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Plural Imagination: Diversity in Mind and Making

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Abstract

The experience of visual mental imagery—seeing in the mind's eye—varies widely between individuals, but perhaps because we tend to assume our own way of thinking to be everyone's, how this crucial variation impacts art practice, and indeed art history, has barely been addressed. We seek to correct this omission by pursuing the implications of how artists with aphantasia (the absence of mental imagery) and hyperphantasia (imagery of extreme vividness) describe their working processes. The findings remind us of the need to challenge normative, universalizing models of art making and art maker.

1. Imagining and Artistic Subjectivity

> Right here and now I can see in my mind, and without using my eyes, a mental picture of Kuniyoshi's *Nishiren in the Snow*. I am not supposing that . . . I am really seeing something with my eyes—something which is in this room and outside my head and which seems to be or look like the Kuniyoshi. . . . My eyes are not shut, they are gazing at the wall, and at the same time I am gazing at the mental picture. . . . [T]here are the brown tree, the grey sky, the falling flakes of snow, the curve of houses along the shore, the man bending into the wind with his red robe and yellowish pack. I could count the twigs, the houses, I can discern the diagonal slope of the hillside.[*]

It can come as a surprise to realize how different other people's inner lives are to one's own. The experience of visual mental imagery—seeing in the mind's eye—is one such dimension of difference. Some people experience imagery with near-perceptual vividness, as seems the case for Arthur Danto in our epigraph. And while most experience some kind of imagery, another minority of people experience none at all—they have no mind's eye. In what follows we ask what this variation means for art making. How do such radical but externally invisible differences in artists' inner lives impact their practice?

Perhaps because we tend to tacitly universalize from our own experience, assuming our own way of thinking to be everyone's, this crucial aspect of art making has barely been addressed. What we instead find among much of the past five hundred years of art-theoretical

[*] Arthur C. Danto, "Concerning Mental Pictures," *The Journal of Philosophy* 55, no. 1 (January 2, 1958): 12.

literature are categorical assertions that art making either must or must not involve an originary act of imagining. The model of artistic subjectivity that emerged in the European Renaissance and persisted through Romanticism into the present as popular stereotype is that of one who imposes their vivid internal vision on a passive world, their environment serving only to realize what had been preconceived. The twentieth-century avant-garde in turn assaulted this stereotype in both practice and theory, employing, for example, stochastic techniques that meant that the form of the work depended on the contingencies of the environment rather than a mental pre-configuration.

Artists who do not experience imagery bely the Romantic stereotype—and seem to instantiate the avant-garde countermodel. They create without a visual preconception of how the work will look, manipulating material media, "in order to discover what it might do, how it will appear," as one such artist in our study puts it (fig 1, L). The creative activity seems to take place to a large degree "in the world," on the picture surface, rather than solely in the mind. At the same time, however, there are artists—perhaps the majority—who *do* experience mental imagery and *do* prefigure or compose the artwork to some degree in their mind's eye. What the following urges, then, is the need to be wary of "totalitarian habits of mind," as Ernst Gombrich put it in his seminal psychological study of art: to resist obscuring the individual subject's particularity with normative statements claiming universal validity.[1] We begin by outlining the two main forms of these assertions. e.

2. The Imagining Artist

From the European Renaissance to the twentieth century it was widely held that artworks are realizations in the outside world of forms first conceived internally, in the mind. It is the mode of making of artists, and great artists, specifically: a mental preconception of the

artwork distinguishes the maker at various times from both nonartists—the rule-following craftsman or artisan—and bad or weak practitioners. It is the way artistic "invention," or in contemporary terms creativity, occurs. Without a preconception of the work, on this view, making is mechanical, mindless; the importance of actual manual execution is accordingly minimized.

As Erwin Panofky's 1924 study demonstrated, this model of art making has classical roots, is manifest in the medieval period, but flowers in early modernity. Sixteenth- and seventeenth-century Italian academicians, intent on elevating their work above that of the craftsman's manual labor, emphasized the mental, intellectual side of the making process.[2] Thus a preconception of the painting was said to be vital. "The painter cannot produce any form or figure . . . if first this form or figure is not imagined and reduced into a mental image (*idea*) by the inward wits," wrote Romano Alberti in his *Della nobiltà della pittura* (1585); "the intellect turns these mental images . . . into a finished composition which it afterwards represents in painting."[3] Painting at this time thus became understood as "primarily a mental image conceived in the imagination of the artist before its transcription on the canvas or the panel"[4]—but as Francois Quiviger acknowledges, Renaissance art theories were more "expressive of artistic aspirations than of realities,"[5] By turning the ability to fully preconfigure the work into a desirable artistic trait, they made a particular mode of artistic subjectivity preferential. Indeed, the richer the imagining, the better the artist. "The greatest geniuses," claimed Giorgio Vasari in his *Lives of the Artists* (1568), in reference to Leonardo Da Vinci, "sometimes accomplish more when they work less, since they are searching for inventions in their minds, and forming those perfect ideas which their hands then express and reproduce from what they previously conceived with their intellect."[6] Conversely, the lesser artist works without an idea to express. Cervantes had don Quixote complain that the author of his history writes in a haphazard and unplanned way like "Orbaneja, the famous artist of

Ubeda, who, when asked what he was painting, replied: 'whatever emerges.'"[7] Orbaneja's depictions were as a result so bad, says Quixote, that they needed labels to be identified.

The model persists into the late eighteenth-century academy. The painter, says Joshua Reynolds in his inaugural Royal Academy lectures, should take their subject from "Greek and Roman fable" or "Scripture history." The stories will cause the artist to "form . . . a picture in his mind of the action and the expression of the persons employed." The artist's task is then to transfer the picture in his mind to the canvas directly: "The power of representing this mental picture on canvass [*sic*] is what we call invention in a painter."[8] Painting such as in the Dutch landscape tradition that was not preconceived in this way was not necessarily malformed like Orbaneja's, but it is without invention, its practitioners, as Paul Duro writes, "constrained to operate within the preordained field of mimesis."[9] Genuinely *artistic* creation consists in the formation of an ideal design in the mind which is then externalized.[10]

The Romanticism that developed in violent opposition to much of the academic, Neoclassical values Reynolds espoused kept this principle that authentic artworks originated in an act of imagining. But where Reynolds had held, in the words of William Blake's annotations to the *Discourses*, that "Genius May be Taught & that all Pretence to Inspiration is a Lie & a Deceit,"[11] late eighteenth-century theory (influenced by Neoplatonic ideas of divine inspiration) aligned genius with an innate, preternatural power to imagine. According to Romanticism, "artists are distinguished as such by the vividness of their inner life and the relative strength of their intuitions";[12] it is the power to imagine vividly that drives the holder to prodigious feats of creation.

3. Art Making without Imagining

The foregoing model of artistic subjectivity and art making persists into the present as the popular stereotype.[13] But contrary models of course exist and even predate it. Gombrich pointed to their first expression in a passage from Leon Battista Alberti's *De Statua* (1464):

> I believe that the arts which aim at imitating the creations of nature originated in the following way: in a tree trunk, a lump of earth, or in some other thing were accidentally discovered one day certain contours that needed only a very slight change to look strikingly like some natural object. Noticing this, people tried to see if it were not possible by addition or subtraction to complete what still was lacking for a perfect likeness. Thus by adjusting and removing outlines and planes in the way demanded by the object itself, men achieved what they wanted, and not without pleasure. From that day, man's capacity to create images grew apace until he was able to create any likeness, even when there was no vague outline in the material to aid him.[14]

We can see in Alberti's speculation a model of art making that directly opposes the one previously outlined.[15] Here there is no *idea*, *concetto*, or "mental picture" of the work conjured up in the mind of the artist before being materially realized; the starting point is rather discovered accidentally, *out there*, in the world. Material is manipulated to emphasize what has been discovered. The contingencies of the object itself rather than a "mental picture" guides the hand of the artist. Such a model of art making brutally undercuts the model of artistic subjectivity prescribed by Vasari and exalted by Romanticism: one does not need a vivid "inner life" to produce art.

Art practice and theory of the early twentieth century made this polemical point again and again. In Europe strategies such as Dada's aleatory techniques effectively prevent the artwork being mentally prefigured. Readymades come into existence through being recognized or identified as such and (often minimally) modified or adjusted. Surrealist automatic techniques set about bypassing conscious intention—the most effective perhaps being Oscar Dominguez's "decalcomania," arbitrary blots left untitled to be recognized, or not, by the viewer. In the US the Modernist painting specified by Clement Greenberg essentially generated itself from the limitations of the material support. Avant-garde representatives of the next generation exploited the legacy of Dadaism as a resource of strategies. Hence Sol LeWitt's wall drawings were executed according to instructions, repetition, and permutation: "To work with a plan that is pre-set is one way of avoiding subjectivity."[16] Others employed tactics of appropriation—Andy Warhol's selected and minimally modified images of electric chairs, for example—to assert that there need be no internal origin. Theory followed on practice with, for example, Rosalind Krauss's critiques of originality,[17] and the consideration of painting at the semiotic level, in reference to its internal system rather than, as Mary Kelly put it, "the exhortation of artistic auteurs."[18] Today, art making driven by algorithms and artificial intelligence continues to undermine the role of conscious pre-configuration in the creative process,[19] while refusing the model of the artist distinguished as such by the vividness of their inner life means for some an embrace of outer life, of their environment, of the materials at hand, as the source of the creative process. Hence sculptor Tony Cragg, when asked where his ideas come from, could declare, "I hate ideas! If I have one, I bang my head against the wall . . . As soon as I look at any material, I combine my thoughts with that material . . . I become influenced by everything that's around me."[20]

Refusing such models of artistic subjectivity could also mean embracing outer life over inner life, taking one's environment and the materials at hand as the sole stimulus for, and basis of, what is made. Hence sculptor Tony Cragg, when asked where his ideas come from, could declare, "I hate ideas! If I have one, I bang my head against the wall . . . As soon as I look at any material, I combine my thoughts with that material . . . I become influenced by everything that's around me." (20) Today, art making driven by algorithms and artificial intelligence continues to undermine the role of conscious pre-configuration in the creative process. (19)

4. Composing Internally, Composing Externally

The difference between these two theories of art making comes down, we want to now argue, to the issue of composition: not in the sense of the arrangement, good or bad, of an image's elements, but where composition takes place. For Romano Alberti, "the intellect turns . . . mental images . . . into a finished composition which it afterwards represents in painting": composition is internal, in the mind of the artist. For Leon Battista Alberti, it is external, taking place out there, in the world, the artist "adjusting and removing outlines and planes in the way demanded by the object itself." One theory holds that the artwork is given form mentally then externalized, the other that the artwork must be given physical form without a mental pre-configuration. It is a matter of internal or external composition.

We can see that the assumption of internal or external composition—that art making must take place one way or the other—might relate to certain contrasting views of human existence. The internal-composition model, in which creation takes place within the mind and is only afterward realized in the outside world, fits with a modern, Western, dualist view of human beings, in which the body is part of the material world, while the mind appears to

produce conceptions of its own. Internal composition is the art making that most accords with that post-Enlightenment, "self-governing reflective individual," like Joshua Reynolds's ideal artist, "whose inner life can be conveyed at will to a public composed of similarly sovereign individuals."[21] And the internal composition model befits a being who is conceived as essentially separate from their environment, so whose capacity as a maker lies within them rather than in relationships with the rest of nature. Conversely, the external composition model of art making suggests a maker who—rather than standing separate from and superior to the rest of nature, on which they monodirectionally imprint their will—makes art through interaction and integration with their environment.

While an individual's commitment to mind–material dualism does not necessarily entail an assumption of the internal composition model of making (and materialism does not entail external composition—we are claiming nothing about the ontological persuasions of either Alberti), it is true to say that when artistic or theoretical strategies have sought to minimize the conscious intention of the artist, to equalize the human maker with the rest of nature, it is often in critical opposition to the kind of human subjectivity implicated by the internal composition model. We can think in these terms of Hugo Ball's declaring in 1916 that "the individualistic-egoistic ideal of the Renaissance ripened to the general union of the mechanized appetites which now see before us, bleeding and disintegrating."[22] Recent anthropological theory has advanced an external composition model for similar reasons. According to Tim Ingold, a "hylomorphic" view of making, where "practitioners impose forms internal to the mind upon a material world 'out there,'"[23] perpetuates a pernicious misconception of human existence; instead, "the most [the maker] can do is to intervene in worldly processes that are already going on . . . adding [their] own impetus to the forces and energies in play."[24] The creation of things should be understood as this process of "morphogenesis," in which "form is ever emergent rather than given in advance."[25] In the

case of drawing, "it is not as though the hand . . . gradually empties out what first fills the head, such that the entire composition slides like a transfer from mind to paper";[26] Ingold cites a statement by sculptor and draughtsman Richard Talbot in support: "when I'm setting out to do the drawing, I don't have a preconceived image."[27]

6. The Maker's Reality

In theories of art making like Ingold's, statements about how people make art are applied universally—because the theorist wants to encourage a certain view of human existence—and particular instantiations are selected in support. But if we put the practitioners' accounts first rather than in support of a polemical pitching of morphogenesis against hylomorphism, a different story is told, one which renders universal claims about how art is made invalid. Different artists work in different ways: some *really do* preconceive the work before they execute it, while others do not, and others still—the majority probably—compose both internally and externally. This difference, we want to now show, is at least partly due to the individual artist's capacity to generate and manipulate mental imagery. Those who do experience mental imagery may use it in the creative process, to compose the work internally before executing it; those who do not experience imagery will use other, often environmental means of composition. Internal and external composition are individual tendencies as much as, if not before, they are normative demands; rather than seeing hylomorphism as something that needs to be overthrown by the "maker's reality" of morphogenesis, we must see art making and artists as inflected by the "maker's reality" of neurocognitive diversity. We devote the rest of our argument to substantiating and developing the implications of these claims.

7. What Imagery Is and How It Varies

Mental imagery vividness, we are asserting, plays a prominent role in the way artists work. But what is mental imagery, and what does it mean to say it varies between individuals? And how could one possibly know that it does?

Mental imagery is quasiperceptual experience that can occur in the absence of the appropriate external stimuli. It is quasiperceptual because it *resembles* perceptual experience, of say, a chair, but one is not *actually* perceiving a chair in one's environment. It is typically an experience that one can voluntarily have and control the content of—people can often decide what kind of chair to image and change it—although sometimes people report experiences that are taken to be involuntary imagery, for example in cases of PTSD, or when reading or hearing evocative descriptions.[28] There are imagery experiences in all sensory modalities; the most commonly studied, and our focus here, is the visual, where it is also known as "visualizing" and "seeing with the mind's eye." Imagery experiences in other sensory modalities might involve, for instance, hearing inner words, music, or other sounds or having an inner experience of touch.

There is an important difference between imagery and nonsensory forms of thought: I can *know* what chairs are, I can *believe* that my chair is made of oak or *desire* that it is so, or I can even *imagine* that chairs have been banned—all without imagery being involved. Mental imagery, then, is the forming of an internal sensory experience that represents how the world or some aspect of it is, was, or could be. It has been assumed—popularly and across disciplines—that the capacity to form imagery is universally and equally shared among humans.[29] But a significant body of psychological and neuroscientific research reveals that is not the case.

This research began to form in the late nineteenth century, when in order to discover the "peculiarities of the mental visions of different persons," Francis Galton devised a survey that asked participants to "think of some definite object" before asking a series of questions about the quality of their mental picture. The responses ranged widely, from those who claimed to see in their mind's eye "as well in all particulars as we can do if the reality is before me," to another who admitted, "My powers are zero. . . . I recollect the breakfast table, but do not see it."[30] Galton's questionnaire gave rise to several descendants, most prominently the Vividness of Visual Imagery Questionnaire (VVIQ), developed by David Marks in the 1970s, which gives similar prompts to imagine scenes and objects, but which quantifies the vividness of the reported imagery along a Likert scale from "no image" to an image "as vivid as perception."[31] Results from the VVIQ consistently present a bell curve of roughly normal distribution across the population: most people report some degree of imagery, with minorities at the two ends of the curve experiencing a complete lack or a perception-like vividness.[32] These extremes were noted but not scientifically explored until the mid-2010s, when they were given the respective names "aphantasia"[33] and "hyperphantasia"[34] by the neurologist Adam Zeman.

But can we be sure these differences are genuine? Psychologists and philosophers have long been skeptical about the ability to gauge an individual's imagery experience by simply asking them: responding to questionnaires such as the VVIQ involves potentially fallible "metacognitive" judgements, which may be influenced by a range of factors, including participants' folk psychological theories, their mood, and their assumptions about researchers' expectations.[35] Empirical research, accelerated since the identification of aphantasia and hyperphantasia, has gone a long way to meet this concern, however, by squaring first-person reports with neurological and behavioral measures. First, visual imagery vividness extremes turn out to be associated with other less subjective traits: aphantasia

predisposes to scientific occupations and is linked variably to face recognition difficulty, reduction in the richness of autobiographical memory, and autistic spectrum disorder;[36] hyperphantasia is associated with synesthesia (sensory cross-over, where stimulation of one sense leads to experience in another, e.g. "seeing" sounds as patches of colour).[37] Second, a number of studies have investigated the neural correlates of imagery vividness and found that questionnaire ratings do associate with specific, identifiable brain activity.[38] Where an act of visualizing typically involves activity in a distributed network of regions across the brain,[39] these studies suggest that differences in imagery vividness result from alterations of brain function or anatomy in the key nodes of this network, or from alteration in the connections between them.[40] In the case of aphantasia, for example, visual information from memory may be available but not reaching the visual cortices. Third, the paradigm of "binocular rivalry" has been developed to provide an objective measure of imagery strength. When different images are presented simultaneously to the left eye and right eye, they will not both be perceived at once: one of the images will suppress the other out of awareness. Now *imagining* one of the two images before the presentation—"perceptual priming"—makes a person more likely to see that particular image in the presentation. But the likelihood of a person seeing the primed image is proportional with the vividness of their reported imagery; indeed, perceptual priming has no effect on those who report no imagery.[41] In these ways first-person, behavioral, and neurological measures can be triangulated to assure us of the objective reality of mental imagery experience and its variation.

8. Imagery Vividness and Imagery Use

A key and recurrent finding among the recent studies of extreme imagery experience is that there is a relationship between imagery vividness and imagery *use*. People who experience

imagery vividly will employ it in daily mental life, when recollecting past events, anticipating future events, and so on. “Imagers” report imagery “strategies,” such as creating detailed mental scenes to help performance in visual working memory tasks.[42] There are many anecdotal accounts of vivid imagers using their imagery in both everyday life and creative work—Temple Grandin’s account of “thinking in pictures” being one well-known example: “I translate both spoken and written words into full-color movies, complete with sound, which run like a VCR tape in my head. When somebody speaks to me, his words are instantly translated into pictures.” “Visual thinking” is a “tremendous advantage” in her work as a designer: “Before I attempt any construction, I test-run the equipment in my imagination. I visualize my designs being used in every possible situation . . . . Doing this enables me to correct mistakes prior to construction.”[43]

But what of those at the other end of the bell curve? The phenomenology of their daily mental life is obviously quite different to that of individuals who experience vivid imagery. When they look forward to or worry about something in the future, they do not visually imagine the object of thought. When they read a novel, they do not visualize what descriptive passages describe—and, it seems, have significantly lowered responses to emotionally powerful scenes as a consequence.[44] Recollection involves no images of the recollected thing or person. “When I think about my fiancée there is no image, but I am definitely thinking about her,” remarks one aphantasic. “I know today she has her hair up at the back, she's brunette. . . . I’m not describing an image I am looking at, I’m remembering features about her.”[45] For these individuals conscious mental representation is taking place—*I’m remembering features about her*—but taking a nonvisual (sometimes entirely nonsensory) form. They use other means to achieve the desired cognitive ends.

We will find that this relationship between imagery vividness and imagery use—employing imagery or “other means”—holds for artists, too.

9. Art Making and Imagery Vividness

Following descriptions of aphantasia in the popular science press,[46] several thousand people contacted us to say they too were "aphantasic." Over 50 of these individuals, we noted to our surprise, reported having a creative practice of some form: they were visual artists, designers, architects, and writers. Intrigued, we secured funding to stage an exhibition of work by those with "extreme imagination" and issued an open call for creative work to our database of contacts, which by that time contained both hyperphantasic and aphantasic individuals. This produced 65 responses, from which we selected 18 exhibitors (6 hyperphantasics and 12 aphantasics).[47] Our findings here are based on a qualitative analysis of interviews with the exhibitors.[48] While these findings are preliminary—the sample is small and unrepresentative (the number of hyperphantasics reflecting the number in the research group's database, due to research having focused on aphantasia, rather than in the population), and a further, more systematic study based on a larger sample of artists is necessary—they have significant implications.

What soon became apparent, as we developed the exhibition, was what little connection there seemed to be between imagery vividness and the nature of the artworks themselves. Work by the aphantasic creatives included both figurative and abstract pieces and was in a variety of media, including painting, video, and sculpture. There was no consistency of theme or subject. The individuals we examined were themselves just as diverse. They worked in a number of fields, from graphic design to architecture to millinery. There were both amateur and professional, untrained and trained, and many were highly academically qualified. What *was* distinctive, however, was how they described the processes they employed to produce an artwork.

For our aphantasic participants there was an externality to the composition process. The starting point specifically was consistently external. Several artists reported requiring reference images or objects to depict or work from. SB, an illustrator, said that she relies "very heavily on photographic references in [her] artwork." DT, a figurative painter, claimed to be "more or less constricted [*sic*] to observation," always looking for "external motives," which could be "anything, from media images to specific objects or scenes that [he] photograph[s]." The milliner CS said that she has "an extensive collection of reference images saved on my Google Drive. I use these a lot to look at techniques, remember past projects or inspire me for a new one. Before Google and Pinterest I used to print them out as color images and keep them in ring binder folders."

Several participants said that they needed to start with a preprepared image rather than a blank surface. One multidisciplinary artist, AB, makes videos in which a well-known old master painting is digitally manipulated to the point of erasure [fig 2, M]. For CS, preexisting representational material is integral to her design process, as a base on which to form her own images: "I draw ideas on printed-out photos of half-made hats, and pin hats together on my head whilst looking in the mirror'.

Where some start with preexisting images, others start by making a mark or marks on the blank surface, which will serve as a stimulus, or a material to work with. ES is one of these: "I try to get some marks down, however loose or approximated, as quickly as possible. Then I can really begin to push and engage with the appearing image." The collages that SB submitted for the study were made in a similar way [fig 3, S]. She described how she applies the material "blindly" (i.e., without an intended final image) to the surface and "gradually, shapes, and colors evoke essences of meaning." Only in the process of making the picture did she recognize it as an image: a depiction of "distressing events" that she had been

preoccupied with but unable to visualize. She concludes that "a figurative representation of them emerged unintentionally." The collages were then accordingly titled.

The artists also perceived themselves to have externalized the composition process. The British artist MC, who paints detailed figurative scenes [fig 4, M; fig 5, S], was especially articulate about this:

> The lack of ability to visualize images in my mind is a great motivation; I must physically work on a drawing or painting in order for my imagination to become visually manifest. I often start a picture with no intention and certainly no end goal; it materializes in an improvisatory way. This sense of stepping out into the unknown is thrilling and the subsequent discovery of latent imagery fascinating. Largely bypassing conscious decision making, the way images (usually figures) emerge from my subconscious is akin to dreaming, and the resulting work is often just as strange, surprising, and revealing as that would suggest.

This externality to the composition process described by our aphantasic artists is made clear when we compare them to the hyperphantasics that we interviewed. All of our hyperphantasic participants reported that their artworks originate in mental imagery. KB's artwork "came to [her] unexpectedly one evening fully formed" [fig 6, S]; GvH worked to "capture the different sounds, shapes, and colors" she experiences while listening to music, building up layers of paint to recreate "the strong sense of space and depth [she] imagine[s]." Other hyperphantasics spent longer manipulating their mental imagery. MEC, who works by weaving together separate fabric patterns [fig 7, L], stated that,

> I spend hours over days or months composing the whole piece in my mind. I visualize the designs, the two separate paintings, make changes, rotate it to check the structures from different angles, and make corrections and adjustments to the design before I put it down on paper. When I finally make the finished piece, the weaving and resulting image come out how I composed them in my mind.

The contrast with aphantasic MC's account is stark. Just as imagery use varies in the mental lives of the population at large, it seems clear, so does it vary in the mental lives of individuals engaged in creative or artistic practice. If an artist has imagery, they often use it; if they do not have imagery, they utilize other, specifically external resources to achieve the necessary ends.

10. Composition and Imagery in the Psychological Literature

The findings of a number of qualitative studies, conducted since the mid-twentieth century, seem to support this observation. Anne Roe (in a study published in 1975 but carried out in 1946) classified respondents into those who worked from an "internal stimulus" and those who worked from an "external stimulus." One in the former group asserts: "I usually carry a picture in my mind for a long time before I paint it, maybe for a year. . . . The picture really exists in my mind complete before I start painting."[49] An "abstract painter," meanwhile, claims to have the opposite working process: "I construct a balance of equilibrium using lots of different pieces of paper so I can copy and take it one step further. I have when I start no idea of a finished picture."[50] Jan Einhoven and Edgar Vinacke, who combined observation and analysis of behavior with questionnaires in their 1952 study, reached similar conclusions. "People differ in the completeness with which conceptualization of the picture is attained in

forethought," they found, "for some the idea is complete to the most minute detail before sketching, for others it develops only during sketching."[51]

The report of a 1987 study by Helane Rosenburg divided the participants into those who describe "working to match the external with the provocative internal image" and those who describe how "the materials themselves lead the artwork."[52] The former group, writes Rosenburg, "seem to experiment first in their mind's eyes. They use the vocabulary of artists describing their external practice, but to explain what is happening internally": "It's like a . . . mental cut and paste," reports one.[53] Of the latter group, whose compositions are led by the materials themselves, the following account is typical: "I'll take a sketch. I'll enlarge it. I'll put color. . . . It happens on the canvas, never in my mind, it's always external."[54]

These qualitative studies found a clear division in how their participants worked: between those that mentally visualize the work before they make it, composing the work "internally," often for a long time, before creating a picture that replicates the mental image; and those who, without a preconception of what the work will look like, experimentally arrange their materials until a "conceptualization," an idea of what it is they are making, occurs. Although these earlier studies did not include standardized self-report measures, such as the VVIQ alongside the narrative accounts, and do not ascribe these working differences to individual differences in imagery vividness, the same division is apparent between hyperphantasic and aphantasic artists, who are identified as such by their VVIQ scores. Reading these VVIQ-correlated accounts alongside the earlier studies suggests the possibility that differential imagery experience could be a factor in determining the degree to which artworks in those studies and among our own artists were composed "internally" or "externally."

11. Historical Implications

Such, then, are some implications of differential imagery experience for art making. But what about art making of the past? Can we associate imagery experience with the artistic styles—the "coherence of qualities," in James Elkins's definition—of people or periods?[55] The answer must begin in somewhat deflationary terms. As we have seen, there seems to be no relation between the form of an artwork and the imagery experience of the artist. We might assume that those with stronger imagery would be urged to externalize it, and so their work might tend toward representation, and that those who do not think in images would tend toward abstraction or language in their work. But this is not the case, at least as was suggested by our artists. And, again, judging from our artists, the level of realism in representational work has nothing to do with vividness of internal imagery and everything to do with artistic intention and the learned ability to realize it. This works in both directions. A detailed and "realistic" depiction does not mean the artist images vividly, and "seeing" a scene vividly in one's mind eye is independent of the ability or desire to render it graphically.[56] The same goes for the style of a period or group as for that of an individual: we cannot say the work is a certain way because of the artists' experience of imagery.

We must also remember that however vivid the individual's imagery is, that imagery will not play an exclusive role in the act of making. Even Vasari seemed to recognize this. Although he stipulates that the greatest art involves forming and expressing a "concetto . . . nella mente imaginator," he also notes in his life of Titian that to "adjust his inventions," the artist must "first draw them in different ways on paper so as to see how it all goes together"—the reason being that "the mind can [not] perfectly imagine such inventions within itself unless it opens up and shows its conceptions to the corporeal eyes which aid it to arrive at good judgement."[57] For even the most vivid imagers, internal, behind-the-eyes thoughts about

what to make will in the act of making give way to attend to external, before-the-eyes activity. Vivid imagers can compose internally first before externally *re*composing—but that recomposition is inflected by the contingencies of manual action and the material they are working with.

Associating past individuals' imagery experience with the artworks they produced, then, is mired with logical and methodological difficulties.[58] Moreover, to pursue this aspect—attempting to retrospectively diagnose the individual artist—risks missing what is really at issue, which is the construction of artistic subjectivity: theories of art making have presented art makers of a certain neurological and cognitive make-up as ideal and ignored or excluded others.

12. Art Making and Neurocognitive Diversity

To address this we can employ the paradigm of *neurocognitive diversity*. This foregrounds the notion that neurocognitive functioning varies among humans as a result of natural variation, whether inherited or acquired—and so challenges any discourse that demands individuals function in a certain "normal" or "correct" way. It is in these terms we must recognize the two theories of art making we have described here. Normative theories of internal composition assume that artworks must begin as mental images, in which case only individuals who experience mental images can fulfill the criteria for being an "artist." Conversely, normative theories of external composition imply a nonimaging art maker. Both theories assume the artist to be of a certain neurotype—"a cluster of similar neurological and cognitive ways of being."[59] The existence and practices of artists who experience extremes of visual mental imagery, both abundance and absence, challenge these theories' assumptions. Aphantasic artists undermine the stereotype of artistic genius with the vivid inner life, while

hyperphantasic artists—and, indeed, those with so-called normal imagery—challenge claims like Ingold's that all artworks are made through morphogenesis, with preconception playing no causal role.

The notion that certain theories of art making or models of artistic subjectivity involve certain neurotypes—the imager, the nonimager—has potentially exclusionary implications. Under sway of the popular stereotype, and associating from their own experience,[60] aphantasic individuals might at an early stage feel themselves to lack imagination or creativity—because they do not think like artists supposedly should—and so do not develop or pursue creative activities. They would need to be reassured that these qualities are not dependent on an ability to generate mental imagery, and that creation, for both adults and children, can be an external process, characterized by play, trial and error, and experiment.

It is important to note that artists do tend to be vivid imagers,[61] and vivid imagers do tend to take up creative occupations.[62] But if, as we have shown, imagery is not a necessary part of a creative life (for aphantasic MC, indeed, imagery lack is itself a motivation to make images), we have to wonder what lies behind these tendencies. The influence of the popular stereotype again raises itself as a possibility: vivid imagers may tacitly recognize themselves in it, while those with weaker imagery might not see themselves as creative, and thus be directed away from those vocations. All the more reason, there must surely be, to reveal and challenge universalizing, normative models of art making and art maker. In his *Principles of Psychology*, William James observed that "until very recent years it was supposed . . . that there is a typical human mind which all individual minds are like, and that propositions of universal validity could be laid down about such faculties as 'the Imagination.'"[63] Galton's study had blown this view apart: the contemporary recognition of neurological and cognitive diversity promises to have a similar effect on assumptions about "the" artistic mind. As James learned from Galton's study, and as aphantasic and hyperphantasic artists remind

us 140 years later, “There are imaginations, not ‘The Imagination,’ and they must be studied in detail.”[64]

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Biographical Statements

Matthew MacKisack is a guest research fellow at China Academy of Art, Hangzhou, and an honorary associate research fellow at the University of Exeter College of Medicine and Health. His research explores relationships between modernity, artistic practice, and the mind.

Susan Aldworth is a visual artist whose artworks—often made in collaboration with scientists, clinicians, and philosophers—investigates the workings of the human mind. Her work is held in public and private collections internationally. She teaches on the MA Art & Science at Central Saint Martin’s, London, and is a regular presenter on BBC Radio.

Fiona Macpherson (FRSE, MAE) is professor of philosophy and director of the Centre for the Study of Perceptual Experience at the University of Glasgow. She researches the nature of consciousness, perceptual experience, illusion, hallucination, imagination, VR and AR, and the metaphysics of mind.

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Crawford Winlove is senior lecturer in neuroscience at University of Exeter College of Medicine and Health. He researches the mathematical modeling of neuroimaging data, with a current focus on elucidating the neural basis for imagery vividness.

Adam Zeman is professor of cognitive and behavioural neurology at the University of Exeter College of Medicine and Health, where he leads the Eye's Mind research project. His main research interests are disorders of visual imagery and forms of amnesia occurring in epilepsy.

Captions

[fig 1] **Isabel Nolan (aphantasic),** ***A Lion with a Thorn in his Paw*****, 2015**, polystyrene, plaster bandage, and papier-mâché, 42.9 x 23.2 x 46.5 in. (109 x 59 x 118 cm) (artwork © Isabel Nolan and Kerlin Gallery, Dublin; photograph provided by the artist and Kerlin Gallery)

[fig 2] **Andrew Bracey (aphantasic), still from** ***Aphantasia—Raft of the Medusa*****, 2017**, digital video, dimensions variable (artwork © Andrew Bracey; still provided by the artist)

[fig 3] **Susan Baquie (aphantasic),** ***The Prahran Friend's Brother #4,*** **1991**, mixed media collage on paper, 17.3 x 21.2 in. (44 x 54 cm) (artwork © Susan Baquie; photograph provided by the artist)

[fig 4] **Michael Chance (aphantasic),** ***Bacchus Walk*****, 2016**, oil on board, 48 x 36.2 in. (122 x 92 cm) (artwork © Michael Chance; photograph provided by the artist)

[fig 5a, b] **Michael Chance (aphantasic), stills from *Improv Painting from Imagination—Time-lapse*, 2016**, digital video, 8 min. (artwork © Michael Chance; stills provided by the authors); [fig 5c] **Michael Chance, *Bacchus Walk***, detail showing how the foreshortened prone figure was suggested by the negative space between two profiles (artwork © Michael Chance; photograph provided by the artist)

[fig 6] **Kirsten Baron (hyperphantasic), *Unfinished Business (I Had a Bad Day)*, 2011**, oil on canvas, 30 x 30 in. (75 x 75 cm.) (artwork © Kirsten Baron; photograph provided by the artist)

[fig 7] **Melissa Campbell (hyperphantasic), *Honey*, 2014**, India ink on linen yarn, 22.4 x 48 x 1 in. (57 x 121 x 2.5 cm.) (artwork © Melissa Campbell; photograph provided by the artist)

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[1] Ernst Gombrich, *Art and Illusion: A Study in the Psychology of Pictorial Representation* (Princeton: Princeton University Press, 1969), 18.

[2] Erwin Panofksy, *Idea: A Concept in Art Theory* (Columbia: University of South Carolina Press, 1968). Panofsky describes how in the treatises of Italian theorists the Platonic metaphysical *Idea* is married with Aristotelian psychology to become a conception residing in the mind, which it is the artist's task is to express.

[3] Romano Alberti, *Della nobiltà della pittura*, in *Trattati d'arte del cinquecento*, ed. Paola Barocchi, 3 vols. (Bari: Lateiza,1960–62, vol. 3, 195-235; translated in François Quiviger, "Renaissance Art Theories," in *A Companion to Art Theory*, ed. Paul Smith and Carolyn Wilde, Blackwell Companions in Cultural Studies (Oxford: Blackwell, 2002), 53–54.

[4] Quiviger, "Renaissance Art Theories," 52..

[5] Ibid., 59.

[6] Giorgio Vasari, *The Lives of the Artists*, trans. Julia Conaway Bondanella and Peter Bondanella (Oxford: Oxford University Press, 2008), 290.

[7] Miguel de Cervantes, *Don Quixote*, trans. John Rutherford, Penguin Classics (New York: Penguin Books, 2003), 506. It is tempting to speculate on whether behind Orbaneja lies Epimetheus ("afterthought"), the idiot brother of Prometheus ("forethought"), who because of his lack of foresight spoiled the primordial act of making he was tasked with.

[8] Joshua Reynolds, *Discourses on Art*, ed. Robert R. Vark (New Haven, CT: Yale University Press, 1975).

[9] Paul Duro, "Academic Theory 1550–1800," in Smith and Wilde, *A Companion to Art Theory*, 95.

[10] We might well ask how to square this model of art making with naturalistic depiction. Certainly in Europe until the late eighteenth century, the general view was that painting's

main task is to produce the greatest possible resemblance to the visible world or "Nature". But in many interpretations mimesis does not mean mindless copying, involving instead a selecting from Nature of the most beautiful or meaningful elements, combining them in an inner *Idea*, then depicting the *Idea* in material form. Hence Raphael's notorious claim: "to paint a beautiful woman I should need to see many, [then] make use of a certain ideal which presents itself to my mind"; cited in Rudolf Arnheim, *Visual Thinking* (Berkeley: University of California Press, 1969), 98.

[11] Joshua Reynolds, *Discourses*, ed. Pat Rogers, Penguin Classics (Harmondsworth: Penguin Books, 1992).

[12] Charles Harrison and Paul Wood, "Introduction," in *Art in Theory, 1900–1990: An Anthology of Changing Ideas*, ed. Harrison and Wood (Oxford: Blackwell, 1993), 14.

[13] For evidence of the power of the popular stereotype, and of how it crosses artistic forms, consider Mozart: we often hear the belief expressed that "Mozart could effortlessly conceive of great swaths of music entirely in his head" (Craig Wright, "How To Be a Genius," *Aeon*, January 26, 2021, https://aeon.co/essays/what-can-we-learn-from-the-secret-habits-of-genius). But this rehearses a mythologized conception of the composer's creative process that was propagated in the nineteenth century by his widow and biographer, among others (see Cornell University Library, "The Mozart Myth: Tales of a Forgery," *Mozart and the Keyboard Culture of His Time*, 2002, rmc.library.cornell.edu/mozart/myth.htm). Mozart's composition was not in fact all "in his head" before being transferred, perfectly, to the paper: he sketched extensively. Although many sketches were destroyed after his death, what survives shows a process whereby primitive snippets and roughly written notes were combined and increasingly refined, over several drafts, into a completed score; see Ulrich Konrad, "Compositional Method," trans. Ruth Halliwell, in *The Cambridge Mozart Encyclopaedia*, ed. Cliff Eisen and Simon P. Keefe,, (Cambridge: Cambridge University

Press, 2006), 100–108. The case of Mozart, then, reveals the continuing power of the stereotype that makes a causal link between vivid imagery and prodigious creativity, reminding us to treat such claims critically.

[14] Cited in Gombrich, *Art and Illusion*, 90; Gombrich presents Alberti's theory as a forerunner of his own theory of "making and matching"—that the artist progressively modifies the image or object to make it match an internal schema.

[15] Alberti is not only writing before Vasari and his notion of individual genius—he is also writing from the standpoint of a practitioner rather than a theorist or biographer, for which reason, Carolyn Wilde suggests, "he paid more attention to the material process of the activity of painting than to the idea of some image in the mind supposedly transcribed into art"; see Carolyn Wilde, "Introduction: Alberti and the Formation of Modern Art Theory," in Smith and Wilde, *A Companion to Art Theory*), 7.

[16] Sol LeWitt, "Paragraphs on Conceptual Art," *Artforum* 5, no. 10 (Summer 1967): 79–84, quotation at 80.

[17] Rosalind E. Krauss, *The Originality of the Avant-Garde and Other Modernist Myths* (Cambridge, MA: MIT Press, 1985).

[18] Mary Kelly, "Re-viewing Modernist Criticism," in Harrison and Wood, *Art in Theory*, 1092.

[19] See Joanna Zylinska, *AI Art: Machine Visions and Warped Dreams*, Media: Art: Write: Now (London: Open Humanities Press, 2020); and Emily Alison Zhou, "Digging and Sinking and Drifting: Allison Parrish's Machine Poetics," *e-flux*, April 2021, www.e-flux.com/journal/117/385623/digging-and-sinking-and-drifting-allison-parrish-s-machine-poetic.

[20] Ann-Sophie Lehmann, "Epilogue: 'Good Art Theory Must Smell of the Studio,'" in *Hiding Making—Showing Creation: The Studio from Turner to Tacita Dean*, ed. Rachel Esner,

Sandra Kisters, and Lehmann (Amsterdam: Amsterdam University Press, 2013), 248.

[21] Brian Massumi, "Introduction / Like a Thought" in *A Shock to Thought: Expression after Deleuze and Guattari*, ed. Massumi (London: Routledge, 2002), xiii.

[22] Hugo Ball, "Dada Fragment," in Harrison and Wood, *Art in Theory*, 247.

[23] Tim Ingold, *Making: Anthropology, Archaeology, Art and Architecture* (London: Routledge, 2013), 20–21. Lambros Malafouris's Material Engagement Theory pursues a similar path but opposes what Ingold understands by hylomorphism with a "hylonoetic" sense of design, where acts of making and acts of thinking are one; see, e.g., Lambros Malafouris, "Thinking as 'Thinging': Psychology with Things," *Current Directions in Psychological Science* 29, no. 1 (2020): 3–8.

[24] Ingold, *Making*, 21.

[25] Ingold, *Making*, 25.

[26] Ingold, *Making*, 127.

[27] Ingold, *Making,* 126–27.

[28] On the relation between imagery and PTSD, see, e.g., Emily A Holmes, Chris R Brewin, and Richard G Hennessy, "Trauma Films, Information Processing, and Intrusive Memory Development," *Journal of Experimental Psychology: General* 133, no. 1 (2004): 3–22; on imagery in reading, see Elaine Scarry, *Dreaming by the Book* (New York: Farrar, Straus and Giroux, 1999).

[29] For a survey of philosophical and scientific approaches to imagery, see Matthew MacKisack, Susan Aldworth, Fiona Macpherson, John Onians, Crawford Winlove, and Adam Zeman, "On Picturing a Candle: The Prehistory of Imagery Science," *Frontiers in Psychology* 7, no. 515 (April 19, 2016), https://doi.org/10.3389/fpsyg.2016.00515.

[30] Francis Galton, "Statistics of Mental Imagery," *Mind* 5 (1880): 301–318, quotation at 310.

[31] David F. Marks, "Visual Imagery Differences in the Recall of Pictures," *British Journal of*

Psychology 64, no. 1 (1973): 17–24.

[32] See Bill Faw, "Conflicting Intuitions May Be Based on Differing Abilities: Evidence from Mental Imaging Research," *Journal of Consciousness Studies* 16, no. 4 (2009): 45–68; see also Adam Zeman, Fraser Milton, Sergio Della Sala, Michaela Dewar, Timothy Frayling, James Gaddum, Andrew Hattersley, Brittany Heuerman-Williamson, Kealan Jones, Matthew MacKisack, and Crawford Winlove, "Phantasia—The Psychological Significance of Lifelong Visual Imagery Vividness Extremes," *Cortex* 130 (September 2020): 426–40.

[33] Adam Zeman, Michaela Dewar, and Sergio Della Sala, "Lives without Imagery—Congenital Aphantasia," *Cortex* 73 (December 2015): 378–80.

[34] As imagery of great vividness, detail, and voluntary control, "hyperphantasia" occupies roughly the same semantic territory as "eidetic imagery." Given eidetic imagery's weak scientific basis (see *Stanford Encyclopaedia of Philosophy*, s.v. "Other Quasi-Perceptual Phenomena," by Nigel Thomas, https://plato.stanford.edu/archives/fall2021/entries/mental-imagery/quasi-perceptual.html) and historical association with "the primitive" in people and culture (its founding theorist claimed it to be a characteristic of "less developed" minds, of children and "primitive peoples" (Erich Jaensch, *Eidetic Imagery and Typological Methods of Investigation*, trans. Oscar A. Oeser [London: Kegan Paul, 1930]), we will be glad if research and usage turns to hyperphantasia. Indeed, when we recognize how the discourse of imagery and mental "powers" was entwined from its inception with a pseudoscientific maligning of human difference—Galton's psychometric studies ultimately aimed at establishing racial and sexual hierarchies in intellectual ability (*Inquiries into Human Faculty and Its Development* [London: Macmillan, 1883])—we can appreciate how vital the reframing work is, done by the paradigm of either "neurodiversity" or "neurocognitive diversity," as we employ here (see Section 12 below).

[35] See, e.g., Russel Hurlburt and Eric Schwitzgebel, *Describing Inner Experience? Proponent*

Meets Skeptic, Life and Mind: Philosophical Issues in Biology and Psychology (Cambridge, MA: MIT Press, 2007).

[36] See Zeman et al., "Phantasia"; Alexei Dawes, Rebecca Keogh, Thomas Andrillon, and Joel Pearson, "A Cognitive Profile of Multi-Sensory Imagery, Memory and Dreaming in Aphantasia," *Scientific Reports* 10, no. 10022 (June 22, 2020), https://doi.org/10.1038/s41598-020-65705-7; and Carla J. Dance, Matt Jaquiery, David M. Eagleman, David Porteous, Adam Zeman, and Julia Simner, "What Is the Relationship between Aphantasia, Synaesthesia and Autism?," *Consciousness and Cognition* 89, no. 103087 (2021), https://doi.org/10.1016/j.concog.2021.103087.

[37] See Zeman et al., "Phantasia"; but also see Dance et al., "Aphantasia, Synaesthesia, and Autism?," which shows that aphantasia can arise in synaesthesia.

[38] See, for example, Sue-Hyun Lee, Dwight J. Kravitz, and Chris I. Baker, "Disentangling Visual Imagery and Perception of Real-World Objects," *NeuroImage* 59, no. 4 (2012): 4064–73; and Nadine Dijkstra, Sander E. Bosch, and Marcel A. J. van Gerven, "Vividness of Visual Imagery Depends on the Neural Overlap with Perception in Visual Areas," *Journal of Neuroscience* 37, no. 5 (2017): 1367–73.

[39] Crawford Winlove, Fraser Milton, Jake Ranson, John Fulford, Matthew MacKisack, Fiona Macpherson, and Adam Zeman, "The Neural Correlates of Visual Imagery: A Co-ordinate-Based Meta-analysis," *Cortex* 105, no. 4 (August 2018): 4–25.

[40] Adam Zeman, "Aphantasia," in *The Cambridge Handbook of the Imagination*, ed. Anna Abraham (Cambridge: Cambridge University Press, 2020), 692–710.

[41] See, e.g., Johanna Bergmann, Erhan Genç, Axel Kohler, Wolf Singer, and Joel Pearson, "Smaller Primary Visual Cortex Is Associated with Stronger, but Less Precise Mental Imagery," *Cerebral Cortex* 26, no. 9 (September2016): 3838–50; and Rebecca Keogh and Joel Pearson, "The Blind Mind: No Sensory Visual Imagery in Aphantasia," *Cortex* 105, no.

4 (August 2018): 53–60.

[42] Joel Pearson and Rebecca Keogh, "Redefining Visual Working Memory: A Cognitive-Strategy, Brain-Region Approach," *Current Directions in Psychological Science* 28, no. 3 (2019): 266–73.

[43] Temple Grandin, *Thinking in Pictures: My Life with Autism* (New York: Doubleday1995), 3–5; for an interview-based study of individual cognitive differences in relation to creative activity, see Laura Otis, *Rethinking Thought: Inside the Minds of Creative Scientists and Artists*, Explorations in Narrative Psychology (Oxford: Oxford University Press, 2015).

[44] Marcus Wicken, Rebecca Keogh, and Joel Pearson, "The Critical Role of Mental Imagery in Human Emotion: Insights from Fear-Based Imagery and Aphantasia," *Proceedings of the Royal Society B: Biological Sciences* 288, no. 1956 (2021), https://doi.org/10.1098/rspb.2021.0267.

[45] James Gallagher, "Aphantasia: A Life without Mental Images," *BBC News*. August 26, 2015, https://www.bbc.co.uk/news/health-34039054.

[46] Carl Zimmer, "The Brain: Look Deep into the Mind's Eye," *Discover*, (March 22, 2010, 28–29; and Gallagher, "Aphantasia."

[47] Susan Aldworth and Matthew MacKisack, "Curator's Introduction," in *Extreme Imagination—Inside the Mind's Eye*, ed. Aldworth and MacKisack, exh. cat. (Exeter: Eye's Mind Publications, 2019). A digital counterpart of the exhibition is available at www.gla.ac.uk/imagination, produced by The University of Glasgow's Centre for the Study of Perceptual Experience.

[48] A note on data collection and analysis. All contacts completed a VVIQ, where scores of 23/80 or less indicate aphantasia, and hyperphantasia if individuals score 75/80 or more. The individuals selected for the exhibition were also asked by email to write a paragraph in response to the question, "How does aphantasia / hyperphantasia affect your practice?" We

used an inductive Thematic Content Analysis approach, where responses were open coded, then themes identified within that data. While no second coder was involved, there was an informal comparison of views with other members of the team who were familiar with the material.

[49] Anne Roe, "Painters and Painting," in *Perspectives in Creativity*, ed. Irving A. Taylor and J. W. Getzels (Chicago: Aldine, 1975), 163.

[50] Roe, "Painters and Painting,", 162.

[51] Jan E. Einhoven and W. Edgar Vinacke, "Creative Processes in Painting," *Journal of General Psychology* 47 (1952): 139–164, quotation at 154–55.

[52] Helane S. Rosenberg, "Visual Artists and Imagery," *Imagination, Cognition and Personality* 7, no. 1, (September 1987–88): 77–93, quotation at 89.

[53] Rosenberg, "Visual Artists and Imagery," 89.

[54] Rosenberg, "Visual Artists and Imagery," 89.

[55] *Grove Art Online*, s.v. "Style," by James Elkins, https://doi.org/10.1093/gao/9781884446054.article.T082129.

[56] And yet this is the central argument of a stream of theory about the anthropological origin of art itself, stretching back to Galton and his suggestion that "judging by the completeness and firmness of their designs," some tribal peoples must possess "the gift of carrying a picture in their mind's eye"; he goes on to speculate that the same ability enabled the production of representations of animals by people who lived in Europe "hundreds of thousands of years" ago (Galton, *Inquiries*, 70–73). Similar proposals were put forward by Wilhelm Wundt, *Elements of Folk Psychology*, trans. Edward Leroy Schaub (London: Macmillan, 1916), and Erich Rudolph Jaensch,"Psychologie und Ästhetik," *Zeitschrift für Ästhetik und allgemeine Kunstwissenschaft* 19 (1925):11–28 (see also n35 above), as well as in the later twentieth century by Julian Jaynes, "Palaeolithic Cave Paintings as Eidetic

Images," *Behavioral and Brain Sciences* 2, no. 4 (1979): 605–7, and George Kubler, "Eidetic Imagery and Palaeolithic Art," *Yale University Art Gallery Bulletin* 40, no. 1 (Spring 1987): 78–85. This line of theorizing is obviously thrown into doubt by aphantasic artists. When their work displays representational qualities indistinguishable from that of those who experience vivid imagery, it cannot be claimed that "completeness and firmness" of design is owed to vivid imagery; the existence of aphantasic artists, and the recognition that they have always existed, undermines claims that primordial art making must be owed to the maker experiencing vivid imagery. Whitney Davis's account, as in, e.g., "Replication and Depiction in Paleolithic Art," *Representations* 19 (Summer 1987): 111–47, emphasizing acts of recognition and modification over imagining, presents a strong case against this line of thought; but for an example of its persistence, see Gillian Morriss-Kay, "The Evolution of Human Artistic Creativity," *Journal of Anatomy* 216, no, 2 (2010):158–76.

[57] Giorgio Vasari, *Life of Titian*, quoted in Ernst Gombrich, *The Image and the Eye: Further Studies in the Psychology of Pictorial Representation* (London: Phaidon Press, 1982), 227. For Gombrich, this is a precursor to his theory of "making and matching" (developed into "recall and recognition" in *The Image and the Eye*), but it is also the essence of many recent accounts of sketching as a primarily perceptual rather than imaginative activity. See, e.g., Andy Clark, *Natural-Born Cyborgs: Minds, Technologies, and the Future of Human Intelligence* (New York: Oxford University Press, 2003), 77.

[58] Such difficulties—and potential—have been discussed by David Berman in relation to philosophers ("Philosophical Counseling for Philosophers: A Confession of Images," *Philosophical Practice* 3, no. 2 [2008]: 255–66) and by Matthew MacKisack in relation to eighteenth-century theorists of poetics ("Differential Imagery Experience and *Ut pictura poesis* in the 18th-Century," *Interdisciplinary Science Reviews* 41, no. 4 (December 2016): 319–31). Both argue that verbal testimonies can be taken as evidence of the author's imagery

experience, and both suggest that the writer's philosophical or theoretical positions can be seen to be influenced by this experience.

[59] Alyssa Hillary, "Neurodiversity and Cross-cultural Communication," in *Neurodiversity Studies: A New Critical Paradigm*, ed. Bertilsdotter Rosqvist, Nick Chown, and Anna Stenning (Routledge: London, 2020), 92.

[60] In Rebecca Chamberlain, "Drawing Conclusions: An Exploration of the Cognitive and Neuroscientific Foundations of Representational Drawing" (PhD diss., University College London, 2013), a recent study of the personality and demographic factors that associate with drawing ability (, the author measured art students' self-perceived and externally rated drawing abilities alongside their visual imagery capacity. A dissociation arose: scores on the VVIQ and other imagery tests correlated significantly with self-perceived drawing ability but not with externally rated drawing ability (102–3). As Chamberlain points out, the result could suggest that some individuals consistently highly rate their abilities across all measures—or that artists believe there to be a link between visual imaging capacity and drawing ability. It would make sense for the converse of the latter to be true: an imagery deficit, an inability to summon images "at will" would lead to a lack of belief in the individual's artistic ability.

[61] María José Perez-Fabello and Alfredo Campos, "The Influence of Imaging Capacity on Visual Art Skills," *Thinking Skills and Creativity*, 2, no. 2 (2007): 128–35.

[62] As reported in Zeman et al., "Phantasia."

[63] William James, *The Principles of Psychology*, vol. 1, new ed. (New York: Dover, 2000), 49–50.

[64] James, *Principles*, 50.