, importantly, something that had never been done before. In this way Bach's creativity is radical, since at the very least his work is novel relative to the entire history of music and in a way that is exciting, valuable, and instructive. This kind of change is not possible using inflexible, truth-bound cognition. Cognitive breakthroughs, however, can be much more banal. But even the everyday breakthrough, as will now be argued, implies that some cognitive faculty play the role of cognitive manipulation.[11]

From the standpoint of philosophy, psychology, and cognitive science, radical creativity does not exhaust theoretical interest. It may in fact be the last place to look if giving a cognitivist or naturalistic analysis of creativity. A number of theorists have acknowledged this general point. Margaret Boden, for example, makes an influential distinction between *historical* and *psychological* creativity (Boden 2004). The first is just as the name implies: an idea or act is novel if it is new relative to the history of ideas (or, broadening the notion, relative to some class of behaviour or culture). Psychological creativity involves ideas that are novel relative to some individual mind. Others too have suggested weaker, mundane, or minimal senses of creativity.[12] The thread common to these analyses is this: creativity is not exclusive to minds like Bach or Beethoven. All human thinkers have some capacity for thinking in ways that are relatively original, for taking on novel skills and information, for solving problems in surprising and unexpected ways. What conditions, then, are there on a more everyday sense of creativity?

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[11] See Stokes 2011 for more on cognitive breakthroughs.

[12] See Barsalou and Prinz 1997; Prinz and Barsalou 2002; Bird and Stokes 2006; Carruthers 2002; Nanay, this volume; Stokes 2007, 2008, 2011; Weisberg 1986, 1999

Boden's distinction is really one between two different types of novelty: an *F* is historically or psychologically creative by virtue of being, respectively, historically novel or psychologically novel. A novelty condition captures our most basic of intuitions about creativity: creative *F*s are novel *F*s. Boden's important insight is that our interest in creative thought outstrips historical novelty or novelty *simpliciter*. A child who works out a difficult mathematical theorem in a surprising way, even if the theorem is well known and established (but unbeknownst to the child), has done something we rightly acknowledge as importantly novel, namely, novel *for the child*. If Borges' character, Menard, manages to re-write parts of Cervantes' *Don Quixote* without copying the text, then he has done something psychologically novel (Borges 1964).[13] In both of these cases, the thoughts and actions of the agent are, even if not novel relative to the history of ideas, novel relative to the cognitive histories of the relevant agents. This difference in novelty needn't be one in kind, but instead a difference in the scope of the comparison class: the child's mathematical solution is novel relative to a narrow class of ideas (namely, that child's), while Godel's incompleteness proofs were novel relative to a much broader class (say, all ideas before Godel). In any case, psychological (or, we might say, *behavioural*) novelty provides one necessary condition for a minimal concept of creativity.

A second plausible condition is agency, which captures the fact that creative thoughts and behaviours are ones for which we are responsible, as evidenced by their general praiseworthiness. Sunsets and cloud figures may be aesthetically interesting, but they are not the kinds of things that we count as creative. One withholds an attribution of creativity here by the same token as one grants it for an artwork or scientific thesis: creative *F*s are the

[13] Psychologically novel at the very least: were Menard to accomplish such a task, he may well have done something historically novel. And, if Borges' theorizing is accurate, Menard would thus have created an entirely distinct work and one with different aesthetic properties. For discussion of the ontological implications of a case like this see, among others, Goodman and Elgin 1986; Currie 1991; Davies 2004.

results of agency. Moreover, creative *F*s have to be linked with agency in the right way: we don't judge happy accidents creative, even if interesting and valuable. An agency condition, suitably sharpened, is thus a necessary condition for minimal creativity. Conjoining these two conditions:

> *MC*:* Some thought (or action) x is minimally creative only if, for some agent A, x is the non-accidental result of the agency of A and x is psychologically (or behaviourally) novel relative to A[14]

It will be assumed here that a novelty condition and an agency condition are conditions on any sense, minimal or rich, of creativity. These conditions are necessary, but unlikely sufficient even for mundane, everyday creativity.[15] But they are sufficient to characterize creativity for present purposes. That is, even with this incomplete definition, we can ask important questions about creative cognition. We can ask what kinds of cognitive faculties are needed to generate thoughts and action that meet these two basic conditions. So grant that MC* provides a working characterization of minimally creative thought, and grant further that minimal creativity is a common phenomenon.

Even minimally creative thought and behaviour requires cognitive manipulation. To see this, consider two independent sets of studies in experimental psychology, both of them on figurative thought.

First consider three related studies on drawing capacities. Annette Karmiloff-Smith solicited drawings of nonexistent houses, people, and animals from children ranging in age from 4 to 11 (Karmiloff-Smith 1990; 1992: 155-61). Christina Cacciari and colleagues

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[14] 'MC*' is used here to flag a weaker characterization of my MC (Stokes 2011). See that discussion for extended analysis of an agency condition plus a third (modal) condition, argued to be conjointly sufficient for minimal creativity. And see Gaut 2009 for related discussion of agency and skill.

[15] For alternative, additional conditions (or simply, alternative analyses), see Boden 2004; Gaut 2003; Gaut and Livingston 2003; Nanay (this volume); Novitz 1999, and for analyses from an empirical perspective, see Sternberg 1999. One condition commonly posited (indeed by most if not all of the just mentioned theorists) as necessary for rich creativity is a value condition: an *x* is richly creative only if it is valuable (or useful). See my 2008; 2011 for worries about the theoretical value of a value condition.

solicited drawings of nonexistent houses and animals from children in the same age range (Cacciari et. al 1997). Thomas Ward performed similar studies on adults, asking them to imagine and draw nonexistent creatures (Ward 1994, 1995). One hypothesis, motivated by all three sets of data, is that children and adults alike are highly constrained by their existing concepts: concepts, like HOUSE, PERSON, or ANIMAL, significantly constrain how a person is able to depict novel instances of such concepts. Although frequency of cross-category combination increases with age, the properties from any one category are relatively stable. Ostensibly then, individuals "retrieve a specific instance of a given category and pattern the new creation after it, regardless of whether they were required to imagine and draw an artefact such as a house or a natural kind such as an animal" (Cacciari et al. 1997: 157).

So even given invitations to create nonexistent things, the drawings were quite predictable—largely generated in line with the relevant conceptual schemes. Nothing *radically* novel here. However, a question remains: are any of these drawings possibly enabled *merely* by the relevant conceptual knowledge? We know that the subjects consistently deployed their concepts of HOUSE, PERSON, etc., to make their drawings; was this knowledge sufficient? No. The concepts of HOUSE and PERSON, no matter how rich, will not (by themselves) enable a child to draw a house with eyes for windows, a mouth for a front door, and arms and legs. These cross-category changes require the child to cognitively manipulate, rather than faithfully mirror, the conceptual space in particular, albeit minimal, ways. These drawings require non truth-bound cognitive states.

Consider a second set of studies on the development and acquisition of figurative linguistic competence—comprehension of metaphors, idioms, proverbs and the like. Children as young as 7 years of age are able to understand and use figurative language. The

development of this competence is not based in rote learning mechanisms. One plausible reason for this is that metaphoricity co-varies with abstraction:

> As with nouns, verbs that are understood at a higher level of abstraction are rated as more metaphorical than when the same verbs could be interpreted at the basic (literal) level. Furthermore, this effect is graded: the higher the level of abstraction, the higher the rated metaphoricity. These findings suggest that people use level of abstraction as a cue to metaphoricity for both nominal and predicative metaphors (Torreano, Cacciari, and Glucksberg 2005: 259)

And recognizing metaphors, as abstractions, is not accomplished simply by observing adult usage of metaphor.[16] Instead one must suspend the literal meanings of the relevant terms and phrases.[17] Learning and recognizing metaphors thus consists in the acquisition of what some call *figurative competence*. This suite of abilities includes the apprehension of a variety of meanings for a single lexical item, suspension of purely literal or referential linguistic strategies, awareness of linguistic conventions, and the importance of the context of utterance (Cacciari et al 1997: 159).[18]

The relevant moral is that learning figurative linguistic types is not enabled by straightforward rote learning: one does not just memorize a meaning and syntactic role for the lexical item(s). This learning requires more than truth-bound cognitive states, more than entertaining and assenting to the information contained in the relevant conceptual space. It requires some consideration of and simple hypothesis formation about the potential for multiple meanings, multiple syntactic roles, conventional and contextual factors, among other factors. These considerations involve more than the formation of true beliefs and

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[16] See Levorato et al (2004: 304), which cites the following studies in support of this thesis: Kempler, Van Lancker, Marchman, & Bates, 1999; Levorato & Cacciari, 1992, 1995; Nippold & Martin, 1989; Nippold & Rudzinski, 1993; Van Lancker & Kempler, 1987.

[17] As Levorato et al (2004: 304) puts it, what's required is "the ability to suspend, if not suppress, contextually inappropriate meanings. In the case of idioms, the reader has to suppress the constituent word meanings that are irrelevant to the figurative interpretation. According to Gernsbacher and Faust (1991; Gernsbacher, Varner, & Faust, 1990), poorer performances in reading for comprehension in adults (and children) might be due to the deficient suppression mechanisms possessed by less skilled readers…"

[18] See also Cacciari and Levorato 1989; Gibbs 1987, 1991, 1994; Levorato and Cacciari 1992, 1995, 1999, 2002.

accurate skills. Or better put, even if the development of beliefs and skills—and thus the acquisition of propositional and procedural knowledge of figurative language—is the end result, this result involves as its means some non truth-bound states. The lesson of this rich set of research is that this result is not enabled by "merely reading off" the information contained in the conceptual space.

The drawing and figurative language behaviours possess two marks of creativity: agency and novelty. The cognitive behaviours of the subjects are effortful and involve thoughts that are (some of them) novel relative to the minds of those subjects. Behaviours that, in this way, meet the conditions of MC* are not *richly* creative, but if there is a continuum of creative cognition, they lie at the end opposite the cognitive behaviours of Bach and Beethoven. In simple terms, they involve *doing something* with the information in the relevant spaces, and in (agent-relative) psychologically novel ways. Note that this is consistent with resisting an attribution of any rich sense of 'creative' in these instances.

Both the drawing behaviour and the figurative language behaviour require non truth-bound cognitive states. The subjects must manipulate the information in that space and use it in cross-categorical ways, even if only in the minimal ways required to humanize a house or comprehend a phrase like 'Lawyers are sharks.' And so these cognitive behaviours, like Bach's composition, require cognitive manipulation. From here, we might derive an empirical generalization. If these cognitive behaviours are minimally creative, then minimally creative cognition requires cognitive manipulation. The inference here is an inductive one: a generalization from two classes of novel cognitive behaviour to all minimally creative cognition. As an empirical generalization, the inference is strong to the degree that the novelty in these behaviours typifies (psychologically) novel behaviour. The cognition involved—concept deployment and combination in the first set of studies, and non-literal

linguistic learning in the second set—is general and basic, and so any psychological novelty that emerges would also be basic. Another way of putting the point is this. The degree or quantity of non truth-bound resources needed to behave in psychologically novel ways—either in the drawing tasks or the figurative learning tasks—is quite low. And so, plausibly, any minimally creative cognition would require at least this much of the same non truth-bound resources.

This empirical generalization may be combined with the earlier conceptual considerations. Novel cognition—be it radical historical novelty or mere psychological novelty—requires more of an agent than accurately representing a conceptual space, even when the tasks are simple and mundane. Novelty implies cognitive manipulation. It is thus the novelty in the studied behaviours that does the work of motivating the claimed need for cognitive manipulation. Creative behaviours *qua* novel behaviours reasonably require whatever resources enable the psychologically novel behaviours in these studies (even if one denies creativity of the latter). These resources have been distinguished as non truth-bound cognitive manipulation, by contrast with truth-bound beliefs and skills. So, if these behaviours require cognitive manipulation, and creative cognition requires at least this much (by way of non truth-bound cognitive resources) of its agents, then creative cognition requires cognitive manipulation. This generates a thesis:

> *Cognitive manipulation thesis (T):* Creative thought and behaviour (rich or minimal) requires cognitive manipulation. Cognitive manipulation involves thinking about the contents of some conceptual space in non truth-bound ways.

This thesis is so far pretty thin: only the notions of truth-boundedness and minimal creativity have been adequately clarified. And so in order to better hone in on the best candidate

cognitive faculty or faculties for the cognitive manipulation role, a more thorough analysis of the cognition typical of creative processes is needed.

III. Enriching the cognitive manipulation role

Whether it is creativity in the category of genius or the everyday, a number of cognitive (or at least *mental*) features typify a creative process. Although these features may not be possessed by every instance of creativity, they do (and usually in some combination) typify a great deal of creativity. Indeed, very plausibly, any instance of creativity will involve some combination of this cluster of cognitive features. Here is the strategy: Identify a cluster of typifying cognitive features. To identify this cluster of features is to enrich the cognitive manipulation role. In terms of explanation, it is to identify desiderata for any theory of creative cognition, features that on balance should be explained by the mechanisms posited or invoked by the theory. And if one type of cognitive faculty best serves this role, then that faculty is plausibly necessary for much if not all of creativity. As should be clear by this point, the concluding thesis (§IV) is that imagination is the relevant faculty.

A brief qualification before proceeding. The central *explanandum* for this paper is the active, conscious component/s of the creative cognitive process. The term 'cognitive manipulation', is intended to make this perspicuous. Although much of the traditional literature on creativity focuses instead on either (or both) (a) implicit cognition (sometimes called *incubation* or, less technically, *insight*) or (b) free association, a great deal of creativity results from deliberate and active cognitive effort. Indeed, if it is minimal creativity in question, it is plausible that active creativity is (part of) the norm. That said, the analysis given below is compatible with the inclusion of these other, less active and/or less conscious, cognitive aspects in a complete explanation of the creative process. Indeed, the

present analysis can work in tandem with explanations of (a) and (b), if not partly explain the importance of (a) and/or (b). More on this below.

Begin by considering an uncontroversial instance of creativity, Picasso's *Guernica*. If one visits the Museo Reina Sofía in Madrid, one will find displayed in conjunction with the massive piece itself over 300 of Picasso's preparatory sketches and (at least this was true a few years ago) a photojournalistic study of Picasso creating the piece. From these photos one quickly learns that Picasso's process included removing or covering components that he had already painted on the final canvass. The process involved not just exhaustive prepping before painting but, essentially, erasing. A case like this reveals the silliness of traditional divine inspiration theories of creativity. Picasso's execution was long, deliberate, and arduous.[19] So unless the traditional theory explains this case by positing a divinely inspired Picasso-automaton (and moreover, where the inspiring deity was apparently regularly changing its mind), the traditional theory cannot explain a paradigm case of creativity. Kicking dead theories to one side, the lesson to glean here is that Picasso produced his work through careful, deliberate thought. This suggests the first desideratum.

Voluntariness: The creative process typically involves a cognitive faculty or faculties that *may* be engaged voluntarily by the creating agent. Very often, even if not always, a person decides to take on a certain project—produce a painting or poem or melody, introduce a new scientific thesis or a new way of testing it, improve or invent a technology, identify a new way of solving a puzzle—and in taking on this project must deliberate, hypothesize, scrutinize, test, try, tweak, and revise. The same is true, even if to lesser degree, for instances of minimal creativity (or, if one prefers, psychological novelty). For example, the subjects of the studies on figurative language had to actively play with the contents of the

[19] For related debate in the psychological literature, see Weisberg 1995; 2004 and Simonton 1999; 2007 (and the critical commentary accompanying the latter target article).

relevant linguistic or conceptual space. In all such cases, the cognition involved was ostensibly under the will of the agent: whatever cognitive faculty or faculties she uses, at least a significant portion needs to be the sort that she can voluntarily, and relatively immediately, control. To be clear, this imposes no requirement that the relevant faculty *always* be under voluntary control. And indeed, given so-called Eureka moments and free-associative insight, a faculty that is generally but not always under voluntary control may be preferable.[20]

Affect and motivation: Creative products, especially artworks, are often emotional in character, both in what they express and what they evoke in their audience. And artists (and generally, any person acting creatively) are emotionally moved by their creative productions and, importantly, before these productions are finished. The point here is not just one about being motivated, and emotionally affected, by "getting the job done." Of course the creative person feels this. But plausibly, in working through the creative process, a person gets emotionally caught up with and in turn motivated by, the deliberation, hypothesis-generation, attempts and failures, and so on. This provides another desideratum for a theory of creative cognition: creative processes often involve mental mechanisms that causally interact with affective and motivational systems.

Inference and decision making: Although the creative process (typically) requires flexibility in the form of non truth-bound cognition, it also requires cognition that can contribute to decision-making and inference. After testing and deliberation, the scientist will draw certain conclusions about how the theorizing should proceed, or about what methods of testing are possible. After considering a variety of possible media or techniques for this or that element

[20] *Working memory* is plausibly relevant here. Information must be made available for manipulation and further processing, and this is generally how psychologists understand the theoretical role of working memory. However, the latter is not going to do the work of explaining (or serving) the cognitive manipulation role as it is understood here, in particular given the features of non truth-boundedness, affect, and free association. At most, working memory will be a *necessary* but insufficient condition for cognitive manipulation.

of a work, an artist will ultimately select the medium or technique she deems best (by some criterion). Consider the child who is learning the metaphor 'Lawyers are sharks'. After reflecting on relevant contextual factors and non-literal possibilities for these words, while suppressing distracting literal meanings, the child will infer an interpretation. So the output of an inference or decision is, typically and respectively, a belief or an action. One forms a belief that '*This* hypothesis/testing method is possible', or 'The phrase can be used *this* way". Or one forms an intention on how to proceed at a juncture in the process. But the output does not exhaust the inferential or decision making process: there is always some cognitive means that fills out the inferential or decisional procedure. The suggestion here is that creative processes are no exception: insofar as these processes often involve inferences drawn and decisions made, whether intermediary or final, these processes will need to involve cognitive faculties that connect in appropriate ways with inferential systems.

Free association: This may just be an extension of the non truth-boundedness already identified. But the notion of free association has figured so largely in philosophical and psychological theorizing about creativity that it deserves separate mention. Here a romantic characterization is instructive rather than distracting. Kekulé's discovery of the benzene molecule may be the most popular of anecdotes in creativity theorizing. One of Kekulé's own descriptions of the discovery goes as follows.

> Again the atoms were gambolling before my eyes. This time the smaller groups kept modestly in the background. My mental eye, rendered more acute by repeated visions of this kind, could now distinguish larger structures, of manifold conformation; long rows, sometimes more closely fitted together; all twining and twisting in snakelike motion. But look! What was that? One of the snakes had seized hold of its own tail, and the form whirled mockingly before my eyes. As if by a flash of lightning I awoke (qtd. Boden 2004, 26).

A common and reasonable way to describe Kekulé's mental activity here is as free-associative: he was allowing, without much mental effort, ideas and concepts to combine

without active direction or correction. Atoms mingled with snakes, twisting, turning, biting, and so on. If one introspects one's own mundanely novel behaviour—say, if one is asked to draw a humanized house—one will sometimes plausibly find similar free-associative activity. The idea to turn some hedges into a beard or some opened window shutters into ears might come simply by randomly mixing house concepts and person concepts, letting these "ideas float around in one's head" as we might say. This provides another desideratum: creative processes often involve this kind of conceptual freedom, and so a faculty suitable for free association should plausibly be part of an explanation of creativity.

In addition to these four desiderata, non truth-boundedness has already been identified and defined. Conjoining these five features of creative processes provides a more robust job description, a richer characterization of cognitive manipulation. The enriched thesis is this:

> *Cognitive manipulation thesis (R):* Creative thought and behaviour (rich or minimal) requires cognitive manipulation. Cognitive manipulation typically involves voluntarily thinking about the contents of some conceptual space in non truth-bound ways. In creative processes, this cognitive activity often causally interacts with affective, motivational, inferential, and free associative capacities.

While perhaps not every instance of creativity will be enabled by or require this cognitive profile in full, much (perhaps all) of creativity seems typified by some combination of these features.[21] To the degree that a cognitive faculty is capable of possessing all of these features, this faculty is a good candidate to fill the role of cognitive manipulation (now more richly understood). And if there is one type of faculty that possesses more (or all) of these features, by contrast with other cognitive faculties, then that faculty very plausibly is *the* faculty to play the role.

[21] Two additional putative aspects of creativity, insight (understood as resulting, apparently unwilled, from unconscious or subconscious thought) and free association, will be discussed at the end of section IV.

IV. Creativity, cognitive manipulation, and imagination

Imagination is the best candidate for serving the cognitive manipulation role. This claim is motivated by considering two contrasting aspects of imagination: *cognitive playfulness* and *cognitive workfulness*.[22] Understanding these two aspects of the imagination reveals how an imagination-based account of creative process satisfies the theoretical desiderata identified in the previous section.

Arguing for the playfulness of imagination is fairly easy work. Imagination answers to names such as 'pretence', 'pretend play', 'role-playing', and 'make-believe'.[23] To engage in imaginative activity is to engage in a cognitive activity that generally, as it were, carries smaller stakes for epistemic and bodily action. In fact, on one plausible model of imagination, this is one of the very features that distinguishes it from other cognitive states like belief, desire, and intention. Imaginings do not, qua imaginings, immediately cause action. Neither do imaginative states function to accurately represent the world.

Simple conceptual analysis suffices for this point. As contrasted with beliefs and intentions, imaginings lack intrinsic commitment to truth and ends. It is a conceptual fact

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22 There are other candidate mental faculties that may serve the role of non truth-bound cognition. For examples of relevant naturalistic accounts, see Campbell 1960, 1965; Martindale 1989, 1995, 1999; Simonton 1999; Thornton 2002). There isn't space to carefully analyze these theories here, but the main worry is that they all posit mechanisms that plausibly enough explain creativity when it ostensibly results from unconscious or subconscious mental activity, but seem to fall short of explaining creativity that occurs during conscious, deliberate mental activity. Although many traditional accounts would indicate otherwise, the latter phenomenon, not the former, is by far the most prevalent. But even if one resists this claim, the central *explanandum* for this paper *is* the latter phenomenon.

[23] There may be important differences between the states or capacities that such terms denote. Differences to one side, and for present purposes, all of these capacities are similar enough in the relevant way—namely, with respect to cognitive freedom or flexibility—to be categorized under the general kind 'imagination.' It should also be noted that philosophers distinguish (and debate) various forms of the imagination and related capacities: sensory imagery vs. propositional imagination, rich or engaged imagination vs. mere supposition, and so on. Various features of the imagination are to be clarified below. But again, the working assumption here will be that in spite of putative differences between these distinguished types, they all fall broadly under a general capacity (or perhaps a family of capacities) that can be reasonably be called 'imagination'. For discussion, see Currie and Ravenscroft 2002; Gendler 2000, 2003, 2011; Kind 2001; McGinn 2004; Nichols 2004, 2006; Walton 1990, among others.

that beliefs aim for the end of truth, and a conceptual fact that intentions aim for the end of action. These types of states are, in some sense, bound to these ends or results: to believe that *P* is to be committed to the truth of *P* and to intend to do *Q* is to be committed, *ceteris paribus*, to doing *Q*. Similarly, perceptual experience is *assertoric*. Although perception can go awry, as it does in cases of illusion and hallucination, it properly functions to provide information about the world. Barring some special reason for doubt, perceptual experience purports to show one features and objects in the world. Imagination bears, by itself, no such commitments. Berys Gaut (2003) offers a compelling test case to this end. Moore's paradox tells us that it is problematic to assert "I believe that it is Tuesday, but it isn't Tuesday." Analogously, an assertion like the following is problematic: "I intend to go to the islands, but I won't go to the islands if given the chance." By contrast, there is nothing paradoxical about either of the following: "I imagine that it is Tuesday, but it isn't Tuesday"; "I imagine going to the islands, but I won't go to the islands if given the chance." Imagination thus enjoys a freedom that other states lack. Therefore, imagination possesses the first feature of cognitive manipulation as characterized above; imaginative states are non truth-bound.

This feature of imagination likely explains another: one generally can control one's imagination at will. Imagine your favourite fictional character sitting beside you as you read this. Imagine s/he (or it) speaking to you about the philosophy of creativity and then offering you a cup of tea. Now that you are off and running, carry on the imagining however you wish. So, one can imagine objects, properties, and events that one has never perceived and the existence of which one does not believe. One can wilfully imagine propositions one believes to be false. One can imagine doing certain actions that one has no intention of doing. And so on. The voluntariness of imagination is explained by its non truth-boundedness. Here also the contrast with belief is useful: one does not, with any immediacy,

decide to believe. And this involuntariness is explained by the fact that belief is committed to truth. In this way, belief is sensitive to evidence. And though the irresponsible epistemic agent may do her best to attend to *this* evidence, ignore *that*, if the evidence is before her, she forms the belief (or not) unwillingly. Imagination, by contrast, is not committed to truth. It is "evidence-indifferent" (McGinn 2004: 132). And so we can imagine with a freedom of will that belief and perception do not enjoy. Imagination is therefore suitably voluntary to serve the cognitive manipulation role. [24]

Just as imaginings are decoupled from truth, imaginings are, typically, decoupled from action. Some have argued that some imaginative states, say in a child's game of pretence, may result directly in action.[25] However, imaginative states do not, by contrast with intentions, stand in any deep conceptual relation with (bodily) action. The analogous behavioural point is that imaginings often, perhaps most typically, result in no relevant action. This feature may be connected with another important feature of imagination, its relation to affect. Consider one compelling explanation for our affective response to fictions. I seem to fear the vampire as I watch the horror film. In spite of my apparent fear, I do not flee the theatre in self-defence but squirm in cinematic enjoyment. The fact that I do not flee is taken as evidence for an imagination-based explanation. I do not believe that the vampire is a real threat nor desire to remove myself from danger, since if I did I would flee. Instead, I form some imaginative states about the fictional vampire that result in an affective response.

[24] There is a lot to be said here. One issue concerns whether it is a mere psychological fact or a stronger conceptual fact that beliefs are not under voluntary control. On this issue —doxastic involuntarism—see see classic papers by Alston 1989, Bennett 1990, Williams 1973. A second related qualification is this. Assuming that beliefs are not under voluntary control (at least as a psychological fact about humans), this does not imply that beliefs cannot sometimes play something like the cognitive manipulation role. We can and do form false beliefs. And these sometimes may be the (indirect) result of fanciful or wishful thinking. But the latter kinds of beliefs deviate from norms of epistemic rationality. And so unless creativity is regularly the result of irrational thought processes or malfunctioning reason, belief is an implausible candidate to explain cognitive manipulation in the bulk of creative processes.

[25] On this debate, see Currie and Ravenscroft 2002; Funkhouser and Spaulding 2009; Nichols and Stich 2000, 2003; Velleman 2000.

The physiology of this affect is often adequately characterized in ways similar to a reality-directed fear: my heart rate rises, my muscles tense, I cling to my chair, and so on. The same can be said for imagining past events, possible future events, or counter-actual events: I may feel temporarily sad upon imagining the death of a loved one, even as she simultaneously sits across the table from me. Imaginative states, then, causally interact with affective systems.[26]

There is an apparent tension here. The suggestion is that imaginative states can engage with affective systems. But part of the motivation for this explanation, in the context of fictional-directed affect, is that the relevant affective responses do not result in action, and imagination (unlike belief, desire, and intention) is conceptually and behaviourally decoupled from action. This threatens to discount imagination from possessing the affective *and* motivational features of cognitive manipulation as it typifies creative processes. However, the apparent problem dissolves if one acknowledges that the claim about affect depends upon the denial of a universal claim about imagination and action: imagination does not always (perhaps not even typically) immediately cause action. This is the conceptual point brought out above. And this is consistent with a corresponding existential claim: imagination may cause action. Here there are a variety of options: perhaps imagination may cause action directly[27]. It may cause affect that is sufficient to motivate action, perhaps not in fiction-directed cases, but in future-directed or counter-actual directed cases. (Is it a belief, or merely an imagining that causes the apparent fear that gets me to check behind the shower curtain for the bogey-man?) And, finally, imagination may cause other mental states that themselves

[26] Fiction-directed affect has received considerable philosophical attention in the past few decades. An imagination-based explanation is perhaps the most popular extant view. A related debate concerns whether these affective responses are genuine emotions. But this question is ontological (some say terminological, see Currie 1997), concerning not whether imagination can engage affective systems but instead whether the resultant affect is of the same psychological kind as reality-directed emotion, or of a separate kind. See, among others, Currie 1990; Gaut 2003; Gendler and Kovakovich 2005; Walton 1990; Weinberg and Meskin 2006; and Harris 2000 for related empirical work. To be clear, the present claims are neutral with regard to this ontological question.

[27] See fn26.

typically cause action: belief, desire, intention. If one or more of these suggestions is true, then imagination can also meet the affective and motivational desideratum.

These last suggestions imply that imagination causally interacts with a rich variety of mental states and processes. Making good on these suggestions requires a careful discussion of the second aspect of imagination: cognitive workfulness. In spite of the playfulness of imagination as just established—non truth-bound, under voluntary control, capable of generating (non-reality directed) affect—imagination can do a great deal of work for us. Philosophers have always implicitly indicated this by using the imagination (and appealing to what is imaginable) to construct arguments, thought experiments, and counter-examples. More recently philosophers have begun to explicitly analyze these valuable features of the familiar capacity.

According to one recently defended thesis, in spite of functional differences, imagination and belief carry information in a *single code*. Thus systems that take input from belief can take isomorphic inputs from imagination, and will process that input in broadly similar ways. A system receiving the input from an imagining that *P* or a belief that *P* will produce similar (though not identical) output. The framework inspired by this thesis is supposed to solve a number of philosophical problems about the imagination and fiction, and enjoys both philosophical and empirical support.[28] One can take a lesson from this approach without commitment to the single code thesis: the representational (or information-carrying) nature of imaginative states is such that these states can be processed by a variety of mental and cognitive systems. And those systems are, at least some of them, the same systems that process belief representations.

[28] See Harris 2000; Leslie 1987; Nichols 2004; Nichols and Stich 2000; Weinberg and Meskin 2006.

Imaginings can, in a familiar way, drive or serve as premises in inference. We often subject our imaginings to ordinary inferential practice, drawing inferences about what is imagined in the same ways we would if we had beliefs with the same contents. If I imagine that *P*, and I imagine that *if P then Q*, then I am disposed to imagine *Q* just as I would in actual circumstances of reasoning. And we often supplement our imaginings with actual beliefs in order to render the imaginative project coherent and consistent. If I am told by a narrative that Holmes has blood on his shirt and the story has been (at least implicitly) a realistic one about humans, I am disposed to infer that Holmes has *red* stains on his shirt, given my beliefs about the actual world.[29] Imaginings can also be used to supplement reasoning about the actual world. One theory of folk mindreading ability requires precisely this: in explaining or predicting another person's behaviour, I imaginatively simulate the (relevant) mental states I take the person to have. From this simulation I draw inferences about her actions, why she did what she did or what she may do next (Currie 1995, 1996; Goldman 1989, 1992; Gordon 1986).

In the theoretical domain, there is a long tradition of supposing an important relation between conceivability—understood broadly as imagination—and possibility. So while few today would maintain that *P*'s being imaginable is constitutive of *P*'s being possible, many do maintain an inferential relation between the two. Imagining that *P* is, in some importantly qualified sense, a guide to modal truth; the first gives one good reason to believe that *possibly P*. Here again, we are using imaginings alongside beliefs to draw inferences, in this case about possible worlds (Chalmers 2002; McGinn 2004; Van Inwagen 1998; Yablo 1993).

[29] Nichols and Stich (2000, 2003) call this 'non-inferential elaboration'; Gendler (2003) calls this 'mirroring.'

These considerations suffice to show that imagination displays another feature identified in §III above: it figures in theoretical and everyday inference.[30] But the connections between the imagination and other elements of the mind go deeper, and some of them show how imaginings may drive decision and action.

Beliefs and perceptual experience on the one hand, and propositional imaginings and mental images on the other, have the same type of content. But we typically keep these mental states appropriately distinguished. For example, we generally do not confuse imaginings with beliefs; introspectively, we identify imaginings *as* imaginings. Imaginings are in this way *weakly quarantined* from other mental states. Further, imaginings are often *strongly quarantined* insofar as they do not cause perceptions, actual beliefs or desires or a change in intentions, values, or other cognitive states.[31] However, there are exceptions to both sorts of quarantine, more commonly to the strong sort.

Imaginings do influence or cause other mental states. I might vividly imagine that it will rain, and come to believe that it will rain. I might visually image the sofa fitting through the doorway and judge that the sofa will fit through the doorway (and then act upon this judgment). I might imagine a bowl of ice cream and quickly find myself, driven by a newly formed desire, on the way to the ice cream shop. In spite of weak cognitive quarantine, imaginings are causally efficacious in these respects, enjoying a kind of *cognitive contagion*. And even weak quarantine can sometimes be violated. For instance, people sometimes mistake mental images for perceptions, or have trouble determining if a perceptual memory is one of

[30] Both Nichols and Stich (2000, 2003) and Gendler (2003) use 'inferential elaboration' to describe these general relations. It should also be noted that, none of this is meant to imply that imaginative states are always subject to rational rules of inference. We can and do use imagination in ways immune or blocked from normal inferential practice.

[31] 'Cognitive quarantine' and 'cognitive contagion' are the terms of Gendler (2003, 2006). 'Weak quarantine' and 'strong quarantine' are my terms.

something perceived or something merely imagined (Segal 1970; Kosslyn 1994: 55; Reisberg *et al.* 1986; see Currie and Ravenscroft 2002 for further discussion).[32]

Imaginative states thus integrate with other states in inference, causally influence our doxastic commitments, desires, and intentions, and in turn influence (even if indirectly) how we decide and act. Given its voluntary nature, there is significant freedom in how one uses and directs the imagination. One can use the imagination in a playful way, potentially engaging affective systems; or one can use it in a more thin and constrained way, making suppositions only as robust as is needed for hypothesis generation. This is evident in the quotation from Kant given earlier: imagination may be constrained by the cognitive task and conceptual domain for which it is employed, and will accordingly connect with inferential and other mental mechanisms. Thus imaginative states may play a rigorous and purposive role in human cognition. Imagination is not all play and no work.

To this point, the conclusion is that imagination has four of the identified features of cognitive manipulation typical of creative cognitive processes: non truth-boundedness, voluntariness, affect and motivation, and inference and decision-making, as they were named above. The final feature, free association, must now be discussed. How should one think about the relation between imagination and free association?

On a liberal account of the imagination, free association is just imagination in one of its many guises. Imagination bears no intrinsic commitment to truth or action. So one might think that free association is just imagination that is unconstrained and, relative to deliberate imaginative projects, undirected. This encourages a distinction between active and passive

[32] Currie and Ravenscroft (2002) propose another exception to weak quarantine, arguing that schizophrenics and other patients experiencing so-called delusional beliefs suffer from a failure to recognize imaginings as imaginings, treating them in ways more like belief (Currie and Ravenscroft 2002: 161-84). Gendler offers an extended analysis of the phenomenon of imaginative contagion (Gendler 2006). For recent and possibly relevant research in neuroscience, see Buda et. al 2011.

imagination, and keeps both free association and deliberate pretence under the same general category of mental process. However, on a more conservative account of imagination, imagining involves actively *doing* something (mentally): imagining a counterfactual proposition and then actively filling out details around that proposition, forming rich visual images of how one will construct a snow fort, and so on. Recalling Kekulé's story, free association is comparatively passive: one does not control the ideas and images, one let's them "gambol" before one's mind's eye. But even if, as this analysis would have it, the two faculties are distinct, they are not incompatible. And importantly, they plausibly may work together. So, even granting the difference in deliberate control, both mental activities are non truth-bound. This similarity is crucial since imagination may then be used, in a truth and evidence insensitive way, to seize upon ideas that result from free association. Plausibly, this is what Kekulé did: when certain images from his reverie surprised or interested him, he continued to actively use and play with them in imagination. It is the combination of the two faculties that helped enable his final inferences about his task, namely, the nature of the benzene molecule.[33] So even if imagination does not subsume free association, it suitably engages with free associative activity and in the ways typical of creative cognition.

This last point generalizes to address some possible worries. At least part of the ordinary conception of creativity, one might urge, involves something very different from deliberate, conscious thought. Instead, creativity involves free association (as in Kekulé's reverie), or insight which results from some kind of subconscious or implicit cognition (sometimes called 'incubation'), or both. And many traditional theories of creativity have placed greater emphasis on these features of creativity. This could motivate various worries: The present account fails to explain important features of creativity. Or, the present account

[33] This line of thought is compatible with a recent model of creative processes—the *Geneplore* model. See Finke, Ward, and Smith (1992).

fails to explain a large sample of paradigmatic creative acts and persons. Or, the present account misses the core of creativity: the non-deliberate and unconscious stuff is where the action is!

First a note of caution and then a response. There is an assumption that often underlies worries and theses like the ones just articulated, namely, that creative thought or behaviour is a single act, occurring at one time (or small window of time). This assumption is misguided. Of course, we might accept that important insights come at a moment, or that some particular daydream or free associative episode is essential to a creative breakthrough. But by the same token, we should insist that *some* conscious, deliberate thought (and/or action) is essential to a creative breakthrough. Kekulé, for example, would not have had his famous insight *at all*, had he not already done a great deal of thinking, deliberating, hypothesizing, and indeed imagining about the chemistry of his day and the problem at hand. Some of these cognitive events, then, are necessary to Kekulé's creative process (in addition to his reverie-induced insight). The general lesson is that it is far more plausible to think of creativity in terms of a multi-faceted cognitive *process*, which occurs over time, and often involves the cognitive manipulation that is the focus here, and the insight and free association that has been the focus in much of the creativity literature.[34]

Finally, can the present account offer any explanation of these additional, putative aspects of creativity? Although it is unclear what psychological mechanisms are supposed to constitute insight and free association, these processes are, *prima facie*, good candidates for non truth-bound cognitive states or processes. And so one advantage of the present account is that it identifies the need for processes like these: non truth-bound cognition is needed for

[34] For a naturalized explanation of incubation (or insight) in creativity, see Stokes 2007. For a metaphysics of creativity that treats creativity as a process, see Stokes 2008. For an empirically grounded process-model of creativity, see Finke et al (1992), who argue that "of creativity not as a single unitary process but as a product of many types of mental processes" (1992: 2)

creativity since creativity involves novelty. And these two processes can, in addition to imagination, provide non truth-bound content. Beyond this, the present emphasis on cognitive manipulation highlights conscious, deliberate thought and its role in the creative process. But this too, as the discussion three paragraphs back should suggest, is compatible with acknowledging the importance of insight and free association. Rarely does an artist or scientist gain a breakthrough by insight or free association without both some important antecedent and consequent cognitive work. Preparation must precede the breakthrough (here one might think of Picasso's preparatory sketches for *Guernica* or Kekulé's arduous research prior to his famous insight). And after the insight, the agent will explore and further consider the apparent breakthrough prior to committing to it (e.g. prior to putting brush back to canvas, or to articulating a decisive scientific thesis). In these cases, cognitive manipulation, performed by the imagination, is (part of) the rest of the story. It is important both prior to, and after, the insight. So while the present account does not fully explain these other putative aspects of creativity, it does provide some explanation for their importance, and encourages a general account of the creative process, whereby the creative process is broadly individuated, and in a way that may include a variety of non truth-bound states and processes.

To conclude, imagination serves, and plausibly *best* serves, the cognitive manipulation role. According to the richer thesis offered in §III, this role as it is typically found in a creative process is typified by at least five features. Imagination—at least when broadly characterized as above--displays all of these features. Imagination is non truth-bound, and this (partly) explains why it is generally under immediate voluntary control. Directly or indirectly, it engages with affective and motivational systems. And it is cognitively rigorous enough to drive inference and decision making. Finally, even if it is not itself free associative,

both mental activities are similarly non truth-bound, such that imagination can interact with ideas generated by free association. Taken together, this provides a powerful explanation for what we may take to be an obvious truth: imagination is important if not necessary for creative thought. This is true, it has been argued above, for both the creativity of genius, and everyday minimal creativity.

IV. A concluding worry and a general lesson

The analysis offered above, which attempts to provide reasons for the commonly assumed connection between creativity and imagination and, in turn, explain part of the creative process in terms of imagination, may evoke the following pair of worries. Simplifying the analysis and focusing just on truth-boundedness for the moment, the basic suggestion is that given the novelty of creative thought, creative processes require (at least typically) non truth-bound cognition. And so the first worry is that the explanation is one *of* novel cognition and not of creativity more broadly understood. Novel cognition, the worry would proceed, is a relatively mundane phenomenon. And what we thought we were getting was an explanation of something far more elusive, namely, creative cognition. The second worry builds on the first. The proposal is that imagination best serves the role of cognitive manipulation. And, again focusing just on non truth-boundedness, it serves this role (at least in part) because it allows for the cognitive freedom that seems needed in even the most mundane of novel thought. But then we are saddled with the conclusion that imagination is needed for much of (if not all of) novel thought. Forming new beliefs and concepts, learning, acquiring new skills, and so on, are partly explained in terms of imaginative activity. And these commonplace mental acts, we might have expected, are simply not particularly imaginative.

These are not challenges to but instead virtues of the present account. Assuaging the first worry does require granting the claim that creativity, or at least a central component of it, is an everyday phenomenon. Human beings all have the capacity for frequent, creative thought qua novel thought, for what above was termed 'minimal creativity'. Once this is granted, the worry disappears with the following qualification. The above explanation does not attempt to explain all features of creativity. It attempts to explain a central one, novel creative thought (that appropriately depends upon agency), by appeal to imagination. And, in addition to this, a number of features typical of creative processes—voluntariness, affect and motivation, and so on—fill out the cognitive manipulation role and further support the claim that imagination is deeply important, if not necessary, for creative thought and behaviour. This does not, to be clear, explain all features or degrees of creativity. But it does explain some central features, and in a way that is broadly naturalistic and ripe for future research in philosophy and cognitive science.

What of the second worry, that on this account the imagination is important for a remarkable variety of mental acts? This should be no problem. First, recall that imagination can vary significantly in richness. One can imagine an entire scenario in rich perceptible detail, or one can baldy imagine a proposition and mechanically run it through a process of inference. So while it may seem initially surprising that mundane cognitive acts like forming a belief or desire, acquiring a concept, or learning a simple skill may require imaginative activity, the proposal does not require rich imagination in its *explanans*: some of these mundane acts of novel cognition presumably involve more bald imagination.

This is a point echoed in contemporary epistemology. On one standard line of reasoning, skeptical doubts are generated by considering possibilities that are incompatible with a proposition *P* believed (or under consideration for belief). From the first person

perspective, whether these skeptical possibilities are salient, and thus whether one recognizes a threat to one's certainty that *P*, depends upon imagination. Belief deliberation, formation, and maintenance, if it involves any of this kind of consideration, involves the cognitive manipulation that imagination offers us. Of course the degree of imaginative engagement shifts with both the epistemic agent and the context: given certain contexts some epistemic agents let their imaginations rip (Lewis 1996). Given other contexts, the imaginings are fewer in number and narrower in scope. Some agents let their imaginations rip all the time; some just aren't very imaginative, ever. Moreover, as mentioned above, imagination plausibly plays a central role in the formation of modal beliefs. Upon clearly imagining that *P* (perhaps above some threshold for clarity, consistency, completeness, etc.) one may well form the belief that *Possibly P*; and oppositely upon failure to (suitably) imagine that *P*. The point here is that we should be happy to accept that rational processes of belief-formation and maintenance involve imagination.

The point generalizes: there is nothing particularly special about belief in this regard. Desires, intentions, and other propositional attitudes are often the result, in part, of imaginative activity. Cross-categorical concept application and skill-acquisition require imagination—this was one of the morals of the empirical studies discussed in §II. So one should not take the mundaneness of a mental state to be an indication that it did not require for its formation the use of imagination.[35]

To conclude, recognizing that imagination and creativity (of at least some limited richness) are commonplace, does not strip them of their value. Nor is the claim incompatible with what seem to be obvious facts: some people are more imaginative than others and some people are more creative than others. Instead, the analysis proposed here identifies

[35] Indeed, on one recent account, imagination is fundamental to all of cognition, since it is fundamental to grasping meaning (McGinn 2004).

connections between imagination and more minimal creativity. This is something that we can study without appeal to the romantic traditions that have so often thwarted good explanations of creativity; the analysis instead encourages explanations from contemporary philosophy and cognitive science. These attempts at explanation, one would hope, may ultimately contribute to explaining the presumed target of those romantic theories, namely, our most imaginative and creative minds. But the first step, taken here, is to identify architectural features common to the minds of Bachs, Picassos, and (perhaps) more ordinary minds like yours and mine.

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