

IMAGINATION AND THE MIND'S EAR

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ABSTRACT

This dissertation provides an analysis of the phenomenon of musical imagery, or the internal 'hearing' of music. I uphold the view that musical imagery, as a kind of auditory imagery, is a kind of sensory or perceptual imagination, and cannot be incorporated into a propositional model of imagination. I further argue that musical imagery differs in important respects both from visual imagery and from other types of auditory imagery, such as inner speech. For this reason, this project makes a contribution to what would be a larger project (not necessarily carried out by a single researcher) of analyzing the sensory or perceptual imagination through careful comparative work in each sensory modality and their various combinations.

Chapter 1 provides the background on theories of imagination necessary in order to make this argument, and demonstrates the lack of attention currently paid to auditory imagination in general and musical imagination in particular. The analysis of musical imagery then proceeds from three points of view: phenomenological, conceptual or analytical, and empirical.

The goal of Chapter 2 is to describe our subjective experiences of musical imagery. While this description is a description of the phenomenological aspects of our experiences, it is not an example of work in phenomenology proper, as practiced by the followers of Husserl, Sartre, Merleau-Ponty or Heidegger. Rather, the method is necessarily first person, but appeals to the idea that musical imagery experiences occur along a spectrum of possible abilities. That is, while there is too much variation among

reports of subjective musical imagery, it still makes sense to appeal to a kind of normal imaginative experience, and, as a result, the reliance on introspection does not result in hopeless idiosyncrasies.

Chapter 3 discusses four topics related to content of musical imagery. First, I address the question of what makes auditory imagination specifically *auditory*; second, I examine the relationship between auditory imagination and imagining hearing; third, I address questions about the ontology of sounds and the ontology of music in the context of my claims about auditory imagination; finally, I discuss whether the contents of musical imagery, as a type of auditory imagination, should be thought of as conceptual or nonconceptual.

Chapter 4 addresses the question of the ontology of the mental image, discussed both by Gilbert Ryle and by participants in the mental imagery debate in the field of psychology. Having demonstrated that scientific inquiry into the mechanisms of mental imagery does not involve commitment to ontologically problematic mental entities, I then survey empirical work in cognitive psychology and neuroscience that sheds light on the neural underpinnings of musical imagery. By way of conclusion, I discuss methodological issues regarding the integration of historical, empirical, conceptual, and phenomenological I use to develop a theory of musical imagery as sensory imagination.

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CHAPTER 1
IMAGINATIONS
Introduction

What does it mean to imagine sound? Is a person who thinks he hears his name spoken in a crowd imagining a sound? Is a child who plays a game with her talking stuffed animals imagining sounds? A violinist waiting backstage before a performance, thinking about the first notes of what she will play? Someone thinking nostalgically about summer days at the seashore? A classroom full of students watching someone pretend to rake his fingers across a chalkboard? A teenager who just can't get the latest pop song out of her head? A mime who turns his head, then opens an imaginary door? A philosopher, thinking about unseen trees falling in forests? Is the hallucinating schizophrenic *imagining* sounds? Surely if anyone has ever imagined sounds, Beethoven did when he composed orchestral masterpieces in profound deafness.

There is some sense in which all these examples might involve imagining sounds. But perhaps the violinist is only thinking that the first note of her piece is an F#, and not thinking about what that F# sounds like. The mime might tell us he is pretending that he hears a doorbell, but this pretending may or may not involve internally 'hearing' the bell. If we ask the child what her stuffed gorilla sounds like, she could imitate its voice, or she could just as easily laugh at us, saying he doesn't *really* talk, she is just pretending that he does. The students who react by cringing violently at the thought of fingernails on a chalkboard might protest that they aren't doing any imagining, or anything else for that matter. They are having something done *to* them. So too those who have songs stuck in their heads, or those who hallucinate. They don't imagine in any voluntary sense, they merely find certain things occurring within their consciousness. Perhaps thoughts of the seashore include imagined sounds of the sea, but this is only one of many ways to

remember that experience. The philosopher might report that he is merely entertaining the proposition that a falling tree makes a sound; there is nothing imaginative going on in his mind.

But what about Beethoven? There was some inner experience that resulted in his writing down thousands upon thousands of beautiful notes on pages of blank staff paper. Does it make sense to say that this was an *auditory* experience? For every person who has said how tragic it is that Beethoven never heard his late works, there is another who will say that what he ‘heard’ internally probably sounded better than anything an orchestra of his time could produce. Beethoven’s deaf composing is the paradigm case of extremely vivid, detailed musical imagery, and musical imagery is a, if not the, paradigm case of imagining sound.

So again, what is it to imagine sounds? Perhaps the question is better stated as follows: how should we characterize the imagination such that the inner experience of musical imagery is one species of imagining? It becomes clear that there are two components to this question: first, what is the imagination; and second, what is (our experience) of auditory and musical imagery? This dissertation brings these questions together in an analysis of musical imagery as a type of sensory imagination. I discuss both auditory imagery in general and musical imagery specifically. The primary goal is to characterize this type of musical imagination.

As I will establish, sensory imagination in the sense of quasi-perceptual experience or mental imagery is distinct from propositional imagination, or imagining that such-and-such is the case. And although Beethoven’s inner auditory experience is intimately linked to his *being imaginative*, in the sense of being creative, they too are conceptually distinct. The sensory imagination is something that nearly all people report having to some degree--they report seeing objects, people, and places in their mind’s eye, and hearing tunes run through their head--whereas the ability to use this imagery to actually compose a whole song internally is rare.

I approach the musical imagination from four different angles. In Chapter 1, I survey both historical and contemporary discussions of the imagination, identifying four major types: sensory imagination, constructive imagination, creative imagination, and propositional imagination. I address the question of whether there is a single concept of the imagination, and claim that the propositional imagination cannot include the sensory imagination. While I do not attempt to argue that in principle there could not be some broad yet clearly defined concept that unifies all types of imagination, I am skeptical that this could be done, and I prefer to view the imagination as a collection of mental functions that have been picked out by this name over the course of the history of philosophy. That is, I am prepared to be a pluralist about types of imagination. What is important for my purposes is that musical imagery is a type of musical imagination and also a type of auditory imagination, which is in turn a type of sensory imagination.

The second section of Chapter 1 discusses several existing applications of imagination in the philosophy of music. I discuss the theories of imagination developed by Roger Scruton and Kendall Walton at length, as well as the extension of each theory into the domain of music. While Scruton does have a discussion of imagery, he finds the relationship between imagery and imagination to be problematic. Among the ways in which his theory differs from mine is that there are instances of musical imagery that I am willing to count as imagination, but that he would not. Scruton devotes considerable attention to the activity “hearing-as”, as well as the role that it plays in the appreciation and basic comprehension of music. Against Walton, I argue that although he allows that imagination can involve imagery experiences, his conception of the imagination is primarily propositional, and for this reason its application to music is mostly inappropriate.

In addition to the work of Scruton and Walton, I also look at work by Thomas Miller and Saam Trivedi. Miller gives an interesting theory of the way the constructive imagination might be applied to music, and I highlight ways in which I think Miller is

correct to say that this constructive sense of imagination plays a role in musical understanding. Trivedi has the most focused treatment of musical imagination in the recent philosophy of music literature, but I observe that his theory is a theory of musical expression, not a theory of imagination. He argues that the imagination is what allows us to hear musical expression; however, rather than develop a single theory of how this is possible, or of what the imagination is such that it aids in the perception of expression, Trivedi instead makes several suggestions about the way several types of imagination might play a role.

After looking at the existing treatments of imagination in the philosophy of music literature, I find that one question not adequately dealt with is the relation of “inner hearing” to the rest of musical activities, practices and capacities. Inner hearing can refer to the widespread and involuntary phenomenon of having a tune stuck in one’s head (these are called “earworms”). It can refer to the consciously deliberate activity a musician engages in when silently reading a musical score. It can also refer to the experience a composer has of spontaneously hearing original music which he then may write down or play by improvising. The more deliberate activity of recalling a piece of music is something that can be done by composer, performer or amateur. For the performer, this may be “mental rehearsal”; for the composer it may be working out details of a new composition, and for the amateur it may just be attempting to put on one’s own silent performance of a favorite piece. It seems both that a theory of musical imagination ought to draw heavily on this phenomenon, and that there is some link between our internal musical capabilities and musical understanding.

Of course, the difficulty in investigating inner hearing is that it must rely on first person intuition of phenomenology. In Chapter 2 I supplement a description of my own characterization of the phenomenology of musical and auditory imagery with work of two phenomenologists, Edward Casey and Don Ihde. I find, however, that Ihde’s work is primarily on sounds and on inner speech, not on musical imagery. Casey addresses

musical imagery at greater length. However, what is interesting about Casey's treatment of musical imagery is that it demonstrates the variability of musical imagery. That is, Casey finds that he is not able to imagine music in great detail, whereas others (typically those with musical training) report more facility with imagining music. I emphasize what I take to be characteristic features of auditory and musical imagery: auditory imagery need not be perspectival; it is essentially temporal; it represents the qualities of pitch, loudness, duration, and timbre; and it can be voluntary or involuntary. I make comparisons between auditory imagination and hearing, and between auditory imagination and auditory hallucinations. In addition to the aforementioned topics, I address a long-standing claim about the nature of Mozart's musical imagery, and discuss some descriptions of what are called "earworms", or repeating tunes that become "stuck" in our head.

Chapter 3 addresses several problems relating to the content of auditory imagery. First, I take up an issue raised by Dominic Lopes about whether it is possible to identify a criterion that distinguishes types of sensory imagining by modality. The primary means Lopes considers by which to so distinguish sensory imaginings is by what are called "specific imaginables", or properties which can only be represented in a single modality. I argue against Lopes that it is indeed possible to identify specific imaginables for auditory imagination. These are the phenomenal properties of pitch, loudness, and timbre that are shared by sounds and auditory images.

Chapter 3 also addresses the relationship between auditory imagination and imagining hearing. Contra Martin, Peacocke, and others, I argue that auditory imagination is not imagining hearing. Imagining hearing requires a combination of auditory imagery with a proposition that one is hearing; so, imagining hearing involves both the sensory and propositional imaginations.

The third topic I address in Chapter 3 is the ontological nature of both sounds and music, such that we can not only hear them but also imagine them. I put this in terms of a

puzzle for musical formalists: if music is sound, but we do not have actual sounds in our heads when we imagine, how is it that we imagine music? In answering this question, I also introduce an additional type of musical formalism that holds that music is abstract structure. If this position is correct, it would be difficult to argue that imagining music, which on this view is purely abstract, is a case of sensory imagination. I develop a position about the sensory nature of musical imagery, and the perceptual categories that it involves, and argue that even if the abstract formalist view is correct, if we can hear music by hearing sounds, then we can also imagine music sensorily by imagining sounds.

Chapter 3 also briefly addresses whether the contents of music perception and imagination are conceptual or non-conceptual. I argue that if the perceptual categories that we use to hear musical structure are concepts, then music perception and imagination are conceptual. But if concepts must be linguistic in some sense, then it is possible to have non-conceptual content in music perception and imagination.

The final chapter approaches the issue of musical imagery from the point of view of cognitive psychology and neuroscience. I claim that recent work in musical imagery studies provides empirical data that make it possible to link the intrinsically private phenomenon of our internal musical experiences with their observable neural bases. While cognitive science does not claim to answer many of the strictly philosophical questions about the nature of our phenomenological experiences, musical or otherwise, it does make the mind less of a mysterious black box that ought to be avoided if one is to say anything with any hope of objectivity. For this reason, I present this scientific work along side discussions of the problem of the ontology of the image, as represented by the work of Gilbert Ryle, and the imagery debate in cognitive psychology.

There are several benefits of approaching the issue of imagination from the point of view of the philosophy of music. First, a focus on music forces us to consider the modality of hearing in detail rather than simply assuming that any theory that handles the visual imagination can be applied to other sensory modalities. Second, a focus on music

forces the philosophy of mind to deal not merely with aesthetics, but with a branch of aesthetics in which one cannot immediately assume that questions can be solved by applying theories about the representation of semantic content. One cannot even assume that music has this content. Few, however, would deny that the having of mental representations of music is a highly complex cognitive ability or skill, one that we value highly.

Imaginations

In his Charles Elliot Norton lectures of 1952, Aaron Copland wrote that of all the arts, it is music that relies on imagination most essentially.¹ ²While Copland touched on a great many important truths about music, both as it is composed and enjoyed, it was not his purpose to provide a systematic analysis of the imagination as it applies to music. Copland's insights are diverse and suggestive: the imagination is some kind of inner mental activity; it is the source of creativity, of genius; it is our inner ear; it aids the listener in hearing the meaning of a piece of music and feeling its emotive import. Surely all of these notions ring true at some level. Yet to a philosopher of music, these ideas call out for clarification. Just what is the musical imagination? How is it related to the imagination broadly construed? In what sense could it be thought of as a mental faculty, or as the mind's ear?

A journey into the philosophical literature on imagination generally conceived only serves to raise additional questions. Philosophical theories of imagination are at least as old as Plato, and have encompassed all the phenomena Copland mentions and more. The central task, then, is to provide a characterization of musical imagination, and to situate it in terms of past and present theories of the imagination. Part I of this chapter will provide a historical and analytical survey of various theories of imagination, culminating in a division between the two major types of most importance in the current

¹ Aaron Copland, *Music and Imagination* (Cambridge: Harvard University Press, 1952).

² He had in mind the lack of formal and figurative constraints that poetry or painting impose on the artist.

debates, propositional imagination and sensory imagination. Part II will survey the existing discussions of imagination in the philosophy of music literature. As the survey will reveal, there is currently a lacuna in this literature: there is very little discussion of the sensory imagination, i.e. of auditory or musical imagery as types of sensory imagination, and the role of this imagery in our perception, appreciation, and understanding of music. The remaining chapters will serve to remedy this omission.

Mapping the Imaginative Terrain: Varieties of Imaginative Functions

I begin this survey of issues and positions with four central types of imagination, which are discussed in P. F. Strawson's "Imagination and Perception".³ While these types of imagination are essentially defined according to the different mental functions they describe or perform, the usage of the term "imagination" has evolved according to historical influences. Thus, I will briefly discuss the relation of important historical views to these four types of imagination. Next, I will then look at more recent approaches to the imagination, noting changes in the schemata for thinking about different types of imagination as well as the specific types identified. It will turn out that the most important distinction in the current literature is the distinction between the sensory, or perceptual, imagination, which is associated with imagery, and the propositional imagination, associated with fictional truths and quasi-beliefs.

³ I use Strawson's four types merely as a heuristic. I am not here discussing the merits of Strawson's theory that all perception involves imagination—that all seeing is seeing-as—since it is really a theory about the nature of perception rather than about the nature of imagination. In order to make this claim, however, Strawson needs to disambiguate the kind of imagination he thinks is involved in perception—the Kantian constructive imagination—from the other three types.

Strawson identifies four distinct senses of imagination: first, imagination as the production of imagery (the *perceptual imagination*, often also referred to as the sensory imagination, which is how I shall refer to it here); second, imagination as a faculty that organizes percepts for coherent cognition (the *constructive imagination*); third, imagination in the sense of being imaginative or creative (the *creative imagination*); and fourth, imagination as a propositional attitude taken towards fictional or imaginary propositions (the *propositional imagination*).⁴ While it may seem that each of these senses of imagination identifies a distinct mental phenomenon or function, and that there could be several different types of imagination, much of the intellectual history of the concept 'imagination' has consisted of attempts to define the imagination by making one of these senses preeminent among the rest.

A Single Imagination or Many Imaginations?

This naturally raises the question of whether we possess some single thing that answers to the name 'imagination', or whether there are several distinct imaginations that do not admit of unification. Not only are there varying conceptions of what the imagination is, there are also a variety of schemas used to sort through these conceptions. As a matter of intellectual history, there are different mental phenomena and functions--for instance, imagery, the ability to think about objects not currently present, as well as artistic creation--that have at one time or another fallen under the term "the imagination." Although there have been numerous attempts to unify these phenomena, or at least trace a logical relation between them, it is an open question whether it is possible to find a single theory of the imagination that covers them all.

⁴ P. F. Strawson, "Imagination and Perception," in *Freedom and Resentment* (London: Methuen, 1974).

For instance, Fabian Dorsch, in his forthcoming *The Unity of the Imagining* undertakes exactly this project, arguing that diverse imaginative phenomena including imagery, supposition and daydreaming can all be characterized as a particular kind of mental action.⁵ However, others choose to treat imagery and supposition as different phenomena.⁶⁷ Alan White is another example of a philosopher who attempts to give a unified theory of imagination, although his concern is actually to provide a single *definition* of the *term* ‘imagine’. As a result, since we sometimes say things such as “imagine the possibilities!” without having any accompanying imagery in mind, imagery is not only not a necessary feature of imagination, but should not even be considered a kind of imagination at all, according to White.⁸ Amy Kind takes an opposing view: imagery should be an essential feature of imagination, and mere supposition (in this case, instances of propositional imagining that lack accompanying imagery) is a different type of mental act.⁹ For a view that does not require a necessary feature of all cases of imagination, compare McGinn, who discusses what he calls the “imagination spectrum”: everything from percepts to memory to dreams to creativity are linked. McGinn does not, however, offer a precise definition to unite this spectrum, but only claims there is some thread that serves

⁵ Fabian Dorsch, *The Unity of Imagining* (Frankfurt: ONTOS Verlag, forthcoming).

⁶ Dominic McIver Lopes, “Out of Sight, Out of Mind,” in *Imagination, Philosophy, and the Arts*, Matthew Kieran and Dominic McIver Lopes (New York: Routledge, 2003), 208–24.

⁷ Amy Kind, “Imagery and Imagination,” *Internet Encyclopedia of Philosophy* (2005), [Http://www.iep.utm.edu/imagery/](http://www.iep.utm.edu/imagery/).

⁸ Alan R. White, *The Language of Imagination* (Oxford: Oxford University Press, 1990).

⁹ Amy Kind, “Putting the Image Back in Imagination,” *Philosophy and Phenomenological Research* 62 (2001): 85–109.

to link them to one another.¹⁰ While definitively resolving the question of the unity of the imagination is beyond the scope of this project, it seems that what is most important is whether the particular mental functions that the imagination picks out are adequately and accurately characterized. Thus, a theory that dismisses the existence of imagery or that holds that only one of the myriad things that from a pre-theoretical standpoint we call imagination will be deficient. If it turns out, however, that there is no *single* faculty that unites all these functions, what results will be a pluralist theory of the imagination.

The Perceptual, or Sensory, Imagination

The perceptual imagination has its roots in Aristotle's *De Anima* III:iii. Aristotle claims that the imagination--in Greek, *phantasia*--is "that in virtue of which an image arises for us".¹¹ This image can be either a sense impression, or what we might call its trace. In distinguishing imagination from perception and judgment, Aristotle notes that imagination "has for its content what can be perceived," that "imagination must be a movement resulting from an actual exercise of a power of sense," and that "imagination remain in the organ of sense and resemble sensations."¹² While the precise interpretation of *phantasia* in Aristotle requires an explanation of its relation to perception,¹³ it is clear that at a minimum Aristotle's *phantasia* includes our capacity to have visual imagery.

¹⁰ Colin McGinn, *Mindsight: Image, Dream, Meaning* (Cambridge: Harvard University Press, 2004), 159–63.

¹¹ Aristotle, *The Basic Works of Aristotle*, ed. Richard McKeon (New York: Random House, 1968), 587.

¹² Aristotle, *The Basic Works of Aristotle*, 588–9.

¹³ M. Schofield, "Aristotle on the Imagination," in *Aristotle on Mind and the Senses*, ed. G.E.R Lloyd and G.E. L. Owen (Cambridge: Cambridge University Press, 1978), 101.

Recalling the wax tablet metaphor for perception common to ancient Greek writers, it seems that Aristotle conceives of images as traces of past perceptions, which can be revived at will. Aristotle's examples are of visual images, or of colors; in principle he allows the imagination to be the revival of past percepts in any modality (and so this first theory of imagination could include musical and auditory imagery); however, it is clear that he takes vision as his central case.

Many features central to Aristotle's *phantasia* are characteristic of the perceptual imagination for philosophers who followed him. The imagination can summon an image that is in some important way (typically in content and phenomenology) like a perception--for instance, it can have shape and color. It can do this at will, and is for that reason distinguished from the faculty of belief. Our beliefs are constrained in the sense that we are prevented from believing anything known to be false merely by choice; imagination, on the other hand, characteristically deals with falsities. The perceptual imagination typically takes the form of a physical object as its content, and in this respect is what is commonly referred to as the objectual imagination. For Aristotle, although not for all writers, dreams are part of the imagination.

In the early modern period, both Hobbes and Descartes adopted aspects of Aristotle's account of the perceptual imagination. For Hobbes, imagination is something like an after effect of a sense impression, or what he calls "decaying sense". Descartes' imagination clearly had a connection to mental imagery, for he contrasted imagining a triangle, which can be pictured mentally, with the thousand-sided chiliagon, which cannot. Descartes' claim is that we cannot *imagine* the chiliagon, though we can think about it. From this point, it is commonly inferred that, for Descartes, an accurate internal picture is necessary for imagination. That is, a mental act is not an act of *imagining* unless it contains mental imagery as a component part.

Additional Functions of the Perceptual Imagination

However, with Descartes, the imagination plays an additional role, that of linking our sense perceptions with our intellect, part of our immaterial soul. It is the imagination that solves a crucial problem within Cartesian dualism, that of the interaction between material sense and immaterial thought. The imagination works to feed our perceptions to a *sensus communis*, a general format of mental representations that no longer takes the uniqueness of each particular sense modality into account, which can then interact with the immaterial soul at the pineal gland. The Cartesian imagination, then, by performing these integrating and mediating functions, moves beyond the strictly perceptual imagination.

The Ontology of the Perceptual Imagination

One central issue that arises with respect to the imagination in Aristotle and the early moderns is what we might call the ontology of the imagination. Should we think of the imagination as a faculty, that is, a particular mental entity, analogous to a sensory faculty such as sight or hearing? If the imagination is a faculty, the questions that follow are what sort of material this faculty operates on, and what its activity consists of. Is it a mere storehouse of past impressions, or is it something that generates a specific sort of mental state? If it is not a distinct faculty, is it rather a particular function of some more general faculty of the mind, or of the mind as a whole? If the latter, one can simply analyze “the imagination” in terms of the types of activities or mental phenomena that

count as imaginings rather than as putative descriptions of some hoped-to-be-discovered organ of the mind.¹⁴

This tension between imagination as faculty and imagination as function is especially apparent in Hume. Hume explicitly claims that the imagination is a kind of storehouse for faded perceptions that are brought forth by the mind in cognition.¹⁵ Some interpreters have read Hume as claiming that all of the mind is really the imagination: he says that the mind stores impressions as ideas, and that it is the imagination that performs this function.¹⁶ In this respect, the imagination is both the faculty that stores impressions as ideas and the term appropriate for naming imaginative functions. Those functions include reviving past impressions, combining them into novel ideas, as well as supplying the ideas of constancy and connection necessary for our experience of object permanence. The function of reviving past impressions while preserving their original temporal order and appearance is termed memory, even if in some sense it is the imagination that supplies the material of which our memories are made.

Hume distinguishes the imagination proper, which produces images of things that come from past perceptions, from the fancy, which is the source of fictive thoughts. Despite this distinction, the term *fancy* was used in a way we might now find synonymous with imagination. It is important, however, to note that imagination as an imagistic component of cognition and imagination as the fictional and the creative are independent notions, albeit related ones.

¹⁴ With functionalism this distinction collapses; a mental faculty becomes nothing more than a term referring to some mental capacity.

¹⁵ David Hume, David Fate Norton, and Mary J. Norton, eds., *A Treatise of Human Nature* (Oxford: Oxford University Press, 2000), 11 (1.1.3).

¹⁶ Eva T. H. Brann, *The World of the Imagination: Sum and Substance* (Savage, Maryland: Rowman & Littlefield, 1991), 82 ff.

The Constructive Imagination

Kant's first *Critique* developed the Cartesian notion of imagination as a link between mind and body into his constructive imagination, the faculty responsible for formatting sensory experience for use in cognition. This type of imagination is alternatively termed the transcendental imagination (because it is what must exist given that we do have coherent cognition) or the reproductive imagination. While this Kantian constructive imagination is related to the older sense of imagination as the faculty for imagery in that it is the location of inner sensory representations, it differs in the role it serves in cognition. Kant claims that it is the imagination that is responsible for the unification of our perceptual experience prior to cognition, whereas Aristotle thought that imagery was a necessary component of thought itself.¹⁷ In positing a constructive role for the imagination in perception, Kant does not jettison the traditional theory of imagination as the production of images, or of fictional thoughts. The imagination that functions in this way Kant terms the productive, or empirical imagination .

The Creative Imagination

During the Romantic period, the idea of imagination as the source of artistic creativity became especially prominent, notably in the writings of Coleridge and Wordsworth.¹⁸ This creative imagination is responsible for the insights of genius, of

¹⁷ Recent philosophers who have provided neo-Kantian theories of the imagination in this constructive sense include Strawson and Warnock.

¹⁸ For an explanation of the relationship between Kant's transcendental imagination and Coleridge's all-encompassing creative imagination of artistic perception, see Warnock pt. III.

poetic invention, and of religious experience. It is this sense of imagination that is meant when we describe someone or something as imaginative.¹⁹ The Romantic imagination had an air of mystery or even anti-rational mysticism about it, understandably due to its highly unpredictable yet valuable products.

Difficulties with the Perceptual and Creative Imaginations

The twentieth century, however, saw a move away from discussion of unobservable inner mental faculties and of intangible fonts of genius, in large part due to the aforementioned ontological issues. Many philosophers denied the existence of a faculty for the production of mental images altogether, replacing any talk of mental faculties with talk of imaginative activities, behaviors, and practices functionally defined. In the analytic tradition, Ryle and Wittgenstein were responsible for the dominance of this approach, which had affinities with the Behaviorist school of psychology. Such an approach focuses on our understanding of fiction and make-believe, while eschewing any commitment to inner mental pictures. Rather than think—along with Hume, for example—that imagining a tree involves contemplation of a mental object that is a faded perception of an actual tree, Ryle insists imagination requires no such ontological commitment.²⁰ Imagining a tree can instead be understood by analogy with belief: the imaginer acts as she would if she believed she were seeing a tree, yet she merely fancies that she sees a tree. It is important to note that the imagination for Ryle is defined negatively. He makes no attempt to give a positive theory.

¹⁹ See Scruton *Art and Imagination* ch. 7.

²⁰ This ontological issue is the concern of Sartre's *L'Imagination* and *Imaginaire* as well. Sartre argues that imagination is a mode of consciousness directed toward the *actual* object, not an image of it. That mode presents the object as not existing; i.e., as absent.

The Propositional Imagination

The fourth type of imagination, the propositional imagination, is perhaps the most dominant conception of the imagination in contemporary analytic philosophy.²¹ Sometimes also referred to as the cognitive imagination, the propositional imagination involves ways of imagining that something is the case, and is very close to what Ryle seems to have had in mind by defining imagination as an attitude alternative to belief that one takes to content. However, Ryle is primarily concerned with correcting views that take imagination to be the literal seeing of imaginary content. For Ryle, the actual content of imagination can either be an object or a state of affairs. The propositional imagination covers only a subset of these cases, those that can be described in declarative sentences or that- clauses as states of affairs. This type of imagination is used to explain how we relate to fictions, how we understand counterfactual reasoning, and how we entertain possibilities. Rather than having the (strictly false) belief that Sherlock Holmes is a detective, we merely imagine that he is. The propositional imagination is also closely related to supposition and to pretense, while not necessarily identical to either.²² Theorists have commonly thought of children's play in terms of the development of the cognitive imagination, and have done considerable work explaining its role in mindreading, mental simulation, and empathic understanding.²³

²¹ Shaun Nichols, ed., *The Architecture of the Imagination* (Oxford: Clarendon Press, 2006).

²² Nichols, *The Architecture of the Imagination*, 6.

²³ Harris; Leslie

Additional Schemata for Mapping the Imagination

Thus far we have explored four primary types of imagination, the sensory, constructive, creative, and propositional. Depending on whether one considers things like pretense and supposition to be imaginative activities²⁴, and if so whether they should be considered varieties of the propositional imagination, these four categories can ostensibly cover the majority of the things that have been called imagination at one time or another. Of course, while Strawson's categories are common in the literature, they are not universal, and there are other ways of making distinctions among various imaginative activities. I will briefly cover a few of these.

Goldman

Alvin Goldman divides the imagination into what he calls the enactment-
imagination (E-imagination) and the suppositional imagination (S-imagination).²⁵
According to Goldman, "enactment-imagination is a matter of creating or trying to create
in one's own mind a selected mental state, or at least a rough facsimile of such a state,
through the faculty of imagination. (...) Acts of visual and auditory imagination, which
involve the production of vision-like or hearing-like states, are familiar types of E-

²⁴ See Gendler for the argument that supposition is distinct from imagination
Tamar Gendler, "The Puzzle of Imaginative Resistance," *Journal of Philosophy* 97
(2000): 55–81.

²⁵ Alvin Goldman, *Simulating Minds: The Philosophy, Psychology, and
Neuroscience of Mindreading* (New York: Oxford University Press, 2006); Alvin
Goldman, "Imagination in Response to Fiction," in *The Architecture of the Imagination:
New Essays on Pretence, Possibility, and Fiction*, ed. Shaun Nichols (Oxford: Clarendon
Press, 2006), 42.

imagination.”²⁶ S-imagination, which is roughly the same as what I have been calling the propositional imagination, is “typically formulated with a ‘that’-clause. (...) Unlike some forms of imagination, S-imagination has no sensory aspect; it is purely conceptual.”²⁷ Thus, for Goldman, S-imagination and sensory imaginings will be mutually exclusive; if imagery is involved, this is the enactment-imagination. What makes the enactment-imagination different from the sensory imagination described above, however, is that enactment can include things like children’s games of make believe and other recreations of mental states, such as simulated emotions or desires, in addition to imagistic recreations of perceptual experience. The sensory imagination would be merely one kind of enactment-imagination.

Currie/Ravenscroft

In their book *Recreative Minds*, Gregory Currie and Ian Ravenscroft adopt a theory of imagination very close to Goldman’s view of enactment-imagination. Both Goldman and Currie/Ravenscroft discuss imagination to support versions of the simulation theory in the philosophy of mind, which states that the way we are able to understand the thoughts and emotions of others is through simulating those mental states ourselves. Thus the Currie/Ravenscroft recreative imagination is defined primarily in order to explain the recreated states of others, rather than our own possible or fantastic imaginative states:

“Imaginative projection involves the capacity to have, and in good measure to control the having of, states that are not perceptions or beliefs or decisions or experiences of movements of one’s body, but which are in various ways like those states--like them in ways that enable the states

²⁶ Goldman, “Imagination in Response to Fiction,” 42.

²⁷ Goldman, “Imagination in Response to Fiction,” 42.

possessed through imagination to mimic and, relative to certain purposes, to substitute for perceptions, beliefs, decisions, and experiences of movements. These are what we are calling states of recreative imagination.” (See²⁸²⁹³⁰).³¹

The recreative imagination covers both belief-like imaginings as well as desire-like imaginings and imaginings that recreate visual and auditory perceptual states.³²

Currie and Ravenscroft mean to contrast the recreative imagination with the aforementioned creative imagination (section 1.4), which they describe as “the kind of imaginative ‘leap’ that leads to the creation of something valuable in art, science, or practical life.”

O’Shaughnessy

Brian O’Shaughnessy treats the imagination at some length in his *Consciousness and the World*.³³ He contrasts the propositional imagination, which for him includes make-believe, from what he calls “direct object imagination”. Object imagination is further divided into two kinds: imaginative perception, and perceptual imagining. Imaginative perception is what is often termed “seeing-as”, or, following Wittgenstein,

²⁸ Malcolm Budd, *Wittgenstein’s Philosophy of Psychology* (London: Routledge, 1989).

²⁹ Richard Wollheim, “Imagination and Identification,” in *On Art and the Mind* (London: Allen Lane, 1973).

³⁰ Roger Scruton, *Art and Imagination: A Study in the Philosophy of Mind*, reprint, 1974 (South Bend, Indiana: St. Augustine’s Press, 1998), 104.

³¹ Gregory Currie and Ian Ravenscroft, *Recreative Minds* (Oxford: Oxford University Press, 2002), 11.

³² Currie and Ravenscroft, *Recreative Minds*, 51.

³³ Brian O’Shaughnessy, *Consciousness and the World* (Oxford: Oxford University Press, 2000).

aspect perception.³⁴ It is what enables us to see figures in the clouds, or to see a painting both as an arrangement of shapes on a canvass and as whatever is depicted by those shapes.³⁵ Perceptual imagining, on the other hand, is what we have been terming the sensory imagination, but includes hallucination and dreaming as well as mental imagery.³⁶

Theories of the Imagination as Applied to the Philosophy of Music

We have now identified four distinct types of imagination, as well as additional ways of describing these types, and we have found that two competing conceptions of the imagination are most often seen in current discussions of aesthetics: imagination as a faculty for the production of quasi-perceptual experience in the absence of a stimulus (the sensory imagination), and imagination as the realm of pretense, fiction and make-believe (this is primarily a type of propositional imagination). In applying these conceptions to music, two major difficulties arise. The first is that perceptually based theories of imagination are assumed to apply to all the sense modalities, yet one rarely finds any

³⁴ For some philosophers, seeing-as is not imagination proper, because it is still a kind of perception. For others, seeing-as is paradigmatic of imaginative activity. But the sense of imagination here must actually be derived from the constructive imagination: the physical object alone does not dictate how we see it; thus, it is mental concepts and categories that we supply in seeing that allow us to see now one aspect, now the other. When we consider that, following Kant, all seeing requires bare percepts to be filtered through our concepts and categories, we see how Strawson is led to his thesis that all seeing is imaginative seeing; all seeing is seeing-as.

³⁵ Some philosophers term this “seeing-in” rather than “seeing-as” (see Wollheim and Gombrich). While some philosophers do think that seeing-in requires imagination, others, for instance Currie/Ravenscroft, do not.

³⁶ Compare McGinn, who includes discussions of both dreaming and delusions. Dreaming occurs on his “imagination spectrum”, while delusions, which include hallucinations, are termed “disorders of the imagination” McGinn, *Mindsight*, Chs. 7–8.

discussion not focused on vision.³⁷ Hearing is temporal in a way that vision is not, thus any discussion of quasi-perceptual auditory imagery needs to account for this temporality in distinction from vision. Discussions of imagery in general seem to assume that mental imagery consists of two-dimensional pictures in the mind, leaving the essentially temporal nature of auditory imagery unaddressed. Auditory imagery has received some attention from psychologists in the last few decades,³⁸ but there has not been much integration of the imagery studies in cognitive psychology with the philosophical literature on imagination. Surprisingly, there has been little attention to non-visual imagery--much less auditory imagery in particular--in the well-known mental imagery debate, either in the psychological literature or in the philosophical literature.

The second major difficulty in applying the imagination literature to music is that the discussion of musical imagination within the field of philosophical aesthetics is largely modeled on the latter of the two conceptions of imagination, that is, the propositional imagination or imagination as make-believe.³⁹ This is problematic because the notion of pretense or fiction is tied to representation of content that is not literally real. The puzzles in literature include how we can have emotional responses to fictional characters, how certain readings or interpretations can be correct or incorrect, and how there can be truth or falsity within a fictional world, despite the fact that the content of the

³⁷ This bias towards the visual is true not only of the imagination literature but also of the literature on perception in general. Only recently has attention turned to sounds and hearing (O'Callaghan 2007, Nudds 2001).

³⁸ Daniel Reisberg, ed., *Auditory Imagery* (Hillsdale, New Jersey: Lawrence Erlbaum Associates, 1992); Margaret Jean Intons-Peterson, "Components of Auditory Imagery," in *Auditory Imagery*, ed. Daniel Reisberg (Hillsdale, NJ: Lawrence Erlbaum Associates, 1992), 45–71; Petr Janata, "Neurophysiological Mechanisms Underlying Auditory Image Formation in Music," in *Musical Imagery*, ed. Rolf Inge Godoy and Harald Jorgensen (Lisse: Swets & Zeitlinger, 2001), 27–42.

³⁹ Lopes makes this point in his 2003 article "Out of Sight, Out of Mind".

literary representation is not real. Similar issues arise in the visual arts. The representational content of a painting may not be real, yet we have few difficulties understanding what the content is meant to be. One solution to this puzzle is that we imagine that it is true in the fiction (whether visual or literary) that such-and-such is the case.

When this discussion is brought into music, philosophers speak of or of its being fictionally true “in the music” that a phrase is sad, or that a section is the introduction to the larger musical movement.⁴⁰⁴¹ Yet there is a crucial distinction between the philosophical problems of painting and fiction, and those of music.⁴² Fiction and painting are (in the canonical cases) representational, and the difficulty that the theory of make-believe addresses is how we understand the representational content despite the fact that it is not truly real. But to assume that a sonata is a musical presentation of fictional content is to beg one of the most important questions in the philosophy of music--whether music is representational. To talk of musical imagination as if it is a

⁴⁰ Ludwig Wittgenstein and G. E. M. Anscombe, trans., *Philosophical Investigations*, reprint, 1953 (Oxford: Basil Blackwell, 1972); Jerrold Levinson, “Music and Negative Emotion,” in *Music, Art, & Metaphysics*, Jerrold Levinson (Ithaca: Cornell University Press, 1990), 306–35; Saam Trivedi, “Imagination, Music, and the Emotions,” *Revue Internationale de Philosophie* v. 60, no. no. 238 (December 2006): 415–36; Saam Trivedi, “The Funerary Sadness of Mahler’s Music,” in *Imagination, Philosophy, and the Arts*, eds Matthew Kieran and Dominic McIver Lopes (New York: Routledge, 2003), 259–71; Jenefer Robinson, *Deeper Than Reason: Emotion and Its Role in Literature, Music and Art* (Oxford: Clarendon Press, 2005); Kendall Walton, “Listening with Imagination: Is Music Representational?” in *Music and Meaning*, ed. Jenefer Robinson (Ithaca: Cornell University Press, 1997), 57–82; Kendall L. Walton, *Mimesis as Make-Believe: On the Foundations of the Representational Arts* (Cambridge, Mass.: Harvard University Press, 1990).

⁴¹ One exception is Thomas Miller’s discussion of the role of the Kantian imagination in understanding music, see section 2.1.3 below.

⁴² Although Lopes’ point is that the propositional imagination is not even sufficient to handle our visual experiences of paintings.

straight-forward analogue of fictional or pictorial imagination is to artificially circumscribe the topic of discussion. There are many additional ways that imagination relates to our ability to understand music that do not enter into the discussion of the way we understand fictional content. Indeed, what is inevitably left out is the notion of the “inner ear.”

Scruton and Walton

The survey of theories of imagination provided in part I of this chapter covered some literature that touched on aesthetics, but most of those theories are intended to be general theories of the imagination, as they play a role in the broader area of the philosophy of mind. In analytic aesthetics, the two dominant theories of the imagination in the latter half of the twentieth century are developed by Roger Scruton in *Art and Imagination* (1974) and by Kendall Walton in *Mimesis as Makebelieve* (1990).⁴³ Both of these authors apply their theories to music, and both suffer from a similar defect, that of overemphasizing the propositional imagination. Walton does not deny that there may be other sorts of imagination in addition to the propositional imagination, but his discussion focuses on this single type. Scruton allows that we do have imagery, but believes that not all imagery should be considered imagination.

While neither Scruton nor Walton goes to the extremes of those who would deny the existence of imagery altogether, or those who would grant its existence but claim it is not truly imagination, they both treat imagery as a difficulty to be largely set aside in favor of the propositional imagination. It may arguably be appropriate to treat imagery this way when discussing literary fictions--i.e., as a phenomenon that can occur while

⁴³ Scruton claims that imagined propositions are “entertained” rather than asserted.

reading, but needn't, and in any case is less interesting than the puzzles that arise from our imaginative engagement with the propositional content of fictions. But in the case of music, it appears that the propositional imagination is only relevant to music once one has already decided to treat music as analogous to literary fictions. Furthermore, even the very act of listening requires the imagistic representations of musical memory and anticipation; for this reason, their downplaying the role of auditory imagery in music listening, as well as composition and performance, is a negative feature of both theories.

Scruton

Scruton contrasts imagination with belief, maintaining that while belief and imagination can have the same content, there must be something aside from that content that distinguishes the two mental states. Scruton's answer is that whereas beliefs are asserted, imaginings are unasserted. That is, belief involves a commitment to the truth of its content, but imagination makes no such commitment. Scruton concludes, then, that imagination is unasserted thought. This theory is clearly closely related to the propositional attitude theory of imagination.

His theory is also closely related to the theories of Gilbert Ryle and Kendall Walton. Where one of the puzzles is to explain how a child playing bears, for example, acts, all the while not responding as if there were really a bear present. One benefit, perhaps the most significant benefit, of this approach is that one can differentiate belief and imagination through the observable actions of the agent. This means that there is an objective criterion verifiable from the third person point of view that allows one to distinguish two speakers who say "There are bears!" The speaker who believes his assertion will act as if he is really in mortal danger; the one who only makes believe that there are bears will not. Even if the latter behaves as if he is afraid as part of the game, there are counterfactual conditions that hold true in this latter case, such as the fact that in

making believe one might be easily distracted from his game, no longer bothering to "escape" from the bear.

Scruton differentiates belief and imagination in this way: "From a cognitive point of view, the two experiences [the first of seeing a threatening man, the other of looking at a picture of a threatening man] are as different as can be. The one is linked to fear and flight, the other to peaceful meditation."⁴⁴ In the case of fearing the actual threat, Scruton says that "my behaviour is adequately accounted for by the fact that what I see I also believe to be there."⁴⁵ Further, in the case of looking at a depicted fictional situation: "Here my behaviour is accounted for by the fact that what I see I also believe *not* to be there."⁴⁶ This is well in keeping with his stated goal in *Art and Imagination*, which is to give observational criteria for the application of terms involved in aesthetic judgment (and presumably this would include the term 'imagination').

One limitation of Scruton's "unasserted thought" theory is that it is designed to handle content structured as beliefs are structured. The natural candidates are propositions. While it is not a straightforward matter to give a standard definition of propositions or of their structure, the paradigm cases seem to be the sorts of things that can be stated by declarative sentences in language. It is for just this reason that Scruton thinks of beliefs as asserted. Typically, this means that something is predicated of a subject, e.g. x is F. If this is correct, part of the content of a proposition must be whatever is represented by the predicate category F. For a person to assert a thought structured as a proposition, then, plausibly, that person must have the concept of F's, which entails that

⁴⁴ Roger Scruton, *The Aesthetics of Music* (Oxford: Clarendon Press, 1997), 89.

⁴⁵ Scruton, *The Aesthetics of Music*, 89.

⁴⁶ Scruton, *The Aesthetics of Music*, 89.

propositional content involves at least some conceptual content. Indeed, one would expect this given that he says the content of a belief is a *thought*.

More to the point, the proposition separates the subject from the predicate, joining them with the copula, but there are contents that can be imagined that do not take this structure. One can simply imagine *Paris*, without imagining *that* Paris is one way rather than another. This is what O'Shaughnessy and others have called objectual imagining (1.6.3), and it is not covered by Scruton's account in any straightforward way. While it is true that there are theories of propositions that would allow for objectual thought or imagining, for example, the Stalnaker model that makes a proposition the set of possible worlds that contain that object, this does not save Scruton for the reason that it is still a stretch to think of these sorts of propositions as asserted.

It must be noted that Scruton does mention the possibility of unasserted perceptions in the context of perceiving an aspect: "Hearing the sadness in the music then becomes the 'unasserted' auditory perception of sadness."⁴⁷ Perhaps, if the idea of an unasserted perception is coherent, this could be extended to cover objectual imaginings. But it is hard to understand what it would mean to *assert* a perception, and hence to understand what it would be for a perception to be *unasserted*. Scruton's initial motivation for talking about assertions was to make sense of aesthetic judgments, which had the structure of ordinary assertoric statements, but appealed to unverifiable mental states and to aesthetic properties that one could not easily account for extensionally. The fact that 'assertion' is in scare quotes when he talks of hearing the sadness in the music leads one to believe that he realizes a perception cannot be asserted.

Scruton does address the phenomenon of having images at some length, and arrives at the conclusion that not all imagery is a form of imagination. He notes that im-

⁴⁷ Scruton, *Art and Imagination*, 127.

ages can be components of memory as well as imagination, and so are neither necessary nor sufficient for imagination.⁴⁸ Imagination “involves thought which is unasserted, and hence which goes beyond what is believed.” Further, “imagining is a special case of ‘thinking of x as y’.” However, imagination is rational in that not just any way of thinking of x as y will count as imagination. It is limited to cases that are in some way appropriate.⁴⁹

As a result of these criteria for imagination--that it goes beyond belief, and that it is rational--Scruton allows that some cases of imaging are involved in imagination. The cases he has in mind are twofold: thoughts of how someone looks--i.e., imagining appearances--and imagining experiences. However, Scruton founders on what he sees as the ineliminably private nature of the image. For him, there is nothing more to be said about imagining an experience than that it involves an image. Scruton rejects any attempt to capture the features of images in description, stating that “such descriptions are metaphors, which may be phrased in a technical language designed for the purpose, and therefore incomprehensible, or which may be expressed in the literary language of Sartre, and hence pleasant but uninformative.”⁵⁰ Scruton applies his theory of imagination to music in two ways. First, he talks about hearing-as; for example, hearing a phrase as sad, or hearing a variation as a variation on a theme. Scruton follows Wittgenstein in his theory of aspectual perception, or “seeing-as”. Aspect perception is notable in that it contains both sensory and intellectual elements. For example, seeing the duck in the famous duck-rabbit requires both that one attend to the right spatial features of the drawing, which is a perceptual task, and that one brings the concept ‘duck’ to bear on this experience.

⁴⁸ Scruton, *Art and Imagination*, 97.

⁴⁹ Scruton, *Art and Imagination*, 98.

⁵⁰ Scruton, *Art and Imagination*, 94.

Scruton claims that “‘hearing the sadness in the music’ is formally analogous to ‘seeing the man in the picture’.”⁵¹ By this he means that just as it is literally false that there is a man in the picture, it is literally false that the music is sad. As a matter of understanding critical discourse of music, which freely draws on non-literal descriptive terms, to see the merits of the critic’s interpretation is to understand how the expressive terms are appropriate to the structural features of the work. “Producing some analogical description has the effect of uniting the first-order features of the work under a particular ‘interpretation’.”⁵²

The work of the critic is to tie the specific gestures of the music to emotion terms; the audience will then hear the music under that aspect, bringing the expressive concept to bear on the experience of listening. Scruton does not, however, attempt to go very far beyond saying that hearing the expression is a form of hearing as, for the reason that there is not much more one can meaningfully say: “the experience of hearing the sadness in the music is in some irreducible way analogous to hearing the expression of sadness--say, in another’s voice. That is, we can do as we did for ‘seeing as’, and define the element of thought in terms of the experience.”⁵³ Although Scruton does not put it this way, we could say that, following O’Shaughnessy, hearing the music as sad in this sense may best be thought of as a kind of imaginative hearing, not a case of auditory imagination.

Scruton additionally appeals to imagination in order to explain how one is able to hear music as music at all. To hear music, for example, one must hear the notes as a melody. (Not all music is melodic. Presumably, in the case of African drumming or composed percussion pieces such as Steve Reich’s *Drumming*, we still must hear the drum

⁵¹ Scruton, *Art and Imagination*, 121.

⁵² Scruton, *Art and Imagination*, 124.

⁵³ Scruton, *Art and Imagination*, 127.

beats as organized and successive. Such music primarily exploits the durational and dynamic properties of sounds to create the organized musical fabric, not their tonal properties.) His theory of musical movement, and indeed of music in general, appeals to metaphor. One must hear the connectedness of the notes and the ways they appear to succeed one another. That is, in order to hear sounds as music, we must hear musical movement. But musical movement is only metaphorical movement, not literal movement; as such, hearing the movement in the music is a further example of imaginative hearing. And metaphor must be understood as unasserted thought, not belief. This means that imagination is what explains our ability to understand metaphor, and thus explains our ability to hear music as music at all.

Scruton rightly points out that if hearing a melody is a case of hearing-as, it does not involve the same combination of concepts and percepts that seeing the duck in the duck-rabbit did. There is no concept of a melody aside from an iteration of the melody itself. Just as there was little room for explanation of musical expressing beyond saying it involves aspectual hearing, Scruton finds that there is no explanation of understanding a melody for the person who is musical beyond appealing to musical capacities themselves, and “musical understanding involves certain capacities for experience that are in a sense *sui generis*.”⁵⁴ Insofar as Scruton insists that musical understanding cannot be understood without a first-person understanding of musical experience, he insists on an important principle of musical aesthetics. But at this stage of analysis, saying that musical understanding involves imaginative hearing or hearing-as, and that this is irreducible to any further explanation, belies the explanatory power of any appeal to imagination.

While Scruton does provide an extensive and fertile discussion of imagination, imagery, and music, it is still the case that his focus is on how to make sense of non-

⁵⁴ Scruton, *Art and Imagination*, 183.

literal aesthetic terms in critical discourse (thus “unasserted thought”), and on how to give behavioral criteria for experiencing imagery. His work was developed in the decades before significant research in music cognition and imagery studies began to shed light on musical understanding. For this reason, it is worth attempting to address some of the topics that he felt were beyond the possibility of analysis, including auditory imagery.

Walton

Kendall Walton’s *Mimesis as Make-Believe* presents an extremely influential theory of the role of imagination in our engagements with representational works of art. His book ushered in many ongoing debates about our emotional responses to these works, about the way we imagine fictions, about the relationship between fiction and non-fiction, and many others. What is ironic about this work, though, is that while Walton is often credited with a theory that defines imagination as make-believe, Walton himself denies having a theory of imagination. Instead, he surveys a variety of loosely related imaginings, from imagining a proposition, to imagining an object, as well as imagining acting. He characterizes these imaginings, noting that some are spontaneous, some deliberate; some are occurrent, some, such as those that serve as an ongoing backdrop for a fantasy or daydream, are nonoccurrent. Imaginings can even be carried on collectively, by a group of people, and not merely by solitary individuals. Episodes of imagining might be accompanied by imagery, but they just as well might not.

At the point at which the reader expects Walton to unify these imaginings with a theory, he proceeds as follows:

“shouldn’t we now spell out what they have in common? Yes, if we can. But I can’t. Fortunately, an intuitive understanding of what it is to

imagine, sharpened somewhat by the observations of this chapter, is sufficient for us to proceed with our investigation.”⁵⁵

Walton gives us a bit more than just an intuitive understanding of imagination, although he decides that “In order to simplify things, (we shall) restrict our attention to propositional imagining.”⁵⁶ Merely entertaining a proposition, however, is not sufficient for Walton to count as imagination. “Imagining (propositional imagining), like (propositional) believing or desiring, is *doing* something *with* a proposition one has in mind.”⁵⁷ The result is an informal theory, which holds that imagining is something we do.

Walton shies away from integrating his view of propositional imagination with the having of imagery. In a passage that echos the logical empiricism of Scruton and Ryle, he asserts that “It is not easy to see what behavioral criteria might throw light on imagining, or what the relevant functions of a functional account might be.”⁵⁸ So, while Walton allows that imagination ranges over a wide variety of mental activities, it is really only those that have consequences in observable behavior that he is wont to theorize. The result is that it is primarily propositional imaginings, thought of as activities we undertake, that become the analytical tool for explaining our engagement with artworks.

The primary thesis Walton develops in *Mimesis as Make-Believe* is a thesis about the nature of mimetic, or representational, artworks. Novels and figurative paintings are the paradigmatic cases. His explanation of fictional representation is similar to Scruton’s theory of imagination as unasserted thought. A painting is able to represent its content

⁵⁵ Kendall L. Walton, *Mimesis as Make-Believe*, 19.

⁵⁶ Kendall L. Walton, *Mimesis as Make-Believe*, 19.

⁵⁷ Kendall L. Walton, *Mimesis as Make-Believe*, 20.

⁵⁸ Kendall L. Walton, *Mimesis as Make-Believe*, 20.

not by asking us to believe that we see, e.g., a man in the painting, but rather by prompting us to imagine this fictional truth. On Walton's theory, then, representations are props in our games of make-believe. Visual and literary representations create fictional worlds by dictating our imaginative engagement with them.

There is one type of music that is readily thought of as representational in a way similar to paintings and literary fictions: program music. For example, Berlioz's *Symphonie Fantastique* is accompanied by a program that indicates how the musical material depicts the opium-induced dreams of the narrator and his beloved. The recurring melody, or *idée fixe*, is recurs in various transformations throughout the symphony, each time serving to denote the idea of the beloved. Not all musical representation occurs as a result of specifications in the accompanying text or program. Some music contains material that is imitative of natural or mechanical sounds, such as bird calls (especially in the work of Olivier Messaien) or railway trains (Arthur Honegger's *Pacific 231*, for example). When these works contain representational material, they serve as prompts for the listener to imagine what is represented, just as do paintings and novels.

While one might think that Walton's theory could not handle music other than program music, Walton has demonstrated that there are ways to think of pieces of absolute music, such as Beethoven string quartets or Brahms symphonies, as works that generate fictional worlds.⁵⁹ Walton seeks to apply his theory of representation to music, showing how music is both like and unlike visual and literary representations. He explores the various ways music might create fictions, prescribe imaginings, and represent any number of things. These cases range from invoking non-existent musical elements—everything from implied pedal tones to singers in instrumental works—to

⁵⁹ Kendall Walton, "Listening with Imagination"; Kendall Walton, "Projectivism, Empathy, and Musical Tension," *Philosophical Topics* 26, no. 1/2 (Spring/Fall 1999): 407–40.

positing composers or other persons who express feelings through musical gestures. Walton believes that this shows that musical works do create fictional worlds and so can be thought of as props in games of make-believe. These worlds are not, however, the same as the fictional worlds of literature or visual art, in that they are not highly unified, and do not bring the listener into a relationship with the fiction. This means that we need not worry that *all* music, contrary to our pre-theoretical views, is in fact program music.

Walton is also concerned about the relationship between the musical world and the listener, as it contrasts to the world of the painting and its viewer or the novel and its reader. On his theory, there is more distance between the musical world and the listener, yet listeners feel as though the musical emotions, and the experience of the musical work itself, are more immediate, not less so. “There may be no fictionality at all until we listen—none apart from listeners’ games of make-believe. Game worlds are paramount in music in a way they are not in painting.”⁶⁰ The resulting theory is that the music prompts us to imagine emotions, whether these are our own emotions or the emotions of a fictional persona in the music. It is, then, this generated world of imagined emotion that becomes the relevant fictional world for Walton.

Walton extends his general thesis of *Mimesis as Make-believe* in something like the following way: music prompts the imagining of emotions, and this imagined emotional experience of the listener generates a fictional world. This fictional world is the analogue of the fictional world in literature or painting. The game of make-believe, of aesthetic appreciation, works at the level of our subjective experience of the work, not at the level of the work itself. Our experience becomes the prop in the game of make-believe.

⁶⁰ Kendall L. Walton, *Mimesis as Make-Believe*, 337.

While Walton might be correct in explaining what our attitude is towards the proposition “the music is sad” (I agree this is not belief), this way of thinking about hearing music is already framed in a way that seems unnatural for describing musical experience. Without Walton’s general theory of make-believe, we might not even find ourselves asking whether we *believe that* certain things are true of the music. Rather, we are asking what we hear in the music itself, and how we do this.

Miller and the Kantian Imagination

Thomas G. Miller in his 1994 article “On Listening to Music” applies the Kantian imagination to music. Miller begins by asking a Kantian question: how is musical experience possible for the listener? Just as for Kant, the imagination plays a role in structuring any coherent cognition; for Miller, it is the auditory imagination that plays a role in structuring coherent *musical* cognition.⁶¹ While Miller is correct that there must be constructive elements in perception that allow us to hear musical sounds as ordered, he is not careful to distinguish the involuntary and subpersonal role of the constructive imagination from the voluntary, personal ability to perceive differing structural aspects in the music. Thus, Miller’s imagination is actually a combination of the constructive imagination, and what O’Shaughnessy terms imaginative perception (see 1.6.3).

Miller’s thesis is that Kant’s synthesizing and reproductive imagination plays a role in listening. Following Warnock, he suggests that imagination allows us to hear the pattern presented in the sound. Music can be thought of as a series of discrete sensory impressions; i.e. as individual notes. But what we hear when we hear music is not a mere succession of tones, it is a coherent stream. (As mentioned earlier, Roger Scruton

⁶¹ Interestingly, it is T.S. Eliot who coins the term “auditory imagination” that Miller adopts here; however, it is clear that he also has the Kantian imagination in mind.

emphasizes this point in his discussion of musical movement in his 1997 *The Aesthetics of Music*. For Scruton, musical movement is metaphorical, not literal. Since understanding metaphor for Scruton is closely tied to imagination in his sense of unasserted thought, Miller's discussion of imagination as what allows us to hear music as music has theoretical affinities with Scruton's view of the role of imagination in music.) It is unified, structured and orderly. The fact that music is intelligible allows us to form "acoustic concepts" of what we listen to. These concepts might be music-theoretic concepts or, for non-experts, verbal descriptions.⁶² Acoustic concepts, however, are more basic. They are required for recognition of music-theoretic concepts, and also for the production of theoretical descriptions of music. Just as for Kant, the imagination synthesizes raw sensory data by applying concepts, in understanding music we bring acoustic concepts to bear on the raw tones that we perceive. One type of musical imagination performs this constructive function.

Miller claims that the performer can act as a unifying agent as well. But in saying so it seems that Miller is conflating aspects of musical listening at two different levels: the basic perceptual issue of how the sounds are heard as following each other, and how the music seems more or less unified as a piece of music. It is possible to experience the first without the second, as is frequently demonstrated in performances by student or amateur musicians, or in poorly composed pieces of music. The audience typically has no trouble hearing a bad performance with an unconvincing interpretation *as music*, i.e. as structured sounds that sort themselves into melodies and phrases. In the case of a poorly written composition, we may not be able to make musical sense of it, but we are typically able to hear *that* it is music. Thus, the constructive imagination operates automatically whenever we hear any musical sounds. But hearing the compositional

⁶² Much of this discussion of the role of music-theoretical concepts is similar to work done by Mark DeBellis in his 1995 *Music and Conceptualization*.

design of the music at a larger scale, whether aided by the performer's interpretation or not, may require deliberate, voluntary attention.

Miller also claims that the imagination plays a role when we need to hear multiple contrapuntal lines as played by one instrument, as in Bach Partitas for violin. In these works, the solo violinist must bring out the different voices in the counterpoint, almost creating the illusion that there are two violinists playing. Miller's claim is that it is partly the role of the listener to hear these pieces as multi-voiced. Thus, hearing certain contrapuntal works might involve hearing-as, or Wittgensteinian aspect perception. What is interesting to explore is the way that musical structures might serve as dual-aspect perceptual stimuli, analogous to the well-known dual-aspect visual images such as the Necker cube or the duck-rabbit.

While Miller's article is not well-known, it deserves further attention. It provides a convincing discussion of the role of acoustic concepts in music cognition, but from the point of view of the Kantian constructive imagination. As such, it is relevant both to theories of the sensory imagination, and to theories of musical understanding.

Trivedi

Saam Trivedi has recently emphasized the importance of imagination in hearing music as expressive, using vocabulary reminiscent of Walton and of Roger Scruton's 1974 *Art and Imagination*, in which he takes hearing music as sad as a paradigm case.⁶³ In his 2003 article "The Funerary Sadness of Mahler's Music", and more deeply in his 2006 article "Imagination, Music, and the Emotions", Trivedi provides what is currently

⁶³ Like Walton, Trivedi declares himself to be a pluralist about what the imagination might be, but focuses primarily on the propositional imagination. (Trivedi 2003, pp. 263-5.)

the most extended discussion of music and imagination in the philosophy of music literature. Trivedi's aim, however, is not to analyze musical imagination for its own sake, but to provide a theory of musical expressiveness. His claim is that when we perceive that sad music is sad, this is not because we notice a resemblance between some structural features of the music and the behavioral or physiognomic features of sad people; nor is it because we ourselves are aroused by the music into an emotional state of sadness.

Instead, Trivedi argues, we imagine that the music is sad. While it might seem that in order to support this claim, there needs to be a specific sense of imagination at work in our perception of musical expressiveness, this is not the approach Trivedi takes. Rather, he suggests various ways that imagination might play a role. These are: simply imagining "that" the music is sad; imagining of our listening experience that it is an experience of sadness (i.e. the "imaginative identification" of these experiences, following a suggestion made by Kendall Walton); having the false belief that it is the music itself which is sad by "animating" or anthropomorphizing the musical sounds; and imagining that the music is an expression of the mental states of a persona (following Cone, Levinson, and Robinson's endorsement of the theory of the musical persona).⁶⁴ While it is easy to see that imagining that the music is the expression of a persona involves the propositional imagination--we cannot "believe" that we are really listening to such an expression, and so must only imagine that this is the case--Trivedi suggests that imagining musical expression as the expression of a persona involves imagery. However, it is difficult to discern what he has in mind:

⁶⁴ Edward T. Cone, *The Composer's Voice* (Berkeley: University of California Press, 1974); Levinson, "Music and Negative Emotion"; Robinson, *Deeper Than Reason: Emotion and Its Role in Literature, Music and Art*.

"It is not a very specific or precise auditory imaging, which is why the persona is indeterminate. And describing this imaging would involve referring to an associated perceptual experience, in terms of what it would be like to hear someone crying or wailing or laughing, and so on. Moreover, the causal story that in part allows this kind of imaging, I suggest, is one that involves resemblances between how the music sounds, on the one hand, and our vocal and bodily expressive behavior as well as the affective feel of the emotions themselves. For example, when we imagine that someone is crying and expressing their sadness musically, this is in part because we hear the sound of the music resembling human or some other creature, human-like or not) crying or wailing. (etc.)" (Trivedi 2003 p. 265-6)

While Trivedi mentions auditory imaging, what he describes might more appropriately be termed "hearing-as", "hearing-in", or imaginative hearing. If he means to say that as we listen to the music, we simultaneously recall a separate auditory image of a person crying, this would indeed be an imagery experience. However, it is unlikely that this is what transpires during listening, in part because perception in a specific modality is known to interfere with imagery in that same modality.⁶⁵ If we are to perform this difficult task, presumably we are to do so with deliberate effort; yet I am unable to find any description of this sort of listening, and have had no first hand experiences of this kind. Rather, this hearing seems more like seeing the figure "in" the painted picture, or seeing a duck-rabbit "as" a duck rather than as a rabbit. It is likely that the stored sensory memory of the past perceptual experience is revived at the subpersonal level in order for us to hear one sound in another sound, but we would be hard pressed to call this an experience of auditory imagery. It is for this reason that O'Shaughnessy divides the sensory imagination into imaginative hearing and hearing mental images; this is a case of the former.

⁶⁵ Virpi Kalakoski, "Musical Imagery and Working Memory," in *Musical Imagery* (Lisse: Swets & Zeitlinger, 2001), 43–55.

What of the claim that imagination involves resemblances? It seems correct to say that if we are to imagine that the music is a kind of expressive cry of a person, we must notice the resemblance between the sounds in order to do this. But at this point, it is unclear what role imagination is playing. Remembering that Trivedi wants his imagination theory of expressiveness to replace any resemblance account of expressiveness, it seems that it is the noticing of a resemblance that explains how we can imagine that the music is the expression of a persona rather than the imagination itself that is doing the explanatory work. Again, it is probably that noticing a resemblance requires a subpersonal retrieval of a past memory trace of the thing being compared; but, just as hearing-as and hearing-in are not imagery experiences, so too noticing a resemblance does not involve having an imagery experience.

Conclusion

I began this chapter by raising the question of what is meant by musical imagination. In looking at existing material relevant to an answer, I covered two bodies of literature, the philosophical literature on imagination, and the literature in the philosophy of music that draws on the imagination.

In surveying the imagination literature, I delineated Strawson's four senses of the imagination, the perceptual (or sensory) imagination, the Kantian constructive imagination, the creative imagination, and the propositional imagination, and discussed occurrences of these four types as proposed by historical figures in the philosophical literature. I demonstrated that while it was the sensory imagination that was dominant through much of history, the twentieth century saw the ascendancy of the propositional imagination. I also made mention of distinctions between imagination and imagery, imagination and supposition, objectual versus propositional imagination, and imaginative perception versus perceptual imagination. I noted that even among those philosophers

who do discuss the sensory imagination, the primary focus has been visualizing, and there is no extended discussion of auditory imagination.

In turning to aestheticians and philosophers of music who discuss imagination, I expounded the views of Roger Scruton and Kendall Walton in some detail, especially the way each conceives of the relationship between imagery and the propositional imagination. I concluded that neither philosopher adequately addresses the role of auditory imagery or musical imagery, and that this omission is partially due to an outdated need to set behavioral criteria for imagination, something difficult to do for the 'private' phenomenon of imagery.

I also discussed Thomas Miller's application of the Kantian constructive imagination to musical understanding as an example of a use of imagination in a sense other than the sensory or propositional. The constructive imagination is especially applicable to an explanation of basic music cognition in showing how the mind is able to apprehend a temporally extended sequence and hear it as ordered or unified.

Finally, I discussed the work of Saam Trivedi, which is the most thorough attempt to apply multiple types of imagination to the philosophy of music. Trivedi's account of imagination, while it does mention many ways in which we might be said to be imagining while listening to music, is mobilized only in the service of a solution to the problem of musical expression, rather than more generally. Further, Trivedi largely follows Walton and Scruton (although perhaps not deliberately) in focusing primarily on the propositional imagination and imaginative hearing. There is scant mention of the role of musical or auditory imagery.

In combining these two bodies of literature, on the imagination in general and on imagination in philosophy of music more specifically, I have established that there has been insufficient discussion of auditory imagery as a type of sensory imagination, and of musical imagery as a phenomenon relevant to music cognition and understanding. The subsequent chapters will examine both auditory and musical imagination from three

perspectives. First, I will provide a phenomenological description of auditory and musical imagery; second, I will address some conceptual problems with the content of auditory and musical imagination; third, I will present empirical work which supports the claims I make in chapters two and three about phenomenology and content.

CHAPTER 2

THE MIND'S EAR

The task of this chapter is to describe our *experiences* of auditory and musical imagery, as opposed to providing a conceptual analysis of such imagery, or an empirical explanation of its causes. While I make use of some work done in the field of phenomenology, this analysis draws largely on first-person introspection, and is supplemented by work in music psychology. The purpose is not to work within the discipline of phenomenology itself, as practiced by the followers of Husserl, Sartre, et al, but simply to lay a foundation for the conceptual analysis that is to follow in subsequent chapters.

The philosophical work that has been done to this point on the experiences of auditory imagery has been done primarily by phenomenologists, and not by philosophers of music. Those who do work within analytic philosophy of mind have typically not explored the experience of auditory and musical imagery in much depth, often making only a few remarks about the way in which it differs from visual imagery. As a result, the theories of imagery and imagination that result are not as general, in the sense of covering imagery in all modalities, as they purport to be.

Phenomenological Treatments of Auditory Imagination

The phenomenologists who have treated auditory imagery are Don Ihde, both in his 1973 *Sense and Significance* and his 1976 *Listening and Voice: A Phenomenology of Sound*, and Edward Casey, in his 1976 *Imagining*. Ihde's work is important for its groundbreaking nature. *Listening and Voice* is one of the few philosophical monographs

focused solely on developing a philosophy of sound. Published in 1976, it attempts to carry out a phenomenology of sound in the spirit of Husserl and Heidegger. Ihde's work is in many ways exploratory, touching on hearing, speaking, listening, and imagining; it jumps from discussions of musical sounds to speech to animal sounds or sounds of inanimate objects. As a result, Ihde merely touches on the issue of musical imagery, comparing it to inner speech and to visual imagery. Casey's work is more general, offering a phenomenological account of the imagination, describing its central features.

Ihde

Despite the preliminary and exploratory nature of Ihde's discussion of the imaginative aspects of auditory experience, he makes several important observations that merit discussion. First, following the phenomenological tradition, he asks about the auditory analogue to the visual field, both in the perceptual and imaginative modes. He finds that the auditory field is in many ways similar to the visual field. Both contain elements of primary focus as well as elements that serve as a constant background. But whereas the visual field in perception is located only in front of us, the auditory field wholly surrounds us. We are able to hear sounds coming from all directions in relation to our bodies. In the imaginative mode, however, the visual field is not so restricted. We can imagine both sounds and visual objects in any location with reference to ourselves, and so the difference between the scope of the visual and auditory fields in perception is not maintained in the corresponding visual and auditory imaginative fields.

In the visual modality, we see objects within an entire visual field. Ihde claims there is also an auditory field for perception, although he rather unhelpfully says that what we hear is "the quiet". His point is that even if there is no medium volume identifiable discrete sound that we are currently hearing, there is almost always some background hum (this is perhaps more true now due to the constant hum of electronic

devices). When it is so quiet that we hear no external hum, we can hear the rush of our blood through our ears, or the sound of our heartbeat. The term “field” is spatial, and thus potentially misleading, though Ihde does seem to want to capture whatever spatial qualities auditory perception might have. Perhaps it is better to call it the auditory “stream” rather than “field”. Within this “stream” there are always layers of sounds, which is the feature of the visual field that Ihde wants to carry over into the auditory domain. We simultaneously hear, for example, a car alarm, while hearing our housemate call our attention, over the background of the television and the sounds of the radiator and the dishwasher. We can vary our attention to items or parts of items in the auditory field, focusing on the speaker’s voice at the expense of the car alarm.

One of the problems with attempting to capture the way we experience our entire auditory and visual domains of consciousness is that while the phenomenologist claims to be “bracketing” experience, and not making any claims about the metaphysics of, in this case, sounds, these claims start to appear very much like metaphysical claims. For instance, Ihde says sound is not entirely temporal, nor is vision wholly spatial. The *direction* a sound is coming from is part of the auditory stream. Unlike the visual field, it surrounds us, and we are at its center.¹ A clearer way of stating this point, without the danger of appearing to make revisionary metaphysical claims about the nature of sounds, is simply to say that the spatial locations of things can be represented in sounds as well as visual appearances. It doesn’t follow from this that sounds are spatial in the way that three-dimensional perdurant objects are spatial, which is what his discussion intimates.

Turning from auditory perception to auditory imagery, Ihde claims that auditory imagery is much more pervasive than visual imagery. In fact, Ihde claims that it is

¹ Ihde, Don. Listening and Voice: Phenomenologies of Sound (2nd Edition). Albany: State U of New York P, 2007. 207.

constant.² In order to support this claim, he appeals to our experience of our inner monologues, or inner speech. He takes the position that it may indeed be impossible to entirely clear one's mind of everything. From this, he reasons that if our mind is always thinking of something, we are constantly experiencing inner speech, even though we are often unaware of this. Inner speech cannot be stopped, then; it can only be interrupted. According to Ihde, two things that interrupt inner speech are very loud external noises (so loud that one says "I can't hear myself think") or other auditory imagery, such as musical imagery.

Ihde raises an important challenge to anyone who would analyze the sensory imagination by treating each sense as distinct. Our experience, so one might think, is always in all modalities at once. It is a metaphysical assumption that there is such a thing as "pure" auditory imagination that the philosopher can analyze apart from the other senses. Experience might not really be divided in this way, that is, such that the visual or auditory imagination can be treated by itself. We can focus on auditory experience, but there is always a background of global experience as well. So there is no pure auditory experience, nor a pure auditory world, aside from a possible constructed abstraction.

Further, Ihde claims that one doesn't hear only with the ears, because one can feel vibrations in one's whole body. His intuition is confirmed in an extreme case by the deaf professional percussion virtuoso Evelyn Glennie, who hears music through her body. These remarks about the experience of sound are confirmed by the science of acoustics, and result from the fact that sound travels as waves, and at low frequencies is felt haptically rather than heard as an auditory sound. In intermediate frequencies, sounds are both heard and felt.

² Ihde, 210.

With respect to the specifically musical imagination, Ihde does not discuss musical imagery at great length, but rather uses musical imagery as an example for two purposes. First, he makes the obvious point that auditory imagination can vary freely, just as can other types of imagination, and musical imagination is one type of auditory imagination. Second, he cites musical imagery as one of the mental occurrences that can interrupt inner speech.³ This characterization is dubious; it is only his commitment to an analysis in terms of fields that leads him to claim that the inner monologue is what makes up the ongoing imaginative auditory field, and that musical imagery is simply an interruption to this. Without this theoretical commitment, we needn't think of music as a layer of imagination occurring over a background. In fact, neuroscientific research supports the idea that processing of speech involves what is called the "phonological loop", and that this processing occurs in a way separate from (but still related to) the processing of non-speech auditory imagery, including music.⁴ This suggests that we ought to think of musical imagery and the interior monologue as competing aspects of consciousness, as opposed to the former being an occasional interruption to the otherwise dominant monologue. While Ihde provides some useful points about the auditory imagination, there is still much about the musical imagination left unanalyzed.

Casey

The second phenomenologist who has analyzed the auditory imagination is Edward Casey in his 1976 *Imagining*. Casey discusses both auditory and musical

³ Ihde, 212.

⁴ Kalakoski, Virpi. "Musical Imagery and Working Memory." *Musical Imagery*. Lisse: Swets & Zeitlinger, 2001. 43–55; Weber, Robert J., and Suellen Brown. "Musical Imagery." *Music Perception* 3.4 (Summer 1986): 411–26.

imagining in the context of a general phenomenology of imagination. Casey begins by thinking about an entire auditory scene at once, complete with imagined external sounds, and so these sounds, e.g. of birds, people speaking, etc., are part of what would be something like a complete imaginary scene.

"Almost immediately this movement of sound takes on a rhythmic cadence, a sort of regular swooping downward followed by a quick return to a high note. The sound itself has a fairly definite sense of locus--emanating either from the visualized bird or (when I manage to audialize without visualizing) from a quite indeterminate region of audialized space ("sound-space," as we might call it). Yet, strangely enough, there is at the same time a quasi-visual sense of the sound's shape, a kind of linear arabesque that is traced out as the sound runs its characteristic course."⁵

Casey's method of analyzing the imagination is to embark on several imaginative projects in order to observe them. Not all of these are successful. Casey attempts to have an imagery experience of an entire symphony, but finds himself unable to do this. This project seems to be one of asking himself to spontaneously generate some new symphony, and he finds it very difficult to do so. "I try to imagine a theme from a symphony written by an entirely fictitious composer. ... Audializing a theme from this fictive symphony is not easy at first. I pause and find myself again distracted by surrounding sounds in the reading room where I am seated. But suddenly a rather thin and insubstantial group of notes occurs. These notes do not seem to have any definite form or movement--not even a definite rhythm."⁶ Further, "A melody has to be at least faintly familiar, or possess a marked rhythmic or repetitious pattern, for it to be easily

⁵ Casey, Edward S. Imagining: A Phenomenological Study. Bloomington: Indiana UP, 2000. 28. 1976.

⁶ Casey, 29.

entertainable in my imagining."⁷ Casey also imagines hearing a philosophy lecture, and in this case he imagines hearing it as part of a larger scene. Thus the sound of the voice is heard as coming from the location of the imagined speaker. He claims it would be quite difficult to imagine a disembodied voice: "when it is a matter of the human voice which is audialized, it is almost always apprehended as emanating from a visualized human body. For it to appear as disembodied would require a special effort of imagination--one that would normally be stronger than that required to imagine the disembodied flamingo cry."⁸

I have quoted Casey at length in order to demonstrate the variability of auditory imagining. While many people have no trouble at all imagining voices without simultaneously visualizing the speaker, Casey seems to have difficulty with this. While some people (namely composers) frequently imagine hearing large sections of newly invented symphonies internally, Casey cannot even imagine a new melody, other than to imagine vague sounds without any structure.

Casey notes that in the case of combined visualizing and "audializing", the sound comes from the direction of the visualized object. But in the musical case, he does not provide an analysis of the spatial or directional aspects of the imagined musical sounds. Presumably this music would exist in some indefinite "sound space". But this is simply to say that the sound is not imagined as externally located. So, just as does Ihde, Casey provides us with interesting preliminary reflections on musical imagination, but leaves room for additional analysis.

⁷ Casey, 30.

⁸ Casey, 32.

Mozart's Musical Imagination

The most famous example of musical imagery comes from a letter written by Mozart--now widely believed to be apocryphal-- which describes his ability to imagine an entire symphony in his head all at once. Even if the letter is apocryphal, the imaginative experience of great composers is an important case of musical imagery, considered as an extreme end of human musical imagery experience. Mozart's letter has been taken to be an indication of an extremely unusual ability, to hear all the temporally extended parts at a single moment, something mere mortals cannot do. That is, his imaginative abilities have been thought of not just as different in *degree* (i.e., richer, more vivid, more detailed), but different in *kind*. This is similar to thinking of time as a kind of atemporal eternity, something asked of us by certain metaphysicians as they try to solve puzzles about finite versus infinite time. True perfection, it is said, is not limited to a particular moment in time, nor any finite sequence of moments; thus, if God is to exist eternally, he does not merely exist at each moment in human time, as this would mean there are moments at which he does not yet exist, an imperfection. Instead, God always exists at every moment. Thus, he is in a sense existing beyond time, in a sort of atemporal eternity.

This atemporal eternity is exactly what we are supposed to imagine for Mozart's imaginary symphony, he "sees" all its temporal parts simultaneously, and if it is impossible for us to imagine what this experience might be like, this is all the more reason to concede that Mozart is a genius of an order we mortals can never reach. It is generally agreed that Mozart did not actually write the account of imagining that is supposed to support his superhuman imaginative genius. But what is not pointed out is that no matter who wrote these words, there is no reason to think that they refer to an

atemporal or simultaneous imaginative experience of music at all. Rather, it is the multiple instrumental parts that are heard simultaneously.

Even this is a difficult imaginative feat, but it is not a superhuman one. It is the same feat that is ascribed to Beethoven, hearing all the full instrumental sound of an orchestra, the melody with all accompanying lines and chords, rather than hearing a single melody. When we consider that the widespread "tune in the head" experience is exactly that, a single tune, we see what the proper contrast is: not a tune experienced in some higher metaphysical atemporal reality, but a tune complete with all its accompanying parts. This ability (basically the same ability one needs in order to sightread an orchestral score, only generative) is indeed rare, but quite explainable for any composer of symphonies. Indeed, some composers admit that they struggle to know exactly what their music will sound like when played. Many need to compose at the piano for this reason. Thus, Mozart's imaginative abilities do not differ in kind from those of other musicians, but differ only in degree.

With respect to my own experience of musical imagery, I can imagine multiple voices for symphonies and chamber music I know well. I can internally compose multivoice counterpoint in a rather limited fashion, or a melody with a very simple chordal accompaniment. My abilities are tied to the musical training and experience I have had. Were I to attempt to compose more, or to score read more regularly, forcing myself to really hear all the parts internally, I believe this ability would improve, although there might be a limit I would reach.

Casey notes that he finds it more or less impossible to imagine music he does not already know. I too find that my abilities are limited by my knowledge and experience, but I am able to generate new melodies and fragments of structured music, not mere undifferentiated vaguely musical sounds. What accounts for this difference? It is the way musical memory informs musical imagination. First, there is very little difference between imagining a sound and remembering the sound. Perhaps it is the difference

between imagining, recalling or recollecting, remembering. Sometimes when we speak of remembering we actually recall the particular event, and the exact sounds as they took place at that event (perhaps remembering a car crash is like this), but more often when we speak of recalling, we just mean reconstructing what those sounds are like, without the accompanying scene they are part of. So, I propose that musical material in imagination is constructed from musical memories, and that musical imagination in general is a function of musical experience and training, in combination with one's inborn physiological dispositions.

The Phenomenology of Auditory and Musical Imagery

As Ihde noted, we often feel we hear ourselves speak internally--in fact, Plato described thought as the soul's internal dialogue with itself.⁹ We can imagine others' voices, and can remember sounds we have heard in the past--not just *that* we heard them, but what they sounded like. Despite the doubts initially raised about whether all the things we might call "imagining sound" necessarily involved something like the experience of hearing internally, all these cases could easily involve some sort of auditory imagery.

Properties of Musical Imagery

Auditory imagery also includes musical imagery. Auditory imagery specifically for music, or "inner hearing," can refer to the widespread and involuntary phenomenon of having a tune stuck in one's head (these are called "earworms"). It can refer to the consciously deliberate activity a musician engages in when silently reading a musical

⁹ Plato. "Sophist." Collected Dialogues. Ed. Edith Hamilton and Huntington Cairns. Trans. F. M. Cornford. Princeton, NJ: Princeton UP, 1971. 263e.

score. It can also refer to the experience a composer has of spontaneously hearing original music which he then may write down or play by improvising. The more deliberate activity of recalling a piece of music is something that can be done by composer, performer or amateur. For the performer, this may be “mental rehearsal”; for the composer it may be working out details of a new composition, and for the amateur it may just be attempting to put on one’s own silent performance of a favorite piece. In sum: musical imagery can be voluntary or involuntary, spontaneous or deliberate, generative or recollective, and is closely related to other aspects of musical experience.

The experience of musical imagery shares many features with the experience of listening to music. We tend to hear “inner tunes” with particular pitches, volumes, rhythms, and timbres (tone color or qualities). It is the rhythmic dimension that most clearly separates auditory imagery from visual imagery: just as hearing is essentially temporal--even very brief sounds occur over time--auditory imagery is essentially temporal. It is not unique in this respect, since any image of an action (e.g., dance) will require time as well, but the temporal dimension is an essential distinguishing feature.

The phenomenology of auditory imagery differs from that of actual hearing in several respects. First, our imagery does not necessarily seem to be coming from a location. It is certainly possible to imagine hearing, or imagine *that* I am hearing a lion’s roar coming from the park across the street, but more often our auditory images seem as if they are somehow located inside our heads. So, not all experiences of auditory imagery are experiences of imagining hearing (or imagining that we are hearing) something.

Auditory Imagery vs. Hallucination

Imagery also differs from auditory hallucinations in this respect as well: hallucinations are heard as external to the head, while images are typically not. Auditory

hallucinations may be generated by the brain from memories, but whatever allows the brain to represent a perceptual trace to us *as* a memory as opposed to an occurring sound breaks down, so that we experience a sound in memory as actually happening.

Other types of hallucinations are hearing organized sounds in “noise”, such as the rage of the ocean or the hum of a busy city. Because we are so often primed to pick out organized sounds whenever they occur, the brain sometimes hears sounds as organized when no organization is present. This occurs more often in the form of speech, so that one might hear the noise of fans combined with people speaking just below the threshold at which their words are intelligible. Perhaps this is the experience Rilke had when hearing angels singing in the ocean; perhaps the brain does not just impose the forms of speech onto a stream of murmuring noises, but also can impose the forms of musical song. Again, what is significant about hallucination is that it is heard as external to the listener’s body.

One might object that if hallucinations are heard as external, but are merely images generated by the brain, and if we can also imagine that we are hearing sounds coming from an external sound source, we need additional criteria that allow us to distinguish hallucinating from imagining hearing. There are three such criteria. First, in the cases in which we actively engage in imagining hearing something, say, what it is like to hear the Amtrak train arrive at 3:00 a.m. when the rest of the city is quiet, we have an awareness of having embarked on this imaginative project deliberately. A hallucination, on the other hand, contains no such awareness. Second, an imagination seems to be part of inner conscious experience, even if, for example, the Amtrak train is imagined to be across the city. A hallucination, however, interrupts internal experience. Third, a point dependent on the second, the hallucinated sound experienced as an interruption of one’s internal thoughts is presented as a more or less integrated part of external reality. Imagination, even when we are lost in it, generally preserves a distinction between our interior and exterior reality. This point is dependent on the

second claim that when we imagine hearing a sound, we do not experience that imagined sound as a part of the external world.

Inner Sounds as Echos?

Auditory imagery is sometimes said to be like an echo, but only rarely is this true, at least in the sense of its moving around *within* one's head. When the auditory system is overwhelmed with sound, we might feel sounds 'echo' or 'bounce around' in our heads, but these cases actually seem to be atypical for auditory imagery experiences. More likely this effect has something in common with visual "afterimages" that occur when the eyes are overtired. Further, we may simply use the term "echo" to mean something more like "trace"; we have the sense of retaining a fading memory of a sound we have just heard, and our experience of the memory growing fainter has something in common with the way an actual sound gradually dies out in an echo chamber: we hear the echoing sound progressively die down, and in our minds we experience the memory gradually become less vivid.¹⁰

Additional Comparisons of Hearing and Imagery

For many people, the timbre of musical imagery seems less vivid than that of what we perceive. We may be able form an image of the correct notes and rhythms of a piece of music, but it is often the rich and varied colors of an orchestra that we have the most difficulty imagining, and are most surprising in a live performance. Further, imagery (in both visual and auditory modalities) seems to allow indeterminacy where

¹⁰ No doubt it is this phenomenon that led Hume to suppose that an idea is simply a faded copy of a percept. Rather than claim that an image just *is* a faded percept, though, it is better to say that our images (especially auditory images) *seem* to us like fading percepts.

perception does not. A famous example in the case of visual imagery is the tiger's stripes: we can imagine a striped tiger, but there may be no fact of the matter about the particular number of stripes it has. Indeterminacy seems to be widespread for musical auditory imagery as well, in that we often seem to recall the contour of a melody without the details of the exact pitches. This issue is less than straightforward, however. It may be that the image is highly detailed, but our ability to accurately access it in consciousness is limited.¹¹

While actual perception is involuntary and determined by the features of the perceived object, imagery can be (but is not always) voluntary. This contrast can be maintained independently of what theory of perception one adopts. That is, in saying that perception is a function of its objects, I am not claiming that it is not *also* a function of our perceptual and cognitive systems, and of our conceptual schemes and past experiences. Nor does this claim rest on the accuracy of our perception. The point is only that sensory perception is an interaction between objects and perceivers; perceivers can't choose to perceive absent objects, nor can they choose not to perceive the objects they are looking at without closing their eyes, interrupting perception. Most standard theories of imagination hold that the primary distinction between imagining and perceiving is that imagination can be voluntary in a way that perception is not.¹² We can choose which objects we imagine. Once the basic point about the world-mind direction of fit for perception has been granted, my point is that we cannot *always* choose what to imagine. Nor can we always choose not to imagine something. (Recall Casey's difficulties.) Thus, if imagery is to be a species of imagination, imagination is not essentially voluntary.

¹¹ This will be discussed at greater length below, along with the mental imagery debate.

¹² E.g. McGinn 2004.

Whereas perception is a relation between mind and world, and thus (partially) constrained by elements on both sides of the relation, imagination, as an operation of the mind (however we end up characterizing it), has its constraints within the mind itself. The Romantics would have had us believe that the mind is the domain of absolute freedom, so the mind's constraints are really no constraints at all; but ordinary experience seems to support the claim that many people try to imagine things (especially in visual, auditory, or other sensory modalities) but fail. In this sense visualizing or producing imagery in other modalities is an ability. It may be that some people have greater natural capacities to develop vivid musical or visual imagery than others, and the extent to which this can be developed is influenced by neurophysiological factors. So, perhaps those with the greatest abilities are those most inclined to draw upon them in the pursuit of painting or musical composition. But as with most abilities, it is possible even for those not initially gifted to increase their skills in imagery through practice.

It is often claimed that we have complete control over the properties of our images, unlike those of what we perceive. However, this freedom of the imaginative domain is overstated. If images draw upon memories, as is typically claimed, the constraints of our memories serve a role analogous to the constraints that the physical environment places on perception. That is, our memories only contain what experience has put there, and imagery is derived from these memories, albeit with the possibility that memory components will be combined in new ways.

Musical imagery in particular may be limited by musical experience and ability. Given the learned categorical nature of perception--i.e., in infancy our perceptual systems become trained to be sensitive to the types of objects we sense in our environment, such as the words of our native language--it is plausible to think that musical imagery will operate on just those musical categories that have been learned over a lifetime of listening. So, for example, only those exposed to the microtonal scales of Indian music are able to mentally compose in those scales.

Just as, so it appears, some people do not have visual imagery, some people may have virtually no auditory imagery. A famous group of psychologists--the “imageless thought” psychologists in Germany at the beginning of the 20th century, who operated in competition with the Gestalt school--claimed to have no visual imagery. They argued on the basis of their own lack of imagery experience that others’ reports of imagery were confused, and that no one really has mental images. The fate of this claim and its relation to the mental imagery debate will be discussed below. What is important here is that even if these psychologists’ lack of imagery was atypical, it may have been an accurate report of their experience. They may have been among a minority of humans who do not experience visual imagery. If they were, there is no prima facie reason to claim that there is no analogous group for auditory imagery. Perhaps there are people who never hear tunes in their head (in addition to those with congenital deafness, although the imagery experiences of the deaf are a subject of ongoing research). While some people report that they ‘hear’ what they read as they read it, others may insist they never do this. Most people, however, can and do accurately remember vast quantities of music, especially popular songs.¹³

We experience images of sounds as having the many of the properties that actual sounds have. Imagined sounds can be loud or soft, high or low in pitch, vary in duration and articulation, and also in timbre. They can be imagined as coming from a particular direction, or they can seem to be located within our skulls. We can voluntarily imagine sounds, or they can arise in our minds involuntarily. We can imagine sounds we have heard before (perhaps revisiting a memory), or we can generate new sounds in our minds.

Further, auditory imagination often plays a role in larger imaginative projects, but musical imagination is often experienced in isolation; while we can imagine watching a

¹³ Levitin, Daniel J. This is Your Brain on Music: The Science of a Human Obsession. New York: Dutton, 2006.

guitarist or orchestra perform, we typically experience images of the sounds alone. However, a person can imagine an entire scene, as if in a movie, a daydream, or a dream proper. This experience often includes music as well as the sounds of voices and objects.

Other Modalities of Sensory Imagination

Since there is virtually no philosophical work done on the sensory imagination outside of vision, it is useful to compare auditory imagery to the other less-frequently discussed modalities. It seems the greater variability in frequency, detail, and accuracy of auditory imagery is also a feature of imagery for taste and kinesthetic imagery. Vision is by far the predominant perceptual modality for humans, and this may be one reason we seem to have a great deal of convergence of intuitions about visualizing, although as mentioned above, even in vision, there are those who claim to have little to no experience of imagery. Other modalities are considerably more variable, and it is reasonable to hypothesize that the variation in imagery experiences (that is, in their frequency, vivacity, specificity, and perhaps other qualities such as facility and ingenuity) both derives from and contributes to the variation in specialized abilities in that modality.

For example, a chef, who requires a highly developed palate as part of culinary skill, will likely draw upon images of tastes and food textures when coming up with new recipes. Also, in the finishing stage of preparing a dish, the chef may compare the taste of the dish with an image of what the dish ought to taste like. Of course this is something all of us do to varying degrees, as we all have tasted things that seem either off taste, or surprisingly good. But the master chef will be sensitive to many more combinations of flavors, and will be much more precise in correcting a taste to one that is very close (in reality, this skill of identifying tastes is not a matter of taste alone, but of taste combined with smell, sight and textural feel). This skill can reasonably be said to

involve imagery, since it involves the comparison of an actual taste with remembered tastes.

So too an expert wine connoisseur will have developed a storehouse of subtly different flavors in memory, and will not only be sensitive to the numerous elements that make up a complex wine, but will have a set of references for comparison with past wines. While the example of the wine expert is familiar from discussions of practiced aesthetic perception and an example (Hume's) of delicacy of taste, what is not typically mentioned is the role that imagery plays in this ability.

Ability in spatial imagination also seems to be something that varies according to expertise. It is dancers and athletes that have proprioceptive imagery most highly developed, and report using "visualization" to aid their training. Upon examination, it is clear that what is called visualization is not necessarily visual; it is often kinesthetic.

Musical Imagery as a Type of Auditory Imagery

What distinguishes musical imagery from auditory imagery more generally? It seems that the most common form of auditory imagery is the internal monologue. We imagine ourselves talking, or just have a perceptual component to our verbal thoughts, whether we really think of them as spoken or not. Often, we imagine ourselves in conversation with others, and it seems reasonable that this involves hearing the sound of that other person's voice. Musical imagery is also quite common, as the familiar phenomenon of having a tune stuck in the head bears out. Least frequent, at least as it seems to me, is the imagining of non-verbal or non-musical sounds. These might include sounds of inanimate objects, water dripping, traffic noise and other noises arising from technology, as well as the many sounds of animals and the natural environment. I suggest, though, that while human speech and music are more specialized sounds, they are more pertinent to humans, and most likely to be repeated in imagination. It would

seem unusual to hear someone claim that she just cannot get the sound of imaginary thunder out of her head.

If this is at all correct, there are some interesting explanations that might account for this. First of all, both music and speech are, to humans, easily remembered and cognized according to learned categories. In fact, we are so attuned to human speech that we naturally hear words as words in our native language, even if those sounds are not actually such words. That is, we are hyper-attuned to hear meaningful language, as the phenomenon of incorrectly hearing people say our own name attests to. But even musical categories, to those who have been exposed to music, become easily perceived. We can hear electronic noises as tunes, paying attention to their pitch contour as if they were melodies. We easily repeat rhythms made by inanimate objects without any design, and in fact can use these "found" rhythms as musical material for improvised or composed music. Just as we naturally see human faces where there are none, we hear organized sound material, according to pitch contour and rhythmic pattern.

While this explains why we are especially sensitive to the kinds of sounds humans produce, we need further reason to suppose that these sounds are the most frequently reproduced internally. But once we think of language not just as heard but as produced, and as produced according to a plan, it is reasonable to think that the ability to mentally rehearse sounds is useful for the production of speech.

One might object that their internal monologue is not experienced as a spoken monologue, but simply as a reproduction of the meanings of words. Or, words are thought without there being any particular accompanying auditory phenomenology. It seems the way to address this problem is by noting the same problem arises in the realm of silent reading. There are a large number of people who insist that they hear the sounds of the words when they read silently. But there are others who insist that, to the contrary, there are no sounds in their heads when they read. Instead there might be visual imagery that reflects the meaning of the text. Rather than take this as evidence

that auditory imagery for speech is not typical, it seems that this is simply a capacity that comes in varying degrees, as does the ability to imagine tastes, or to use imagery to imagine what movements one would have to make to successfully execute a back flip off a diving board. We must also note that human speech, when it is heard, is largely transparent. That is, in the normal cases we do not, and should not, have the sounds of the words as our primary focus of attention, but rather hear "through" those sounds to their meaning.

As is often pointed out, it is only when language becomes unintelligible that we really hear it in all its sensory details. If the normal case of hearing language is such that we are not aware of its sound, those who "hear" language internally, either when reading or in their internal monologues, may be unaware of the perceptual qualities that accompany their words. Of course, there is something theoretically unsatisfactory about this sort of an answer, since it blocks what might be a reasonable counterexample by saying that introspection can be a guide for those who claim to have vivid auditory imagery, but it should not be a guide for those who claim not to. Yet, if the claim is simply that there is patterned variation of a particular phenomenon, this hypothesis can account for the variation.

Involuntary Musical Imagery, or "Earworms"

While in principle one might imagine any sort of music internally, there seem to be certain types of music that are stuck more often than others. People report that certain popular songs are especially "catchy", which is a way of saying they are easily remembered, and that people find themselves imagining them unaware, without having chosen to do so. Those that are repeated most often are, unsurprisingly, frequently the ones that become "earworms". Also, those that are the most easily cognized, in the sense of having a melody that is easy to follow, is of typical phrase length and structure,

has a regular rhythm. But catchiness also seems to involve some novel element, so that the song isn't boring; it has to be just novel enough to be interesting, but similar enough to what we know well for our minds to easily parse it.

There is currently a small body of literature on earworms, or what Oliver Sacks refers to as involuntary musical imagery (INMI).¹⁴ One especially interesting study was performed by Steven Brown on what he terms the “perpetual music track”. Whereas Ihde claimed that it is the interior monologue that is constant, Brown experiences constant musical imagery. He finds, however, that his imagery occurs as “looped” phrases: sections of music, under thirty seconds long, recalled from pieces he knows well and has either performed or listened to recently, and repeating over and over inside his head. (The term “loop” refers to a tape loop, as used by recording engineers and popular musicians.) The repetitive quality, or loopiness, is unique to musical imagery. It is what people refer to when saying a song is “stuck” in their heads, and the reason that musical imagery can often be an unpleasant experience. Imagery in other modalities is not typically described this way, and is likely a result of the temporal nature of auditory as opposed to visual or other experience.

Other Modalities of Imagination Involved in Musical Imagination

While we have primarily focused on musical imagery as a form of auditory imagery, imagining music can involve other modalities. Much musical imagery also draws on motor imagery, and so mental rehearsal, e.g. of singing or playing, involves rehearsing the actions as much as it does rehearsing the sounds produced. This can include subvocalization or phonological imagery, which is not identical to the musical

¹⁴ Sacks, Oliver. Musicophilia: Tales of Music and the Brain. New York: Knopf, 2007.

imagination, conceived of only as the hearing of tones.¹⁵ Further, when one imagines music, one can imagine seeing the performer. Note that in actual listening, viewing the performance enhances comprehension, so it isn't right to assume that there could never be imagery that helps comprehension. For example, perhaps imagining the performer when listening to a recording would give a fuller experience of the music and its expressive properties than merely listening and focusing solely on the sounds. This is contrary to what has often been assumed by the musical formalist, who contends that the only proper object of aesthetic attention in a musical work are its sounds; but empirical evidence supports the claim that even for the formalist, it might be easier to grasp the formal and expressive properties of the sounds when one sees or even imagines seeing them produced.

This concludes our initial survey of the phenomenology of auditory and musical imagery. What features result from it? I began by observing that auditory imagery is essentially temporal. Its objects include musical sounds and the sounds of spoken language as well as noises and the sounds produced by objects, animals, and the natural environment. Like perception, auditory imagery needn't represent these sounds accurately. Our internal image of the sound of our own voice is notoriously inaccurate. This is not because auditory images are systematically distorted, but because the sound we hear of our speech is a composite of the information gathered by our ears and the vibrations transmitted directly through our body.

¹⁵ This reiterates a point from Carl Seashore, that the performance of music involves multiple sensory modalities Seashore, Carl E. The Psychology of Musical Talent. Boston: Silver Burdett, 1919.

Conclusion

In this chapter I described our experiences of both auditory and musical imagery. I presented existing work by the phenomenologists Don Ihde and Edward Casey, whose work contains the most extended treatment of auditory imagination and imagery. Ihde compares the features of auditory imagination to those of visual imagination, and addresses the question of how to think of the totality of auditory experience (and the totality of imaginative auditory experience)--i.e., how to think of the auditory analogue of the visual field. I argue that the term 'field' is inappropriately spatial, and suggest instead that we speak of the auditory stream. Ihde also addresses the question of whether our auditory experience is truly a discrete component of our conscious experience; that is, can we separate auditory experience, in either its perceptual or imaginative modes, from experience in the other sensory modalities. I will return to this question in chapter 3.

Casey's descriptions of his auditory imaginings provide us with information about the way auditory imaginings can interact with imaginings in other modalities, and about the difficulties some people have in generating musical imagery. Since I have extremely detailed and omnipresent musical imagery, it is important to take my own experience as at one end of the spectrum of human musical imagery experience (although not being a composer, my experience is not that of Mozart or Beethoven). The discussions of Casey and Ihde suggest that musical imagery is a function of one's musical exposure and training in combination with one's inborn capacities.

I supplemented the work of Casey and Ihde with an extended discussion of my own experience of musical imagery, focusing on the way in which the features which characterize imagery experience compare to the features of musical perception. I discussed the temporal nature of musical imagery, as well as the properties of pitch and

timbre. I claim that musical imagery is rarely heard as coming from a direction outside our bodies, but is most frequently experienced as internal to our heads. I also claim that involuntary musical imagery forms a much larger proportion of auditory imagery experiences than involuntary imagery in other modalities forms of those imagery experiences.

This comparison between imagery and perception paves the way for the discussion in chapter 3 about how, while both auditory imagery and musical imagery share the phenomenal properties of auditory and musical perception, many of the phenomenal properties of perception drop out of imagery in a systematic fashion. So, many people only experience the contours of imagined melodies, not their exact pitches. We have only faint imagery of timbre (or tone color in the case of music). The dynamic range of our imagery is narrower than the dynamic range of perception. Further, most people cannot simultaneously imagine all the instruments of an orchestral work. Arguably, it is most common that people imagine melodies, as is evidenced by the “earworm” or “tune in the head” phenomenon.

In addition, I examined the locution of “sounds echoing in our heads”, and compared our imagery experience to echos. I also compared our imagery experience to auditory hallucination, and argued that the primary distinction between auditory imagery and auditory hallucination is in the way spatial location is represented in the image of the sound.

Finally, I treat auditory imagining as a mode of sensory imagining, and briefly compare imagery experiences in other non-visual sense modalities. I have emphasized that musical imagery can be voluntary or involuntary, spontaneous or deliberate, generative or recollective, and is closely related to other aspects of musical experience. These features of auditory and musical imagination that result from the phenomenological discussion of this chapter will help to support the conceptual claims

made in chapter 3, and will be supported by the empirical imagery studies presented in chapter 4.

CHAPTER 3

THE CONTENT OF AUDITORY AND MUSICAL IMAGINATION

This chapter addresses four related conceptual problems that remain from the previous chapter's phenomenological discussion of our experience of auditory and musical imagery. First, I address an issue treated by Dominic McIver Lopes in his 2003 article "Out of Sight, Out of Mind", the issue of whether it is possible to classify or define sensory imagining in a specific sense modality, and if so, what feature (or features) defines this content. Lopes terms this the "'content specificity thesis': each mode of sensory imagining involves a type of sensory experience that necessarily represents some property type that is not represented by experiences involved in any other mode of imagining." These property types are what Lopes terms "specific imaginables". Thus, as Lopes defines it, "the content specificity thesis says that modes of sensory imagining are individuated by their specific imaginables."¹ I argue that auditory imagination indeed has specific imaginables, and that these are the phenomenal properties specific to the auditory representation of sounds, such as pitch and timbre.

In addition to the issue of the specific content of auditory imagination as a type of sensory imagination, I address the question of whether auditory imagining is imagining hearing. There exist in the literature arguments for the claim that visual imagination is not imagining seeing. Currie and Ravenscroft argue that imagining seeing involves the *concept* of seeing, where visual imaginings need not. Lopes argues that visual imagining (visualizing, in his terminology) need not represent perspectival properties that are represented in imagining seeing. My argument for the claim that auditory imagination is

¹ Lopes, Dominic McIver. "Out of Sight, Out of Mind." Imagination, Philosophy, and the Arts. Matthew Kieran and Dominic McIver Lopes. New York: Routledge, 2003. 215–6.

not imagining hearing is similar to Lopes argument, in that I argue that auditory imagination can lack properties required by imagining hearing and therefore cannot be identical to it, but I proceed by applying my phenomenological results from Chapter 2 about the sensory properties represented in auditory imagery.

This chapter also addresses the issue of the content of the musical idea. There is an ontological puzzle lurking behind the very idea that we imagine music. If music, as an ontological kind, is an entity necessarily comprised of sounds, but the mental images we have of music cannot themselves be sounds, how is it that we imagine *music*, if for anything to be music, it must be a sound object?² This is clearly a pressing problem for a musical formalist, such as Edward Hanslick, who famously stated that the content of music is “tonally moving forms”, or for someone who agrees with Edgar Varese’s statement that music consists of structured sounds. But it is also a problem for a theorist who believes that while a work of music is much more than mere sounds (perhaps it is an emergent cultural object), it is still ontologically dependent on the sounds that ground its important aesthetic and socio-cultural properties.

My answer to this puzzle is that while it cannot be literally true that we have sounds in our heads, since sounds themselves are acoustic entities that depend on sound waves resulting from vibrating bodies that travel through a resonating space, the causal links between images and sounds and the phenomenal properties shared by sounds and imagery, which these causal mechanisms preserve, are sufficient to explain how, even for a formalist who believes music is sound, we can imagine music. Some of these claims will be further bolstered by empirical literature that I survey in Chapter 4. In addition, my view will explain the relation between the structural components of music as it is

² I thank Andrew McGonigal for helping me formulate this issue as an interesting philosophical puzzle.

heard, and the imagined content of musical imagery that is made up of these structural components.

The third issue addressed in this chapter, once the idea of the perceptual content of musical categories has been addressed, is the relation of this type of content to concepts. I relate my view to the work of Mark DeBellis and to his discussion of the work of composer and music theorist Fred Lerdahl and linguist Ray Jackendoff in *A Generative Theory of Tonal Music*. DeBellis argues that musical categories such as chords and scales are music-theoretical concepts, so that the content of our experience of hearing music is conceptual content. I argue that while DeBellis is correct to claim that we bring music-theoretical categories to bear on our listening experience, it is important to consider the way these categories relate to sounds. (They are perceptual categories instantiated in particulars involving phenomenal properties, not abstract spatial relations.)

Lopes and the Question of Specific Imaginables

Chapter 2 presented an extended exploration of the phenomenological question “what is the experience of imagining sounds, and imagining musical sounds, *like*?” This section of Chapter 3 asks a conceptual question: “what is it to imagine *sounds*?” That is, are there any criteria one can give that allow us to say what distinguishes an episode of auditory imagining from other types of imagining? The first criterion, as I have argued in Chapter 1, is that auditory imagination is a type of sensory imagination. But exactly which type? Can we provide an analytic definition that captures what it means for auditory imagination to be specifically *auditory*? And, can we specify the content of auditory imagination as such?

The theory that there are distinct types of sensory imagination that correspond to the five sense modalities is known as the “specificity thesis”.³ Some versions of the specificity thesis make the further claim that we not only have separate kinds of imagination corresponding to sight, hearing, taste, touch and smell, but that we also have various kinds of kinesthetic imagery, including motor imagery and proprioceptive imagery. That is, we can imagine performing actions such as dancing or swinging a baseball bat, and this imagining can include imagining the feeling of motion, as well as imagining what it feels like in our bodies to make those movements.

The task for those who would hold the specificity thesis is to distinguish the various modes of sensory imagination from one another. This issue is actually similar to the issue discussed in the previous chapter, which was raised by Ihde. Recall that as a matter of methodology for the phenomenologist of sound, the possibility of analyzing auditory experience separately from the rest of conscious experience had to be established before that analysis could be carried out. That is, the assumption that one can analyze auditory experience involves the assumption that it is possible to separate auditory experience from other types of experience, or to carry out what is known in phenomenology as “bracketing”. As mentioned above, Dominic Lopes considers this issue in terms of whether there might be “specific imaginables” that allow us to distinguish imaginative content in one modality from that in another, and that make, e.g., auditory imagining uniquely *auditory*.

Lopes presents this discussion of specific imaginables in the context of his theory of the sensory imagination, which is couched in terms of visualizing. Lopes argues that “sensory imagining involves experiential states of the kind involved in perceiving,”⁴ and

³ Lopes, 215.

⁴ Lopes, 208.

for this reason he must shift the question from a question about the specific content of sensory *imagining* to a question about how to distinguish sensory *experiences* by modality. He claims that there are two ways to establish the specificity thesis: first, one might argue that there are unique auditory qualia that make auditory imaginings auditory; second, one might argue that sensory imagining represents *properties* that are unique to a modality. This second possibility is referred to as the “content specificity thesis” because it identifies content, in the form of properties, that individuate the modes of sensory imagination.

If the first suggestion--that auditory imagination is auditory because it involves experiences with auditory qualia--is correct, Lopes concludes that analysis ends at this point, presumably because of difficulties with the private nature of qualia. (In fact, however, I uphold a version of this qualia thesis, in that I argue that it is the fact that the phenomenal properties that we experience in hearing sounds are preserved in auditory imagery that defines auditory imagery as auditory. In chapter 4 I argue that this is not the analytical stopping point that Lopes claims it is by providing a link between these phenomenal properties and their neurophysiological basis. I do not, however, make any claims in terms of qualia, but rather in terms of phenomenal properties.)

Lopes instead pursues the second proposal, that sensory imagining represents *properties*--specific imaginables--that are unique to a modality, i.e., the content specificity thesis. Recall Lopes from above: “each mode of sensory imagining involves a type of sensory experience that necessarily represents some property type that is not represented by experiences involved in any other imagining.”⁵ Specific *imaginables* must be differentiated from specific *sensibles*, those property types that are represented in sense *perception* in a modality. A property that is a specific sensible of a modality is not neces-

⁵ Lopes, 216.

sarily a specific imaginable of that same modality. For instance, according to Lopes, colors are specific *sensibles* of visual perception, but since one can visually imagine a colorless scene, they are not specific *imaginables* of visualizing. That is, color is not a property that all visual imaginings must have, and so does not define visual imagining.

Turning to auditory perception and auditory imagination, I claim that the properties of pitch, timbre, and loudness are both specific auditory sensibles and specific auditory imaginables. Auditory perception and auditory imagination consists of musical sounds, spoken sounds, sounds produced by animals, and sounds produced by natural and man-made inanimate objects. As I claimed in Chapter 2, these sounds are both perceived and imagined as having pitch, loudness, duration, and timbre. I do not count duration as an auditory sensible or imaginable, because I consider it to be a feature of any event.

If it turns out that a mode of sensory imagining has more than one specific imaginable, each would serve as a *sufficient* condition to distinguish that mode of imagining, but not as a *necessary* condition. For example, if having timbral properties is a specific imaginable of auditory imagination--that is, if only auditory imagination can represent timbre--and if having pitch properties is *also* a specific imaginable of auditory imagination, then, if an episode of auditory imagination represents pitch but not timbre, this is still sufficient to individuate it as auditory imagining.

Returning to the discussion of visual imagining, Lopes claims that there might be no specific imaginables for visualizing. This is because the spatial properties that one might think are definitive of vision can be represented by touch as well, and so, as Lopes concludes, there may be no specific imaginable for visualizing if neither color nor spatial properties are specific imaginables. Lopes considers the possibility that the content specificity thesis is false--that there are no properties that are unique to visualizing--and that it is the propositional imagination that distinguishes one mode of sensory imagination from another. In order for this to be the case, Lopes proposes that sensory imaginings begin as amodal, and only become differentiated by modality when accompanied by a

belief involving the concept of, e.g., seeing or hearing. “A blind person may amodally imagine an island from the air in the sense that the content of her experience is a tactile one, or to visualize it if she imagines that her experience is a visual one.”⁶ Recall Lopes’ definition of sensory imagination: sensory imagination is *sensory* because it “involves experiential states of the kind involved in perceiving.”⁷

There are considerable (perhaps even fatal) difficulties with this proposal. First, it is difficult to understand how an amodal imaging could be sensory. While it may be difficult to provide necessary and sufficient conditions that define each type of sensory modality, surely for something to be a case of sensory imagination at all, it must be in *some* modality. Second, according to Lopes’ view of experiences, they must have duration, have phenomenal character, and possess non-conceptual content. If sensory imagination involves an experiential state, but is itself amodal without an accompanying belief involving the concept of seeing, what phenomenal characteristics does this experiential state have? Presumably, the experiential states involved in perceiving were supposed to have the phenomenal characteristics of *seeing*, or of *hearing*. For those who think of phenomenal character in terms of qualia, it is presumably *visual* qualia that we had in mind. It is true that some philosophers talk of qualia accompanying any experiential state, whether it be perceptual or not, and so perhaps an amodal experience of sensory imagining could still count as an experience provided it have these non-perceptual qualia (whatever they may be), but this is a counterintuitive solution. Thus, Lopes’ solution to the problem of distinguishing the modes of sensory imagination only by propositional content is inconsistent with his requirement that sensory imagination involve experiential states of the kind involved in perception.

⁶ Lopes, 218.

⁷ Lopes, 208.

Lopes began with two possibilities for distinguishing sensory imagination by modality--the qualia hypothesis, and the specific imaginables hypothesis--and considered a third possibility, the amodal imagining combined with propositional imagination hypothesis. We have rejected the third hypothesis. What remains of the other two? I have claimed that it is indeed possible to identify specific imaginables for hearing. Could one object that pitch, loudness, and timbre are neither specific auditory sensibles nor specific auditory imaginables? What lead Lopes to the conclusion that spatial properties could not be specific imaginables for visualizing?

As Lopes presents it, drawing from M. G. F. Martin and Robert Hopkins, the properties in question are representational properties *of the objects represented* in vision and in imagination. The following observation about visualizing is an indication that this is what Lopes has in mind: “The interesting fact about visualizing is that properties visualized are experienced both as properties of the object imagined and as properties of a mental object.”⁸ He does *not* say that these are properties of the *appearance* of the object (e.g., ‘looking three feet long’, as opposed to ‘being three feet long’, where the first is a response-dependent property), or phenomenal properties that are part of our experience of perceiving objects that have the corresponding appearance properties.⁹ So, in the case of visualizing Yves Klein’s solid blue painting IKB 191 (1962), Lopes would only be talking about the imaginative experience representing the object as having the property of *being* Klein blue, not *looking* Klein blue. And, perhaps more importantly, since colors are frequently already thought of as response properties, the example Lopes gives as an example of a spatial property is the spatial relations generated from the locations of two

⁸ Lopes, 209–10.

⁹ Kathleen Stock, in her paper entitled “What is the Content of a Mental Image?”, presented to the White Rose Aesthetics forum in the fall of 2009, makes a threefold distinction between object content, appearance (or phenomenal) content, and experience content.

objects in relation to one another. This spatial relation seems to be an objective property of objects in the world. That is, this property doesn't seem to be the property of appearing to be a certain distance apart, but of actually being that distance apart.

It is interesting to consider the way in which the properties of sounds might be representational. When we talk of the types of information that can be conveyed in sounds, we include things such as *being a certain distance away*, as well as *being the type of object or organism that makes this sound*. More simply, if I hear the off-stage trumpet part in the opening of Prokofiev's *Lieutenant Kije Suite*, the properties represented in my episode of hearing the off-stage trumpet include *being off-stage*, and *being a trumpet*. But, I maintain, the sort of properties that we want to use to individuate auditory experience and auditory imagination are properties of the sounds, not properties of sound sources. So, the property that is specifically auditory is *being brassy*, not *being made of brass*. This is either an appearance property or a phenomenal property, not a property that the sounding object is represented as having.

My view, then, is that the sorts of properties that we should look for both as specific sensibles and specific imaginables are appearance properties or phenomenal properties. Once we consider appearance properties, there is a way to save the content specificity thesis. Specific sensibles are appearance properties, or phenomenal properties, and are exactly the sorts of properties that account for the phenomenal character that is part of any perceptual experience.

How, then, do we avoid the objection that spatial properties cannot be specific visual imaginables? Let us instead take the auditory case, and then generalize to the visual case, since both seeing and hearing overlap with touch: Just as one can object that spatial properties can be detected in vision and in touch, so too one can object that sounds can be both heard and felt. We observe this whenever we feel the bass notes coming from the stereo in a neighboring apartment, or even from a car half a block away. We can tell that the notes we hear are low in pitch. So do we feel pitches? I claim that we do

not. Instead, we experience rumbling sensations that are felt representations of frequency, just as pitches are auditory representations of frequency. It is *frequencies* that are not specific auditory sensibles, not pitches.

I claim that the same holds for auditory versus haptic imagination. If we are to imaginatively “feel” a rumbling bass coming through the floorboards, this would involve imagery of touch or bodily feelings. It is likely that we rarely do this, especially not as a way of imagining a vibrating object. However, the professional percussion player Evelyn Glennie likely does this daily. Glennie detects frequencies through touch, not by hearing. If she is like other professional musicians in that she regularly uses imagery to aid practicing, it would have to be imagery of feels, not imagery of sounds. It is true that her experience might be described as “imagining sounds by means of touch”; yet if we look at what properties are detected in hearing and in feeling, we see that both detect frequency and intensity, not pitch and loudness. Respecting the terminology of psychoacoustics, what we call sound waves are characterized by frequency, intensity, and overtone profile. What we hear are sounds, which are characterized by pitch, loudness, and timbre. We can thus conclude that pitch, loudness, and timbre are appearance properties or phenomenal properties that are specific to both auditory perception and imagination. That is, pitch, loudness, and timbre are both specific auditory sensibles and specific auditory imaginables.

Is Auditory Imagination Imagining Hearing?

I have argued that there are specific auditory imaginables that account for the uniquely auditory nature of auditory imagination. But there is a further question that one can ask about the auditory imagination: is auditory imagination imagining hearing? That is, when we experience auditory imagery, either of the voluntary or involuntary sort, do

we imagine that we are hearing? This needn't be a kind of propositional imagination, or a combination of sensory imagination with the proposition that we are hearing. Instead, one might claim that auditory imagination is the imaginative recreation of the experience of hearing. I shall argue that this is false. The content of auditory imagination includes the specific auditory imaginables discussed above. However, the imaginative content is usually a proper subset of the phenomenal properties that would occur in the perceptual counterpart to a particular imaginative experience, many of which are significantly and often systematically altered. By 'proper subset', I mean that some, but not all, of the properties are included. By 'altered', I mean that pitches might not be recreated with exact detail, sounds might lack clear timbral qualities, and melodies might lack their true dynamic range.

Dominic Lopes, Christopher Peacocke and Mike Martin all hold views that tie visualizing to imagining an experience of seeing. Martin writes, "if I succeed in visualizing things a certain way, then the way I visualize them to be is the way they would look if veridically perceived"; and further "to imagine sensorily a p is to imagine experiencing a p".¹⁰ Peacocke presents what he calls the "experiential hypothesis", which states that "to imagine an F is always at least to imagine from the inside an experience as of an F (or more weakly, an experience of a sort which might be enjoyed in perception of an F)".¹¹ As we have seen in section 1 above, Lopes equates visually imagining with visualizing, and argues that "Sensory imagining involves experiential states of the kind involved in perceiving."¹²

¹⁰ Martin, M. G. F. "The Transparency of Experience." *Mind & Language* 17.4 (2002): 403–4.

¹¹ Peacocke, Christopher. "Imagination, Experience and Possibility: A Berkeleian View Defended." *Essays on Berkeley*. Ed. J. Foster and H. Robinson. Oxford: Clarendon Press, 1985. 23.

¹² Lopes, 208.

As Currie and Ravenscroft have pointed out, whether this theory is true depends on what is involved in an experience of seeing.¹³ As it is currently stated, Lopes' formulation of his thesis would be insufficient to allow us to distinguish the claim that auditory imagining is imagining hearing from the claim that auditory imagining is having an imagery experience that involves the auditory modality in that it necessarily shares at least some phenomenal properties with hearing, but need not share the full range of properties that make an experience "as if" one were hearing.

The properties represented in hearing that are lacking in many experiences of auditory imagery--cases that on my view are also cases of auditory imagination--include perspectival properties, which are only rarely represented in auditory imagery, as mentioned in Chapter 2. Typically we imagine a rock song without imagining hearing it coming from across the street, or from upstairs. We can choose to imagine hearing, and we can choose to imagine sounds coming from a particular direction, but we very often imagine sounds without doing this.

An additional distinction between imagery and hearing is that the range of phenomenal properties represented in the image, as opposed to the perceptual experience, may be impoverished or narrowed. Thus, we can distinguish imagining hearing--imaging combined with the supposition that the full range of phenomenal and perspectival properties is present and where one is experiencing those properties vividly--from auditory imagination, where the full range of properties need not be present.

The way for the additional supposition that one is having an experience of auditory perception to occur is for an episode of imagery to be accompanied by a propositional imagining; i.e., one imagines *that* one's imagery is an experience of hearing. What is remarkable about this accompanying proposition, however, is that it cannot cause us to

¹³ Currie, Gregory, and Ian Ravenscroft. Recreative Minds. Oxford: Oxford UP, 2002. 27.

have an experience of the missing phenomenal properties. One *can* to an extent wilfully imagine some of the perspectival properties that are included in an experience of hearing. But an experience of the timbral properties, the exact pitch properties, and all the voices included in the full orchestration of a symphony cannot be added into the imaginative experience by an act of propositional imagining. Propositional imagination does not cause imagery that one cannot generate.¹⁴ Therefore, because imagery experiences typically do not recreate full experiences of the sounds or musical extracts they represent, imagining the experience of hearing requires an act of propositional imagining if it is to have content that imagery cannot provide.¹⁵ Thus, the auditory imagination, as a subcategory of sensory imagination, is not imagining hearing. In Peacocke's terms, it is not imagining from the inside an experience as of an F, nor an experience of a sort which might be enjoyed in perception of an F.

The theory that sensory imagining is imagining perceiving fails for auditory imagination because only some episodes of sensory imaginisng are also imaginings of having sensory experience. With respect to Lopes' theory, whether it succeeds or not depends on how he would precisify the conditions for involving experiential states that he appeals to. If to experience auditory properties is to be in an auditory experiential state, that auditory imagining is an auditory experiential state, but not a state of imagining hearing. But if having an auditory experience requires that one have an experience with *all* the phenomenal properties of experience, then auditory imagining is not a case of having an auditory experience. Lopes simply says that experiences differ from beliefs in that

¹⁴ Recall Descartes' claim that we cannot imagine a chiliagon.

¹⁵ Martin claims that the fact that imaging is less distinct than perception is an obvious point. Yet he argues that this amounts to a difference in degree between imagining and perceiving, not a difference in kind.

they are occurrent, have precise duration, have phenomenal character, and have nonconceptual content.

It is clear that Lopes does not require that a visual imaginative experience be identical to a visual perceptual experience, although he does not specify what components of the experiential states must be shared in sensory imagination. He uses the example of perspective, both in the visual case and the auditory case, to show that imagination can still be a visual experience without having all the same characteristics of seeing. So Lopes must not think that visualizing is imagining seeing. But there is room to say more about what is constitutive of a sensory experience in the imaginative mode, and what distinguishes auditory imaging from hearing on the one hand and from imagining hearing on the other.¹⁶

I have claimed that the content of auditory imagining includes a proper subset of the phenomenal properties of a counterpart perceptual experience, some of which are systematically altered. How does auditory imagining get this content? I claim that the content of an episode of auditory imagining is a trace of an experience.¹⁷ Its properties are shared, preserved, and are a result of the object. As an image, it represents the sound structure that caused it, because it is derived from it in a way that preserves its structural and phenomenal properties. The answer to the question of how the image gets its content, then, is causal.

Another way of putting this distinction between having sensory imagery and imagining a perceptual experience is in terms of what Sartre calls the “illusion of immanence”. Sartre’s claim is that in imagery we have an experience of the object that we im-

¹⁶ Amy Kind, too, requires that the experience of imagining and perceiving be similar, but not identical. Kind, Amy. “Putting the Image Back in Imagination.” Philosophy and Phenomenological Research 62 (2001): 85–109.

¹⁷ This claim is primarily justified by empirical material presented in Chapter 4.

agine. His point is a point about intentionality: if we decide to imagine Paris, the intentional content of our imaginative state is the actual city Paris, not a copy. While this has to be true for the intentional content of belief, it does not always seem to be true for images. Again, what matters is what it means to have an experience of the object we imagine. We don't always imagine experiencing when we experience imagining.

Evan Thompson presents a view of imagining that is similar to Sartre's. On Thompson's view, the visual experience is not the intentional object; rather, the visualized object is. But, the object must be given *visually* (so not just the concept, I suppose). "This mode of visual givenness on the part of the object entails a correlative mode of visual experience on the part of the subject. The visual experience co-imagined in visualizing an object is thus simply the intentional correlate of the imaged object's mode of visual appearance in the visualization."¹⁸

This does not seem correct for auditory imagination, for it would either say we imagine a sound presented auditorily, which is redundant, or we would say we imagine a trumpet presented auditorily. The latter is surely the correct analogy, but it shows that Thompson's view is not correct. It is the sound of the trumpet that is the content of auditory imagery, not the trumpet. If the sound were being produced by a machine that produced exact copies of sounds (better than every currently existing synthesizer or recording playback device), we would say the content of the imagery was the same. In the cases in which we would say otherwise, this must be due to the proposition added to imagery, *that* it is being produced by a trumpet, or *that* it is being produced by a CD player. I claim, then, that the intentional content of auditory imagery is not the sounding object, but the sound of the object.

¹⁸ Thompson, Evan. "Look Again: Phenomenology and Mental Imagery." Phenomenology and the Cognitive Sciences 6 (2007): 154–5.

Perhaps a difference between visual imagination and imagination in the other sensory modalities is that a larger proportion of experiences of visual imagination are episodes of visualizing, by which I mean they are experiences whose intentional objects are the external causes of the analogous sensory experience. On the other hand, sensory imagery in the non-visual modalities are more often revivals of sensory traces. These revivals of traces recreate the subjective side of the perceptual experience, and do not always have the original object as their focus. Thus, a typical act of visual imagination might be visualizing a tree in the world (there might not actually be such a tree in the world, but the tree is imagined as being in the world). The primary focus of visualizing is its object. But a typical act of non-visual sensory imagining might be a revival of the subjective experience of, e.g., tasting a fig. The focus of this act is on the way the phenomenal properties of the fig appear to me; that is, it is a revival of the way the flavor of the fig tastes. The focus here is not the fig, but the flavor of the fig.

So too with auditory imagination; the focus is on the sound of the symphony, the pitches, contours, and rhythms of its melodies, the colors and timbres of the instruments (insofar as we are able to imagine those in detail), the volume and articulations of the sounds. In the case of a sounding object, the way the cellphone sounds is at the center of the imaginative episode, not the cellphone. In the case of music, imagining music typically just is imagining these properties, and so the appearance properties of the imagined object and the imagined object itself overlap. To imagine music is to imagine the way it sounds.¹⁹

¹⁹ This is true in the typical case of having an imagery experience of musical material. I do not deny that we can imagine that there exists some fictitious Beethoven *Symphony no. 10*, or that we can imagine what the score of Berlioz's *Symphonie Fantastique* looks like. We could even imagine going deaf and then attending a rock concert, thus imagining seeing the music performed.

I have argued for two conclusions in this section. First, I argued that auditory imagination, as a kind of sensory imagination, has specifically auditory content, and that this content is determined by the representation of specifically auditory properties, or specific imaginables. This is likely true for imagination in other sense modalities, but I have not argued for this claim here in detail. Second, I argued that the content of an episode of auditory imagining is not a recreation of an experience, and so is not equivalent to imagining hearing. However, it can be thought of as a trace of an experience. Experiences of auditory imagination typically represents some but not all of the qualities that an actual experience of auditory perception would have. For instance, it typically does not represent perspectival properties, and it typically will distort or omit phenomenal properties that would be present in its perceptual counterpart. Again, it is likely true that sensory imagination in the other sense modalities is also not equivalent to imagining perceiving, but I have not argued for that here in detail.

A Puzzle about the Ontology of Sounds

A further question that needs to be addressed is whether and how we imagine *sounds*. This raises the issue of the metaphysics of sounds, touched on in part 1 of this chapter, and whether issues involved in the ontology of sounds create difficulty for my claim that the contents of auditory imagination are phenomenal properties of sounds. In addition, if I want to be able to claim that we imagine *music*, ontological views about music must be reconciled with the metaphysics of sounds and the metaphysics of imagery. I cannot survey all the possible positions on the ontology of sounds here; I appeal only to the intuition that on whatever view one takes on the ontology of sounds,

we want to claim that there is a difference between the things that we hear and the things we imagine.²⁰

My discussion of specific sensibles and specific imaginables relied on a distinction between sounds and sound waves: sound waves are acoustic stimuli and are mind-independent; sounds, which are the bearers of the auditory phenomenal properties discussed above, are mind-dependent. There are two questions raised by the claim that sounds are mind-dependent entities, only one of which I will discuss in detail. First, there is the question of whether sounds are objects, events, or properties. The view that sounds are properties is usually the view that sounds are properties *of their sources*, and so since I hold that sounds are mind-dependent, this seems to be the least likely position for me to take. The two positions that I would need to choose between are the position that sounds are mental objects, or that sounds are mental events. Nothing I claim here is dependent on a choice between these views, and so I put aside this issue as not relevant to the current project.

There is a second question that is raised by the claim that sounds are the mind-dependent counterparts of sound waves. It is clear from the previous discussions that auditory images, like sounds, are mind-dependent entities that bear auditory phenomenal properties. What allows us to make a distinction between sounds and auditory images of sounds? I draw on information about perceptual processing to argue that while both sounds and auditory images are mental entities, they are not the same mental entities.

²⁰ Even this intuition, however, is not uncontroversial. On many views of the contents of perceptual states, the content of hearing must be shared by the content of hallucinating, and so one cannot claim that the contents of actual perceiving must in principle be distinct from those of quasi-perceptual counterparts. But see Chapter 2 for a comparison of auditory imagination and auditory hallucinations.

Sounds are mind-dependent entities. They are what result from the interaction of acoustic stimuli (i.e., what we call sound waves) with our auditory system, where the auditory system includes not just our ears but the auditory processing components of our brains. Acoustic stimuli result from the interaction of the vibration produced by the vibrating body (e.g., a violin string) and the environmental medium through which the vibration travels (e.g. the air, but also other objects that amplify, dampen, or otherwise distort the vibration). Our perceptual systems register these acoustic stimuli, breaking down the complex sound waves that reach our ears into individual sound streams heard as coming from distinct sound sources. The individual sound streams are registered by the brain in a way that encodes accurate frequency data, including the overtone profile of the vibration. This is a temporally extended process, and it is the constant tracking of the relative stability of the sound stream from moment to moment, that allows us to hear sounds as stable but temporally extended.

Images of sounds are also mind-dependent entities, but they are not the same mind-dependent entities that sounds are. Images are the result of the reactivation of the representations of sound that are stored during the process of perception. Because only some of the information (i.e., information about the perceptual properties of sounds) that we register in hearing is stored in short-term and long-term memory in a way that can be reactivated, the reactivation will not contain the full range of properties we hear in a live sound. It can in principle only contain what has been stored. But the process of reactivation need not involve even the full range of *stored* properties.²¹ This is further

²¹ Evidence from Oliver Sacks' reports of patients of musical hallucinations that seem to be highly vivid and accurate reactivation of long-stored memories of pieces of music heard decades previously suggests that the brain stores much more detail that we are typically able to access. Sacks, Oliver. Musicophilia: Tales of Music and the Brain. New York: Knopf, 2007.

reason to claim that the image and the sound, while both being mind-dependent entities, are not the same mind dependent entities.

Turning to music, there is a further question to address. Again, I will not cover all the possible positions one can take towards the ontology of music. I take it that the question of the ontology of music can be distinguished from the ontology of musical works. While I have referred in many cases to imagining musical works, such as Beethoven symphonies, I believe that the important question for perceiving and imagining music must include folk music and improvised music (things that might be musical works on some views, but not on all), as well as works of composed art music in the Western tradition. Also, imagining a fragment of a musical work arguably counts as imagining music. So, I refer to the ontology of *music*, and not musical *works*.

With respect to the ontology of music, I raise a potential problem for two kinds of musical formalists, those who hold that music is structured *sound*, and those who hold that works of music are abstract structures capable of being embodied, or instantiated, in sound. I understand Eduard Hanslick as holding the former view: Hanslick states that music consists of *tonen bewegte formen*, usually translated as “tonally moving forms”. I take this to mean that music is *not* just the forms, but their sensuous or acoustic embodiment. I understand the latter view to be the claim that works of music are much like abstract mathematical objects; music in its heard form is just a manifestation of the real work, which is a fully abstract entity. This view is a Pythagorean view, but is also arguably what Schoenberg had in mind by his view of musical space that justified his twelve-tone approach to music composition.²²

²² For discussion of Schoenberg’s view of abstract musical ideas, see Deutsch and Pierce “The Climate of Auditory Imagery and Music”, in Reisberg.

For the first view of musical formalism, the view that music is ordered sound, there is a potential difficulty: how do we imagine *music*, if only sounds are music, and images aren't sounds? On the second view of formalism, the view that holds that music is an abstract structure that is only sometimes instantiated in sounds, we no longer have the difficulty that arises from the view that images aren't sounds. If music consists of ideal abstract structures, presumably these are things that we can imagine directly, or at least have as mental content.²³ But this abstract view has its drawbacks, in that we lose the meaningfulness of calling musical imagination a form of *sensory* imagination. If music is simply abstract structure that can be manifested in the sensory medium of sound, but is not necessarily dependent on such medium, then in its abstract, imagined form, it is not meaningfully sensory. Of course, in response to this view one can point out that if it is possible to hear music structures through hearing sounds, it is also possible to imagine musical structures through imagining sounds, and so there is still a role for the auditory imagination.

I do not wish to argue for a formalist position of the ontology of music. I would not argue that either music or musical works can be wholly understood outside of their cultural context, nor would I argue that the sound structure is the sole object of aesthetic appreciation in a musical work. However, I am sympathetic to a modified version of the first view of musical formalism as stated above, the view that music is structured sound. I will not fully argue for this position, except to insist on a view that music is *at least* structured sound. That is, whatever else music is as a cultural object, that object is also a

²³ Of course there is a long-standing epistemological problem for this sort of view, which is that if the view is a kind of abstract idealism, and these abstract structures exist as mind-independent, it is a mystery how we ever come to know these structures, whether they be musical structures, mathematical structures, or Platonic Forms. But most such positions at least begin investigation from the position that we do have knowledge of these things.

sound structure. Appreciation of music involves understanding the musical sounds as a necessary, not a sufficient condition. I thus reject the second version of formalism that holds that music is purely abstract.

With respect to the first formalist view, that music is structured sound, I claim that we imagine music in the same way that we imagine sound. As argued for earlier, auditory images are *of* sounds, but are not themselves sounds. Likewise, we imagine music by imagining structures instantiated in imagery replete with perceptual qualities, without needing to be committed to the idea that we have the full piece of music as a sonic structure in our head.²⁴ Because these structures themselves are properties of music as it occurs in sound, and the categories are formed out of perceptual processes, music as it is processed by the mind should be thought of as sensorily embodied, not as purely abstract.

DeBellis and Conceptual Content

The final section of this chapter will serve as a way of linking the non-sensory imagination and the sensory imagination through an examination of the issue of structural hearing—what it is to hear features of the music that music theory describes. While this issue is closely related to the issue of musical understanding in general, it presents a distinct philosophical question that is best examined in the context of non-conceptual content debates in the philosophy of perception rather than just within the philosophy of

²⁴ Intuitively, we believe we have reason to hear a concert or a recording as opposed to just imagining music, and that this is for reasons to do with what can be gained in hearing real sound over generating imagined sound. If this is correct, it is actually a benefit of my view that imagining music is not the same as hearing music.

music. The question, raised by Mark DeBellis,²⁵ is what it is to hear a chord as a dominant, or to hear a musical passage as a recapitulation.²⁶ This is again a question about the content of what one perceives: there is a difference between hearing a piano tone as an F sharp in the key of G major and hearing the identical tone as a G flat in the key of D flat major. Clearly, this difference is not captured by the interaction between the physical sound and our auditory system alone. There must be something else involved in order for us to hear the tone as one thing and not the other.

DeBellis presents this issue of hearing music-theoretical structures as similar to seeing the dual aspects of a Necker cube, or the duck-rabbit. In the duck-rabbit case, there must be conceptual content that enters into our perception. Seeing-as is like seeing, but also like thinking.²⁷ For the Necker cube, however, it seems that it is a matter of structural seeing-as, not conceptual.²⁸ We see the object as having one organizational structure rather than another, as opposed to seeing it under one concept rather than another. It might be the same in the musical case: to hear an F# is to hear a pitch with certain tendencies to resolve; it fits in a distinct hierarchy among other pitches. This is something that we detect by hearing, so it seems not to be a matter of utilizing the concept “F#”. DeBellis asks additional questions, however, about how our conceptual knowledge of music theory informs our listening. Is it different to hear something knowing *that* it is structured in sonata form from merely hearing the particular musical relationships that are required to instantiate this music-theoretical type?

²⁵ DeBellis, Mark. “The Representational Content of Musical Experience.” Philosophy and Phenomenological Research 51 (1991): 303–24.

²⁶ In Wittgenstein and Scruton the issue of “hearing-as” is closely linked to imagination. In the *Philosophical Investigations* Wittgenstein calls “hearing-as” a kind of imaginative hearing.

²⁷ See Wittgenstein *Philosophical Investigations*.

²⁸ These distinctions were also raised earlier in the discussion of Scruton in Chapter 1.

It seems that underlying this question is the issue of perceiving non-conceptual content, and in fact DeBellis is engaging with Christopher Peacocke in his work. Imagination comes in at two points here. First, if perceiving music as structured can be done without explicit employment of semantic concepts, the same plausibly will hold for imagining the same content. If one can see or hear an object, it seems that mentally recreating this experience is a way of imagining an object, and not just imagining that it is fictionally true that one sees or hears something. Thus, that the sensory imagination is involved seems to follow from the possibility of non-conceptual content, in Peacocke's sense. But the sensory imagination might be also be compatible with conceptual content, provided such content needn't involve having a proposition involving the concept. Second, imagination in the Kantian sense seems to play a role in music perception as DeBellis presents it (as argued earlier in Chapter 1). The contents of the musical experience are not exhausted by immediate perception, and so this fact requires that we invoke stored categories for musical structures that we bring to bear on perception.

In addressing this final question of non-conceptual content and of the possibility of structural categories, I claim that the way we conceive of structural categories such as those for music-theoretical entities is central to deciding whether the content of perception and imagination is conceptual. The issue turns out to be an issue about the nature of concepts and what possessing a concept involves. If concepts must be abstract linguistic items, and it is possible to recognize musical structures without knowing the music-theoretical terms that refer to those structures, it will turn out that the content of music perception (and musical imagination) is non-conceptual. If, however, it is possible to have perceptual concepts for music-theoretic items such as "dominant chord" or "leading tone" without possessing the accompanying vocabulary, then musical perception is conceptual whenever it applies structural categories. So too for imagination: musical imagining, as a type of sensory imagining which involves perceptual categories, involves

categorized content. This content is not propositional content (although propositional content might be added to an episode of auditory imagining). Whether or not it is conceptual content depends on whether categories for perceptual structures are concepts or not.

Conclusion

In this chapter, I have discussed four interrelated issues regarding the content of auditory and musical imagination, considered as types of sensory imagination. First, I addressed the question of what makes auditory imagination specifically *auditory*. I framed this question in terms of specific imaginables, and argued, contrary to Lopes, that it is possible to identify both specific sensibles and specific imaginables for auditory imagination. I further argued that these specific imaginables are phenomenal properties of sounds, and not properties of objects.

Second, I discussed the relationship between auditory imagining and imagining hearing. I argued that auditory imagining is not equivalent to imagining hearing for two reasons. The first reason is that auditory imagining, in typical cases, does not involve imagining a sound as coming from a direction external to one's body. The second reason is that the range of phenomenal properties represented in imagination is narrower than the range of properties represented in hearing.

Third, I addressed a puzzle about the ontology of sounds in combination with the ontology of music. I argued that, while both sounds and images are mind-dependent, there is a distinction between sounds and auditory imagery that arises from the causal history of perceptual processes. I further argued that it is possible to explain how we imagine music, even if we consider music to be, or to necessarily involve, sounds.

Finally, I argued that because music perception and musical imagination involve the application of perceptual categories, whether or not one conceives of the content of

musical imagination or music perception as conceptual depends on the nature of these categories. If these categories are concepts, then musical imagination is conceptual; if concepts are language dependent, then we should think of categories for perceptual musical structures as non-conceptual.

CHAPTER 4

EMPIRICAL GROUNDING FOR MUSICAL IMAGERY

Introduction

This chapter will present some work in cognitive psychology and neuroscience that has been done on the topic of musical imagery. I begin by presenting an account of the well-known “imagery debate”, which took place over the later decades of the Twentieth Century, primarily between Stephen Kosslyn and Zenon Pylyshyn, along with its philosophical background, primarily in the work of Gilbert Ryle. Next, I present work in auditory and musical imagery that establishes support for my claims in previous chapters that the phenomenal properties of audition are preserved in imagery, and that imagery gets its content through the causal processes involved in perception and memory storage. In support of this work in imagery, I provide a brief description of perceptual processing in music, linking perception to memory and imagination. Third, I present various theories of imagery that have been proposed in psychology, focusing on the way they relate the phenomenology of the imagery experience to claims about its neurological underpinnings. Finally, I discuss the role of musical imagery in music perception, arguing that the activation of stored musical imagery serves a role similar to that which has been claimed for the constructive imagination. Thus, we find that the psychological literature on musical imagery studies supports the existence of not only the sensory imagination but also the constructive imagination.

Imagery in Psychology: The Ontological Problem of the Image Revisited

Despite the ubiquity of imagery experiences, theoretical accounts of mental imagery have not fared well. Problems arise when we try to determine what we commit

ourselves to in conceding that musical imagery exists and that having musical imagery is a case of imagining sound. Do there exist entities, sounds, that occur both in the world and in our heads? To say so would be analogous to the claim made by the Gestalt psychologists of the late nineteenth and early twentieth centuries (among others) that when we see an object, we have an internal picture of that object imprinted in our brain. (More recent theories that explain the phenomenon of imagery through objects, images, include Hannay and Ishiguro.¹) When we imagine that same object, we revive the mental image, now without its external cause. The important aspect of their claim is that the mental picture depicts elements of what it represents *by itself having those features*. So, just as an apple has a left side and a right side as it is presented to our eyes, so too will the mental image of that apple have a left side and a right side. It will retain the (visually accessible) dimensionality of the original by reproducing that dimensionality in the image. That is, if seeing involves scanning the spatial features of an object, imagining that object will involve mentally scanning the spatial features of the image of the object.

This theory of perception and imagery has an immediate and well-known difficulty. If seeing requires the interaction of the visual system and the object seen (along with the mediation of light waves), what is it that “sees” the mental image? We must posit a mental correlate of the visual system, the “inner eye” that sees the inner object. In fact, this is the preferred metaphor, and the history of ideas bears out its popularity. But quickly we see that the theory of the “inner eye” is not conceptually coherent. The model of perception that leads us to posit mental pictures and the inner eye holds that perception is a relation, and this relation requires two relata: the seeing faculty and the seen object. The difficulty is that the explanation of the operation of the seeing

¹ Hannay, Alastair. Mental Images. London: George Allen and Urwin, Ltd., 1971; Ishiguro, Hide. “Imagination.” Proceedings of the Aristotelian Society, Supplementary 41 (1967): 37–56.

faculty (i.e., our perceptual organs) involves an additional object, the inner image. This image is a relatum in the relation of mental seeing, and so requires a fourth object, the faculty for mental seeing.

If we were to propose an analogous view about hearing, it would be equally difficult to explain the structure of the mind's ear. We would posit either additional sounds, echos or miniature stereo systems, any of which must be 'heard' by an internal sound image detector. In addition, the temporal aspect of auditory imagery makes it harder to understand how internal sounds are supposed to be stored, without having to postulate some sort of "playback" mechanism.

A further problem is to explain how this faculty for mental seeing would operate. There are two options, neither of which is satisfactory. The first explanation is that we have an internal sense organs just like our external sense organs; the second is that we should avoid any discussion of how this works, because any explanation depends on unobservable internal processes. One might be lead to the former explanation, the "inner eye," by arguing that since inner perception is *logically* structured just like actual perception (it takes an object, involves perceptual properties, and has a phenomenology), inner perception (i.e., imagery) is also *physically* structured just like actual perception as well. This means that the inner eye (and ear) is an inner sense organ that works by forming *yet another image*, this time of the mental image. But this additional mental image too requires something that "sees" it, forcing us to posit an infinite regress of images and additional mental sense organs. The infinite regress is philosophy's version of the many-headed hydra of Greek myth; any theory that results in such a monster must be discarded.

What was it about this theory of mental seeing that seemed compelling, even though it leads to an impossible regress? It is that the "inner eye" seems to explain something. Specifically, it explains the fact that, phenomenologically, the experience we have when we imagine an object has something in common with our experience of

actually seeing that object. Why is this, according to this theory? It is because their objects are in fact similar. The image is like the seen object in ways that are important to the phenomenology of seeing and imagining. An image seems scannable because it *is* scannable. Further, imagining seems to be like seeing because the causal processes underlying both are indeed similar. Or so we might like to be convinced.

As alluded to above, there is a second option for explaining the workings of the inner faculty, the mind's eye. This is to say that indeed there is some internal process² responsible for imagery that we allude to with the metaphor of the mind's eye, but that the only things we know about this process are that it exists, it produces the phenomenological effects we claim it produces, and it is structured in a way that does not lead us to logical objections. A way to characterize this explanation, though, is that it "explains a mystery with a mystery," which is to say that it is not explanatory after all. As a result, the mind's eye is either logically suspect, or it is utterly mysterious.

The regress problem is not the only difficulty with traditional theories of mental images. The very idea of "pictures in the head" is difficult to countenance. As Gilbert Ryle points out in *The Concept of Mind*, this manner of speaking makes it seem as though there are two types of pictures, actual pictures and mental pictures. So too for other mental objects. Ryle's point is that we are misled by language if we believe that having mental imagery involves a special class of objects: inner sights, sounds, tastes, and the like. "They are not things that I find out about by watching them, listening to them, or savouring them."³ A mental sound is not a type of sound, and inner hearing is not a type of hearing. Further, "the familiar truth that people are constantly seeing things in their

² This can be in either the mind or the brain, depending on what tradition we are working in and what our metaphysical commitments are.

³ Ryle, Gilbert. *The Concept of Mind*. Chicago: The U of Chicago P, 1984. 205. 1949.

minds' eyes and hearing things in their heads is no proof that there exist *things* which they see and hear, or that the people are *seeing* and *hearing*.”⁴ (italics mine)

As far as his claim about the language of perception and imagery is concerned, Ryle is quite correct: India, the zoo, and my mind are not names of three places I could go to see tigers; strictly speaking, *hearing* is not the right term for experiencing auditory imagery. Ryle realizes that just what is going on when we have visual or auditory imagery remains an open question. But he responds that these “are simply questions about the concept of imagining or make-believe. ... (H)aving a tune running in one's head is imagining that one has the tune being played in one's hearing, maybe in a concert hall.”⁵ Ryle further stresses that imagining is a kind of activity, one that involves the application of knowledge. Having a tune in one's head is thinking about how that tune goes, which is one way of using knowledge of that tune. This knowledge is just the disposition to behave in certain ways: “Knowing a tune is just being able to do some such things as recognise and follow it, produce it, detect errors in the playing of it and go through it in one's head.”⁶ What Ryle has done is to remove the suspect ontological entities (ghostly inner tigers, and mysterious image-viewing faculties) and replaced them with a description of activities and dispositions.

Ryle's parsimony is motivated in part by a desire to refute Hume's theory of ideas. Hume's view was that the contents of the mind consist solely of what he calls impressions and ideas. An impression is an occurrent sense perception; an idea its faded image. Thinking, for Hume, involves mental operations on these faded percepts.⁷ It is

⁴ Ryle, 245.

⁵ Ryle, 256.

⁶ Ryle, 269.

⁷ See p. 15

not only imagery that has its roots in perception, but all of thought. Ryle, however, wants to insist that imagination involves knowing rather than perceiving: “it has been supposed that what is taking place, when I ‘see’, or ‘hear’, or ‘smell’, corresponds to that element in perceiving which is purely sensuous; and not to that element which constitutes recognising or making out; i.e. that imaging is a piece of near-sentience and not of a function of intelligence, since it consists in having, not indeed a proper sensation, but a shadow-sensation.”⁸ Ryle is at pains to disabuse us of this manner of speaking:

“Whereas an unknown tune may be played in a person’s hearing, so that he hears the tune without knowing how it goes, we cannot say of a person in whose head a tune is running that he does not know how it goes. Having a tune running in one’s head is not to be likened to the mere having of auditory sensations; it is to be likened rather to the process of following a familiar tune, and following a heard tune is not a function of sentience.”⁹

It turns out that Ryle is only partially correct. First, if he means to have given an argument that imagery cannot be in any sense perceptual, he has given a faulty argument. While having a tune running through one’s head is indeed not the *mere* having of auditory sensations, it is still quite possible that even following a tune may be a function of past perceptions. What matters in this case is exactly what kind of knowledge is involved. If the answer is “perceptual knowledge,” Ryle has appealed to a false division between perception and intellect. In all fairness, Ryle’s view of knowledge is broad enough to include much more than propositional knowledge. One of the themes of *The Concept of Mind* is that some knowledge is knowledge-how rather than knowledge-that; presumably knowing how a tune would go is a variety of knowing-how, if it isn’t

⁸ Ryle, 265.

⁹ Ryle, 265.

something that could be stated in a set of propositions. But it is still possible that some kinds of knowing-how are perceptually derived, or, contain sensory components.

Generally speaking, there are two ways in which images might be linked to percepts. First, as Hume has it, an image is formed from a percept by some process that involves the representation becoming less vivid. This process does not prevent the image from being the same sort of thing as a percept, i.e., a representation. The relation is constitutive. Second, it might be the case that images are formed from (stored) percepts, but in the process, whatever is essential to a live percept drops out, or something is added to the perceptual trace so that the image and percept are not the same sort of thing. So it would be wrong to call an image a faded percept, but there is still a causal and partially constitutive link between percept and image. This is actually consistent with what we learn from studies in perception and cognitive neuroscience, as will be shown below in sections 5 and 6.

Although Ryle was not a psychologist, and so a fortiori not a member of the Behaviorist school of psychology, his ideas have a certain concinnity with Behaviorism. Both are characterized by a desire to eschew any internal mental entities. Such things could not be observed scientifically, and so played no role in a properly scientific psychology of the mind. Anything mental was to be explained in terms of observable behavior. Due to the dominance of Behaviorism throughout much of the twentieth century, the study of mental imagery in the field of psychology languished in disrepute for decades. A small number of researchers continued to work in the area, but with the publication of several groundbreaking studies in cognitive psychology, beginning in 1971, a vigorous debate arose over the existence of mental images. On the surface, it appears that those who argue for the existence of mental imagery are simply trying to reclaim the idea that there are internal mental representations, thus refuting the Behaviorists. But in fact the debate is primarily a debate internal to the field of cognitive psychology among scientists that agree both that we have experiences that seem imagistic

and that the mind contains representations. This latter view is what grounds the representationalist theory of mind, held by cognitive scientists and by certain leading philosophers of mind.

What these cognitive scientists and philosophers disagree about is the nature of the representations that underlie our experiences of imagery.¹⁰ There are two very influential sets of studies that have been used to argue that there must be something “quasi-pictorial” in the mind corresponding to visual images. The first set is by Shepard and Metzler (1971) and Shepard and Cooper et al. (1982) and involves mental rotation of three dimensional objects presented in two dimensional projections. In order to use an image to answer questions about the rectangular objects represented in the picture, rectangular objects, subjects “mentally rotated” the objects using mental images of the objects. The mental image, then, must be something that can be “rotated.”

Stephen Kosslyn, one of the primary proponents of the existence of mental images in the mental imagery debate, carried out further experiments to establish the spatial properties of mental imagery. In Kosslyn, Ball, and Reiser (1978), subjects were given a map of an island with three objects represented at various distances apart. They were given some time to memorize the map, and then asked questions about the objects (e.g., is the tree in between the shack and the pond?). One group of subjects was instructed to answer these questions by consulting an internal image of the map and scanning it. The group that was asked to answer by scanning took longer to answer the questions. In fact, the “scanning” time varied proportionally with the time it took subjects to visually scan the actual map. This was taken as evidence that the structure of

¹⁰ As Nigel Thomas points out, and as has been implicit in previous chapters, “mental imagery” can refer to any of three things: the subjective experience of imagery, the image-like representations that correlate with imagery experience, or whatever in the brain underlies that experience, image-like or not. He further notes that the participants in the mental imagery debate have been guilty of equivocating between these senses.

the mental representation of the map was similar to that of a physical map. Kosslyn concluded that, in addition to abstract representations in our minds that are like sentences or bits of data on a computer chip (digital representations, as advocated by proponents of the computational theory of mind), we also have pictorial, or analog representations in our minds.

The difficulty with the results of Shepard and Kosslyn's studies, as was pointed out by Zenon Pylyshyn and others, is that it is theoretically possible to generate the same behavior in response to the experimental task with a differently structured underlying representation of the spatial properties of the map. Just as a computer program might represent a pictorial image by subdividing the pictorial space into a finite number of subspaces, or pixels, and then 'filling' each pixel with a single property. In doing so, it produces a digital rather than analogue representation, so the brain might break down what we think of as the spatial properties and relations that comprise the visual scene into something structured more like a list of properties represented at locations. In such a representation, the spatial properties would be encoded in the list, but the list itself need not be spatially structured in a way that imitates the original spatial information. Pylyshyn is further committed to the view that mental representations responsible for imagery are not only not pictorial, but also that they are propositional. This would mean that the properties and relations are encoded as they would be in a language: the lamp is in the corner next to the sofa. Imagery is generated not from a mental picture of the living room, but from this sentence about the placement of furniture.

Understandably, a great deal of confusion has resulted from the debate about propositional storage formats versus pictorial storage formats used by the brain for generating imagery experiences. Propositional versus pictorial views about storage format map superficially onto propositional imagination versus sensory imagination views. But the parallel is only superficial. The distinction is that the former debate in cognitive science is a debate about what happens at the subpersonal level. The latter

debate in the philosophy of imagination is a debate about what we take ourselves to be imagining at the personal level. That is, do we imagine objects, or do we only imagine states of affairs that involve objects? And, does our conscious experience involve something like imagery?

Whether we have representations in our brains that take the form of pictures and whether images are really part of our inner subjective experience are separate questions. One can accept the latter while rejecting the former. At the beginning of this section I gave arguments that showed that an inner faculty of the “mind’s eye” had two possible solutions, one of which--the existence of an internal sense organ--was described as incoherent; and the other of which--that imagery experiences are real but unfathomable--was described as mysterian. There are remnants of both of these solutions in the current neuroscientific discussions of imagery. Kosslyn’s discussions sometimes still commit him to the logical problem of the homunculus. Some researchers claim nothing about the nature of images, only that their work supports the existence of imagery experiences at the phenomenological level. Yet, due to the great expansion of our knowledge of the inner workings of our brain, a third solution to the problem of the “inner eye” and “inner ear” is now possible: neuroscientific work can begin to explain the processes that undergird the functions ascribed to the mind’s eye and ear, *whatever those processes might be*, without also being committed to the existence of internal sense organs and internal pictures. If this third solution is still a bit unfathomable, it is at least promising.

A remark by Evan Thompson, made in the context of reconsidering the imagery debate in light of his work in phenomenology, is instructive. He points out that if what we refer to as an image just is whatever we experience in the process of reenactment, then imagery involves images. But some images are not pictorial objects like painted pictures: “In visual imaging or visualizing, we do not inspect a phenomenal mental picture, but instead mentally re-present an object by subjectively simulating or emulating a perceptual experience of that object. If the proposal is that a phenomenal mental image

is simply a subjectively simulated or emulated perceptual experience, then the foregoing analysis can be taken to support this proposal. A phenomenal mental image is not a phenomenal picture in the mind's eye, nor indeed is it any kind of static image or depiction; it is rather the mental activity of re-presenting an object by mentally evoking and subjectively simulating a perceptual experience of that object.”¹¹ Imagery is the apprehension of a mental image, not the mental apprehension of an image.

What remains to be demonstrated is exactly what is involved in this mental activity of reenacting the perceptual process. There has been work done on musical imagery that parallels some of the visual imagery studies carried out by Shepard and Kosslyn, notably work by Halpern and Zatorre. (In fact, auditory imagery presents a problem for the Pylyshyn/Kosslyn debate, since neither the description (propositionalist) theory nor the picture (pictorialist) theory makes much sense for representations of sounds). Just as the Kosslyn studies demonstrate the presence of the same phenomenal properties in vision and in imagination, the Halpern and Zatorre studies support my claims in chapters 2 and 3 that the phenomenal properties experienced in hearing are also experienced in auditory imagination. We will now turn to a discussion of those studies.

Results of Musical Imagery Studies in Cognitive Psychology

In the 1980s, Halpern designed experiments that attempted to apply Shepard and Kosslyn's results in visual imagery to musical imagery. The objective was to link the phenomenological properties of pitch, timbre, and duration, to the information must be stored in order to give rise to imagery experiences with these properties. We not only experience “inner tunes” as if they have pitches, but these tunes are stored in a way that

¹¹ Thompson, Evan. “Look Again: Phenomenology and Mental Imagery.” Phenomenology and the Cognitive Sciences 6 (2007): 156.

encodes information about particular identifiable pitches. We can “scan” a melody by playing it in our heads, demonstrating that the representation of a melody is extended in time, just as we can scan an image of a visual map that is represented spatially. The perceptual features of auditory experience occur along three dimensions: pitch, meter (or rhythm), and timbre. Zatorre and Halpern’s auditory imagery experiments (and experiments of others) confirm that these measurable properties of auditory perception are preserved in auditory imagery, that auditory imagery draws on the same neurophysiological processes in the auditory cortex as ordinary hearing, and that focal damage to these areas disrupts auditory imagery.¹² I explain each of these three in the remainder of this section.

What is revived from the “mind’s eye” theory is not the troublesome idea that an auditory image is just like a sound, to the point that the “inner ear” registers sound waves on a tympanic membrane and forms images just as the outer ear does. This ontology would still generate an unacceptable regress. What remains of the “mind’s ear” metaphor, once we give up any commitment to an inner perceptual organ, however, is the sense that there is a reason we think that inner hearing is an auditory (in Kosslyn’s term, “quasi-perceptual”) experience. The motivation is not so much to show that we have magical mental “sounds” in our heads, but that the experience of perceptual imagery cannot be explained merely in terms of conceptual or linguistic representations--there is more to it than that.

In Halpern’s musical imagery task, subjects were asked to determine whether a lyric was part of a song by mentally “playing through” the song. Members of the control group were not given any instruction about how to make this determination. Those asked

¹² . Andrea R. Halpern, “Musical Aspects of Auditory Imagery,” in *Auditory Imagery*, ed. Daniel Reisberg (Hillsdale, NJ: Lawrence Erlbaum Associates, 1992), 1-28; Andrea R. Halpern, Robert J. Zatorre, Marc Bouffard, and Jennifer A. Johnson, “Behavioral and Neural Correlates of Perceived and Imagined Musical Timbre,” *Neuropsychologia* 42 (2004): 1281-1292; Robert J. Zatorre and Andrea R. Halpern, “Mental Concerts: Musical Imagery and Auditory Cortex,” *Neuron* 47 (2005): 9-12.

to “play through” the song took longer to respond: the response time was correlated with the amount of musical time between lyrics. Typically, subjects needed to “play through” the song from the beginning and arrive at the correct lyric in the song in order to be able to access the correct word. This was taken to show that subjects were accessing inner representations of tunes that encoded temporal information. As I emphasized in Chapter 2, temporality is a crucial feature of auditory imagery. These studies indicate not just that imagery is temporal, but that it *accurately* encodes temporal information.

An additional task tested pitch representation, as opposed to temporal relations.¹³ This time subjects were asked whether the note corresponding to the lyric was higher or lower in pitch than the starting note. Some subjects in both groups could not do this at all; those with musical training performed measurably better than nonmusicians. The results of this experiment offered further evidence that the pitch comparison task required a representation drawing on the musical elements of pitch and tempo, as opposed to something like conceptual knowledge or visual memorization of a score.

Halpern’s claims are modest: she states that her results show that auditory imagery is a “strong subjective experience”, and its features are at least partly quantifiable. “People indeed behave as if they were running songs through their heads. That is, the evidence seems to point towards a representation that codes extension in time, that unfolds in real time, that has strong links between adjacent elements, and that is unidirectionally ordered.”¹⁴ This isn’t to say that we don’t *also* encode melodies in other ways (e.g., to know *that* a piece starts on F # requires conceptual encoding), but it is to insist that the phenomenal qualities of musical imagery that are shared in auditory perception

¹³ This is the task designed to be like the mental rotation experiment of Shepard and Metzler, ‘71.

¹⁴ Halpern, Andrea R. “Musical Aspects of Auditory Imagery.” Auditory Imagery. Ed. Daniel Reisberg. Hillsdale, New Jersey: Lawrence Erlbaum Associates, 1992. 10.

are those unique to the modality of hearing, and must be represented in ways that are sensitive to just these qualities.

Halpern has also shown that musicians have consistent, accurate recall for tempi, and that ordinary (nonmusician) subjects can mentally transform or manipulate tempos in their minds. “Ordinary people can externalize the “speed” of their internal images, and can differentiate among those tempos. To an appreciable extent, they, and even more so musicians, are able to replicate that tempo over long periods of time. These results strongly imply that tempo is encoded in the long-term memory representation of familiar tunes.”¹⁵ Halpern ‘89 attempted to determine whether people associate particular pitches with imagined music, and whether these pitches are stable over time. Subjects were asked to run various songs through their head, think about the starting note, then hum the starting pitch for familiar tunes. Variability among same songs (each song was repeated several times) was low; among different songs, high. “If humming is an adequate externalization of mental pitch, then these results point to a form of absolute pitch among ordinary people.”¹⁶ Of course, this is limited by whether humming is in fact an accurate means of externalizing imagined pitch.¹⁷

Another task asked subjects to match the inner imagined pitch to a note produced on a keyboard. This study established that subjects’ performances in imagery tasks cannot be explained by claiming that subjects are physically singing to themselves (i.e., by

¹⁵ Halpern, Andrea R., 16.

¹⁶ Halpern, Andrea R., 19.

¹⁷ Additional work surveyed by Patel in “Music, Language, and the Brain” demonstrates that far fewer people are tone deaf than believe themselves to be tone deaf. True tone deafness would be the inability to discriminate between differing pitches; studies demonstrate that most people who call themselves tone deaf are in fact able to make pitch discriminations, but are unable to accurately match those pitches by singing. The deficit is in coordination between what one tries to sing and what one is able to sing Patel, Aniruddh. Music, Language, and the Brain. Oxford UP, 2007.

appealing to the phenomenon of subvocalization, a once commonly-held hypothesis), since when subjects are asked to hum, men hum an octave lower than women, but when selecting a note on a keyboard, they do not vary according to vocal range--men and women select the same note in the same octave. In general, the starting note selected for the beginning of the tune is not adjusted for the subject's singing range. Even if a song has a starting note that would put the rest of the song outside a subject's vocal range, subjects chose the accurate but uncomfortable note rather than a different note that would facilitate singing.

An additional task asked subjects to compare a tone suggested by the experimenters to the starting tone they imagine the piece to have, and then to judge whether or not that new tone would be appropriate for that song. Tones related by fifth, and major and minor third (i.e., tones that would put the piece in a key that is closely harmonically related to the original key), were considered next most appropriate as starting points. Notes creating dissonances with the imagined starting tone were not considered appropriate. Finally, subjects were asked to imagine higher and lower pitches as starting tones. The results show that "performance in these experiments was indicative of considerable memory for an arbitrary starting pitch of familiar tunes."¹⁸ That is, memory for tunes accurately encodes the original pitch information of those tunes, and is not adapted to the singing abilities (i.e. what amount to restrictions on pitch-generating abilities) of the subjects. Halpern describes her results as follows: "The "tune inside the head" is in some ways an apt description of the representation of familiar tunes. These tunes seem to be stored with much exact or analogue information." "Real time passes while auditory images are activated, and the representations apparently include the fairly absolute information of tempo and pitch, in addition to the relative information of note and harmony rela-

¹⁸ Halpern, Andrea R., 23.

tionships.”¹⁹The studies presented thus far provide evidence for the encoding of phenomenal properties of musical imagery, such as pitch. Note that nothing here requires the existence of a homunculus, but the experimental results do enable us to say some things about the character of auditory imager, contrary to the “mysterian” objection. In addition, information about the physiological underpinnings of auditory imagery experiences also provides evidence for the encoding of phenomenal properties of musical imagery. It has been demonstrated that visual imaging tasks involve nearly identical brain areas as perceptual tasks, and Halpern and Zatorre have begun to demonstrate the link between the brain locations for music imagery and music perception. They note, however, that since auditory perception is already a memory task, more so than is vision, the relation between auditory perception and auditory imagery cannot be strictly compared with the relation between visual perception and visual imagery. That is, whereas we believe we can make a strict distinction between vision and visual imagination, hearing already involves the same memory processes that imagination draws on. However, the fact that hearing draws on the same memory processes as auditory imagination serves to reinforce the claim that the auditory imagination has sensory features that are shared in perception.

Results of Musical Imagery Studies in Cognitive Neuroscience

Whereas cognitive psychology has provided evidence for the encoding of phenomenal properties of musical imagery, cognitive neuroscience provides methods for investigating the neural underpinnings of the mechanisms responsible for musical imagery. The studies used in this research include PET scans, fMRI studies, and other brain imaging techniques help to isolate neural activity that occurs during imaging tasks, as well as “lesion studies” performed on patients who have suffered strokes or other brain

¹⁹ Halpern, Andrea R., 25.

damage to determine the location of impairment that correlates with cognitive deficits. For many years, researchers operated on the fairly crude assumption that musical and visual processing takes place in the right half of the brain, whereas language processing takes place in the left. It has now been demonstrated that music processing takes place in a wide variety of locations, involving many different systems in addition to the auditory cortex.

Results show that the brain areas involved in musical imagery are the right temporal neocortex and other right hemisphere structures. “The right temporal lobe is an important mediator of musical imagery, as it has been shown to be for musical perception.”²⁰ Perceiving and imagining songs with words, however, involves the left hemisphere as well. During some tasks, the supplementary motor area (recruited for the preparation of movement) is activated in musical imagery. In fact, motor area response is actually more pronounced in imagery than in perception. Halpern and Zatorre speculate that this mediates performance rehearsal, (or humming, e.g.) for a musical task.²¹ This result is interesting because for some time, the phenomenon of inner speech was explained as sub-vocalization. If one is a behaviorist, inner speech is indeed an action, just a very subtle and subconscious one. If auditory imagery is also a motor task, this theory might have been partially correct. But additional auditory imagery tasks do not show activation of the supplementary motor area, so imagery cannot be equivalent to sub-vocal singing or humming, nor can it be necessary for it.

²⁰ Halpern, Andrea. “Cerebral Substrates of Musical Imagery.” The Cognitive Neuroscience of Music. Ed. Isabelle Peretz and Robert Zatorre. Oxford: Oxford UP, 2003. 220.

²¹ Zatorre, R. J., et al. “Hearing in the Mind’s Ear: A PET Investigation of Musical Imagery and Perception.” Journal of Cognitive Neuroscience 8 (1996): 29–46.

As a result of brain imaging studies that compared the brain regions recruited by imagery processes to the brain regions recruited by perceptual processes, Halpern was able to show which brain areas are shared by imagery and perception, and to identify four brain areas that are recruited in auditory imagery tasks but not in perceptual tasks.

...the primary auditory area (located in superior temporal gyrus, or STG) is quite active when listening to sounds, as one would expect. More interesting is the fact that several areas of the STG adjacent to the primary auditory cortex (secondary auditory cortex) are also active when people were just imagining the sounds. [There are] several other areas of correspondence between the imagery and perception tasks: several areas in the frontal lobe were active in both tasks, as was one area in the parietal lobe.²²

For tasks with songs and lyrics, almost all areas activated in imagery were bilateral, indicating that language areas are recruited as well as auditory areas. For tasks involving well-known instrumental themes, Halpern and Zatorre again found activation in secondary auditory cortex, but this time in the right but not left lobe, indicating that it is only songs with text that recruit the language areas of the brain (left lobe), and not purely instrumental music. Additionally, frontal areas of the brain are activated, more prominently on the right side than on the left. These areas recruit conceptual or schematic knowledge, perhaps representing music theoretic or structural elements. In sum, as a result of the lesion studies in combination with the brain imaging studies, Halpern and Zatorre conclude that right-side temporal lobe activity is “both active in and necessary to the support of musical imagery tasks.”²³ Overall, the studies in cognitive psychology and neuroscience support the hypothesis that “parts of the cortex specialized for processing actual sound are also recruited to process imagined sound,” and thus that not only are the phenomenal properties between perception and imagery shared, but so

²² Halpern, Andrea, 222.

²³ Halpern, Andrea, 225.

too are their physiological underpinnings, at least in terms of brain regions.²⁴ Particular structures, especially in the right temporal lobe, seem to be shared. *This offers some support for the intuition that the experience of imagery is importantly like the experience of perception because they share causal processes.* While the fact that cognitive neuroscience is still a relatively young field may invite the objection that we are still to some extent explaining a mystery with a mystery, it is a mystery with a well developed research program behind it, a program that has made considerable progress.

The guiding presupposition behind neuroscience of musical imagery, as well as the claim that these studies confirm the existence of what we have referred to as the musical imagination, is that our understanding of the subjective phenomenology of imaging can be usefully enhanced by cognitive science, and that neuroscience can begin to explain the brain processes that support these experiences. These types of studies provide compelling evidence for links between experience and brain processes. While the philosophical discipline of phenomenology is limited by first-person point of view and by its stance of bracketing subjective experience from anything else, paying attention to the ordinary phenomenology of experience and linking it to cognitive psychology and neuroscience can compile a range of first person reports and explain the source of variation among subjects' responses to musical imagery tasks.

Theories of Musical Imagery in Psychology and their Philosophical Significance

At this stage it will be helpful to explain three different psychological theories of what the musical imagery studies could be taken to show. Psychological theories of musical imagery are classed into three categories according to the types of similarity that are claimed to hold between imagery representations and perceptual representation:

²⁴ Halpern, Andrea, 228.

functional theories, structural theories, and interactive theories (these categories were originally adapted to auditory (and thus musical) imagery from theories of visual imagery²⁵).²⁶

First, functional theories claim only that musical imagery simulates the perceptual experience of music listening in a way that preserves the relations among perceptual properties.²⁷ Any theory that argues that it is our imagery *experiences* that preserve perceptual processes, however this occurs, *without* also claiming that these properties are features of whatever storage vehicle is responsible for generating imagery experiences, is a functional theory.

Functional theories are often invoked to explain how images are used to perform cognitive tasks rather than to explain the nature of the image itself. For example, the rotational and map-scanning tasks mentioned above draw on imagery in such a way that the subjects are able to give the same answer about, e.g., the relations between the objects in the map that they would give were they looking at the actual map. Thus, imagery serves to allow the same outcome that would result from perception. In the musical analogue of the map-scanning task described above, subjects were able to mentally “scan” a song in order to answer questions about relations between lyrics and particular

²⁵ According to Brodsky et al (2003), it is a mistake to say that there is a single model of auditory imagery, since the origins for inner speech and for musical imagery might be different. Earlier research presented musical imagery as characteristic of auditory imagery in terms of the preservation of phenomenal properties; information now available about the locations of brain processing help to differentiate inner speech from musical imagery.

²⁶ I take much of this discussion from Intons-Peterson (1992) and Kalakoski (2001).

²⁷ Kalakoski, Virpi. “Musical Imagery and Working Memory.” Musical Imagery. Lisse: Swets & Zeitlinger, 2001. 44; Intons-Peterson, Margaret Jean. “Components of Auditory Imagery.” Auditory Imagery. Ed. Daniel Reisberg. Hillsdale, NJ: Lawrence Erlbaum Associates, 1992. 65.

pitches. The fact that subjects are able to perform these tasks supports functional theories of imagery, whether or not it also supports some stronger theory about the nature of the representation that generates the imagery experience, as indeed Zatorre and Halpern take them to.

Structural theories claim not only that the experience of imagery preserves perceptual properties so that they can be accessed in a manner functionally similar to that of perception, but also that there are structural similarities between the objects of perception and of imagery.²⁸ Some theorists capture this difference between structural and functional models as the difference between first-order and second-order isomorphisms.²⁹ In the auditory and musical cases, this amounts to the claim that imagery representations encode not just pitch properties, but frequency. ‘Pitch’ is a phenomenological property that captures the way we perceive the different frequencies of sound waves; i.e., as tones capable of being organized into scales. Thus, a structural theory holds that the brain encodes information about the frequencies of sounds into the memory stores which generate auditory imagery experiences. Indeed, there is evidence that the brain does encode frequency, as well as exact temporal relations (rhythm and tempo) among pitches of different frequencies.³⁰ Third, interactive models are named for the view that there is interaction between the neurological processes that support auditory perception and auditory imagery, and for the even stronger view that these processes

²⁸ Kalakoski, 44; Intons-Peterson, 66.

²⁹ An isomorphism is first-order just in case the features of one representation can be mapped onto features of the other in a one-to-one correspondence in such a way that the relations between these features are preserved. In a second-order isomorphism, the relations are preserved in a mapping of the properties that *result* from the two representations.

³⁰ Halpern, Andrea R.; Zatorre, et al..

involve shared neural mechanisms. Before the recent developments in brain imaging techniques, the evidence for such views came from studies that demonstrated that contrasting auditory stimuli interfered with imagery tasks, and that complementary auditory imagery facilitated perceptual tasks, whereas competing imagery hindered perception.³¹ Now, evidence for shared mechanisms comes from brain imaging studies. These studies are able to show that the location of imagery processing overlaps with the location of perceptual processing, leading to the conclusion that there are neural mechanisms shared in imagery and perceptual processing.³² This supports the claim that there is a causal and possibly a constitutive relationship between perceptual representations and imagery representations.

Each of these views about the nature of the physiological storage processes that underwrite our phenomenological experience of musical imagery supports the claims made in earlier chapters that imagery preserves the phenomenal properties characteristic of auditory perception (such as pitch, rhythm, loudness, and timbre).³³ That imagery preserves the phenomenal properties characteristic of auditory perception follows from experiments the primary purpose of which is to verify that precisely this preservation of

³¹ Brodsky et al (2003) provides some empirical grounding for the widespread anecdotally reported phenomenon of imagery during score reading Brodsky, Warren, Avishai Henik, Bat-sheva Rubenstein, and Moshe Zorman. "Auditory Imagery from Musical Notation in Expert Musicians." Perception & Psychophysics 65.4 (2003): 602–12.

³² Brodsky, Henik, Rubenstein, and Zorman; Zatorre, Robert J., and Andrea R. Halpern. "Mental Concerts: Musical Imagery and Auditory Cortex." Neuron 47 (7 July 2005): 9–12.

³³ I have not surveyed the literature that explicitly deals with timbre and loudness. For a discussion of loudness in imagery, see Intons-Peterson, M. J. (1980) "The role of loudness in auditory imagery." Mem. Cognit. 8, 385-93. Intons-Peterson argues that loudness can be a feature of imagined sounds, but often is not. For a discussion of timbre in imagery, see Crowder, R. G. (1989) "Imagery for Musical Timbre." J. Exp. Psychol. Hum. Percept. Perform. 15, 472-8.

phenomenology occurs in subjective imagery experiences. But the interactive view (or, as I prefer to refer to it, the “shared neural mechanism” view) also provides some support for the claim that the content of our mental images results from a causal process that transforms data about the frequency, duration, and intensity of sound waves into categorized perceptual representations. These representations are then accessible as memories or as images.

There has been extensive work on auditory and musical perception and memory that serves to show how memories are recruited in perceptual processing, and how sounds are processed by the brain into categorized representations with increasing levels of abstractness. The work of Bregman on what is called “auditory scene analysis” explains how raw sensory data containing sound waves from multiple sources is parsed into separate categorized representations for, e.g., the vocal line and piano accompaniment of an art song. Further, these representations of the two musical voices are further parsed into, corresponding to the lowest level of musical organization, individual pitches with durations, dynamics, and timbres (these are encoded at the lowest level of memory, echoic memory). Next, corresponding to higher levels of musical organization, these pitches are grouped into melodies and phrases (involving short-term memory). Long-term memory stores encode information about formal musical structures, such as sonata forms. There is some evidence that these structures are encoded in long-term memory not only as abstract categories applicable to music as it could be represented on paper by an analysis of a musical score, but also as perceptual features embodied in the live, performed version of that score.³⁴ The processes of auditory perception and memory closely interact: both long-term and short-term memory stores are activated and then

³⁴ Kvifte, Tellef. “Images of Form: An Example from Norwegian Hardingfiddle Music.” *Musical Imagery*. Ed. Rolf Inge Godoy and Harald Jorgensen. Abingdon, PA: Swets & Zeitlinger, 2001. 219–36.

recruited in the categorization processes required for the parsing of sound waves in perception.

As mentioned above, both memory processes and perceptual processes are involved in auditory and musical imagery tasks. According to Baddeley and Logie (1992), it must be only short-term and long-term memory involved in imagery, since memory at the first stage, echoic memory, "operates only in the presence of auditory stimuli, and, hence, cannot be the seat of auditory imagery".³⁵ But recalling earlier discussions of the way imagination is thought to serve perception, this means that we can think of the processing that takes perception from echoic memory to short term memory as the constructive imagination, and we can think of the reproductive imagination as that which is associated with imagery experiences and other standard imaginative thoughts.

Because perception requires cognitive processing of raw sensory data according to whatever existing perceptual and conceptual categories the brain currently possesses, it is the presence or absence of relevant *musical* categories that account for the wide variation of imagery experiences. Thus, a person who has had sufficient exposure to Western tonal music to form perceptual categories that represent scales and harmonies will be able to encode Western melodies in a way that is sensitive to the tones and intervals found in this music. However, a Western listener may not be able to encode the microtonal scales of Indian or Indonesian music, and would need training and exposure in order to become perceptually sensitive to these musical categories. Insofar as aesthetic features of music supervene on perceptual features, repeated perceptual exposure to the musical categories of a culture are a prerequisite for understanding and appreciation.³⁶

³⁵ Baddeley, A., and R. Logie. "Auditory Imagery and Working Memory." *Auditory Imagery*. Ed. Daniel Reisberg. Hillsdale, New Jersey: Laurence Erlbaum Associates, 1992. 179–97.

³⁶ I do not wish to defend the claim that all aesthetically or artistically relevant features of music are perceptual features, only that some are. It is likely that many

Musical Imagery and the Constructive Imagination

Due to the interrelationships between auditory perception, memory, and imagery, it is possible to better understand how imagery plays a role in music perception. Recall from chapter one that Thomas Miller speculated that something like the Kantian constructive imagination must be at work if we are to understand music in a way that is organized into music-theoretical categories over time. Further, Roger Scruton claims that some kind of imaginative hearing (or hearing-as, involving not concepts but perceptual categories) is required for us to hear music as music at all. It turns out that the empirical findings can support the claim that there is something like the constructive imagination involved in music perception. Musical imagery is recruited by perceptual processes that allow listeners to anticipate future sections of compositions while listening. That is, the experience of “following along” requires anticipatory imagery. This accounts for the difference we experience when listening to familiar versus unfamiliar music. Further, it explains how an unfamiliar piece in a familiar musical language (i.e. the style of Mozart) will be easier to follow than something in a new musical language.

Janata (2001) divides musical imagery into two categories according to the contexts in which they occur.³⁷ The first, which he calls ‘non-expectant’ imagery, is imagery that occurs in the absence of any live musical stimulus. The second, ‘expectant’ imagery, refers to the stored images the brain draws upon in order to follow along with a

aesthetically or artistically relevant features result from the cultural context in which a piece is both composed (or generated, if not a composed work) and appreciated. This fact does not obviate an analysis of the perceptual features of music and their cognition.

³⁷ Janata, Petr. “Neurophysiological Mechanisms Underlying Auditory Image Formation in Music.” *Musical Imagery*. Ed. Rolf Inge Godoy and Harald Jorgensen. Lisse: Swets & Zeitlinger, 2001. 27–42.

live piece of music while anticipating the portions of music that will come next. The first sort of imagery involves only long-term memory stores, while the second requires the interaction between memory processes and live perceptual processes.³⁸ Thus far, the primary type of imagery under discussion has been ‘non-expectant’ imagery, which we have been considering a type of auditory imagery, which in turn is a type of sensory imagination. ‘Expectant’ imagery, however, can also be considered as a type of imagination: the constructive imagination.

‘Expectant’ imagery performs some of the functions ascribed to the constructive imagination. As was explained in Chapter 1, the constructive imagination refers to the mind’s ability to parse streams of perceptual stimuli into formats that it can cognize. Once a representation of a perception has been formed, it is the reproductive imagination that draws upon the stored representation, either recalling it as a memory of the previously experienced event, or using that representation as a representation type, such that it can be used in an imaginative event, either of imagery or of a fictional scenario. But it is the constructive imagination that recruits previously structured and stored material to structure new perceptual stimuli. Thus, the empirical literature supports the claim that musical imagination is a form of sensory imagination and encodes specific auditory phenomenal properties. But it also supports speculative philosophical claims that the imagination plays a role in musical understanding and basic listening. This imagination, however, is the constructive imagination. Yet it is closely related to the sensory imagination, in the case of perceptual processing, because the ‘expectant’ imagery recruited in anticipatory listening is imagery that encodes perceptual features.

Conclusion

³⁸ Janata, 28.

This chapter has presented empirical work in cognitive psychology and neuroscience on musical imagery in order to link the insights gained from the phenomenological investigation of Chapter 2 with the psychological and neuroscientific facts of perception. This chapter also addressed past ontological objections to imagination as imagery, both those of Gilbert Ryle and those arising from the mental imagery debate in cognitive science. The strategy was to show that the traditional objections to mental imagery do not defeat the idea of the sensory imagination, and to show that the recent scientific results support the characterization of the sensory imagination as presented in earlier chapters.

CONCLUSION

The phenomenon of musical imagery is widespread. It is not limited to a select group of gifted composers, such as Mozart, who are able to have images of entire orchestras in their head. Nor is it limited to professional or even amateur musicians, who often use imagery when learning new pieces or when mentally “rehearsing” how a performance ought to go. Anyone who can voluntarily imagine the tune of the national anthem can have musical imagery. But musical imagery is not always voluntary: the familiar experience of having a tune stuck in one’s head is a highly prevalent form of involuntary musical imagery. Further, musical imagery seems to be related to other kinds of imagery and imagination that are equally widespread. Having musical sounds in our heads seems just as ordinary as picturing trees, or as imagining scenarios of which musical imagery might be a part. No doubt young people all over the United States imagine their wedding days, including imagery of the ubiquitous wedding march in their fantasy.

The philosophical questions raised by musical imagery are various. Some of these questions are classificatory: Is musical imagery a form of musical imagination? If so, what is the relationship between musical and auditory imagination? Are both musical and auditory imagination types of sensory imagination, or could they also be considered as other types of imagination? In addition, there are questions about the nature of musical imagery. These include questions about the phenomenological characterization of imagery experiences, as well as conceptual questions about the content of imagery and the ontological status of the image. Additional questions involve the applications of musical imagery, including its role in the practice of music and in musical understanding.

Chapter Summary

The central task of this dissertation was to begin to address the neglect of these questions in the philosophical literature. I began in Chapter 1 by situating musical imagery in the context of the imagination literature, in order to demonstrate that musical imagery should be thought of as a type of sensory imagination. I surveyed historical and contemporary views, identifying several main types of imagination: the sensory or perceptual imagination, the constructive imagination, the creative imagination, and the propositional imagination. I also discussed the existing treatments of imagination in the philosophy of music literature, arguing that most philosophers of music have focused on the propositional imagination or the notion of “hearing-as”.

In Chapter 2 I presented an investigation of the phenomenology of musical imaging, in order to identify features of experiences of musical imagery that any analytic treatment should respect. I contrasted my imagery experiences with those of phenomenologists Don Ihde and Edward Casey, demonstrating the variability of abilities in musical imagery. Drawing on the (likely apocryphal) account of Mozart’s imaginative abilities, I emphasize the temporal nature of musical imagery, as well as claiming that the detail and frequency with which one imagines music is likely a function of musical memory, and of past musical experience and training. Indeed, there is little difference between remembering how a piece goes and imagining that piece.

I argue in Chapter 2 whereas visual imagery is often perspectival, auditory and musical imagery is usually experienced as “inside one’s head.” I also argued that musical imagery shares many of the phenomenological properties of hearing sounds, such as pitch, timbre, and loudness, but that these properties are typically less detailed than they would be in perception. Many people are able only to “hear” the shape of a melody, as opposed to its exact pitches. Often, musical imagery occurs all at a neutral,

medium range as opposed to in full dynamic range. So too the subtle shadings of the timbres of the orchestral instruments are lessened in imagery.

It is not just that musical imagery is “less vivid” than perception, as Hume famously noted, but that the specific phenomenal properties registered in hearing are degraded in predictable and systematic ways. This point is related to the point made by Daniel Dennett that a visual image of a tiger is often indeterminate, in that we can have an image of the tiger as striped without representing a specific number of stripes. My additional point, however, is that auditory imagery is less accurate in each phenomenal property represented, and in systematic fashion. However, this is not a fixed feature of our imagery experience; as we attempt to make our images more detailed by paying attention to subtleties of phenomenal properties, we are able to have more accurate imagery. This is not a matter of mere choice, but of practice.

It is worth briefly commenting on my use of the term “ability” to describe our musical imagery capacities. What is at stake in choosing “ability” over “capacity” or “skill”? It is likely that a person’s musical imagery experiences are limited by innate capacities, but I think it less likely that the accuracy of one’s musical images is fixed at birth. Rather, experience indicates that the more one attempts to accurately recall pieces of music, to rehearse them internally by accurately “hearing” the nuances of pitch and rhythmic timing, the more one is able to do this successfully. This seems to be the case with motor imagery as well: professional dancers and athletes report using highly detailed imagery of the complicated movements they must execute in future performances or competition, but it is likely that the ability to imagine these movements developed along side the ability to perform them. Thus, though there may be a sense in which musical imagery is a capacity, because this capacity must be developed, it is best to refer to abilities over capacities.

However, there is indeed a sense in which the exercise of musical imagery is a skill in addition to an ability. Again, for those who have little imagery in music, the

comparison to applications of motor imagery may be more useful: accurately imagining the movements one has to make to execute an effective serve in tennis may aid one's tennis game, but typically a person will have to practice the act of imagining itself for some time before one notices that imagery techniques have any marked benefit to execution.

In Chapter 3, I apply the results of the phenomenological investigation of Chapter 2 to several existing discussions of the content of sensory imagination. I claim that the phenomenal properties shared in hearing and auditory imagery are the "specific imaginables" of auditory imagery. I also claim that auditory imagination should not be identified with imagining hearing, contra Martin and Peacocke, because auditory imagery in the typical case is not perspectival, and because it lacks the phenomenal properties that are experienced in hearing. In order to use auditory or musical imagery to imagine *that* one is hearing, one has to imagine that it is true of one's imagery that it has the qualities of actual sounds. This is an act of propositional imagining, which I claim cannot by fiat supply properties in imagery experience that one is incapable of generating in imagery.

Further, I reconcile my earlier claims that auditory images are not identical with sounds, and that imagining music is an instance of auditory imagination with views about the ontology of both music and sounds. One might ask how we can imagine sounds if sounds are not in our heads; further, one might ask how we can imagine music, if, as many philosophers believe, music is dependent on sound if not actually identical to it.

On my view, sounds are mental entities that result from the interaction of acoustic stimuli and the auditory system; the properties of sound waves--frequency, intensity, and overtone profile--correspond to the response-dependent properties of sounds--pitch, loudness, and timbre. I argue that while auditory images are also mental entities that are characterized by pitch, loudness, and timbre, it is the causal process involved in perception, storage, and retrieval that is responsible for an auditory image being an image *of* a sound while not being identical to a sound. Again, I appeal to the systematic

transformation and degradation of the range of properties in sounds as opposed to images of sounds in making this distinction.

Once I have established how images can be of sounds while not being sounds, I am able to explain how we can have imagery that is *of* music without actually being equivalent to music sounds as heard in live or recorded performance. In addition, I consider a different version of musical formalism, one that holds that music is actually the abstract structure realized by the sound, not sound itself. On this view, one might claim it is unnecessary to use the sensory imagination to imagine music; one can simply imagine abstract musical structures directly. I argue that while I am not sympathetic to this ontological view of music, if it is possible to hear music structures through hearing sounds, it is also possible to imagine musical structures through imagining sounds.

The final point I make in Chapter 3 is that whether or not one considers the content of musical perception and imagination to be conceptual or non-conceptual depends on how one classifies the perceptual and music-theoretic categories responsible for hearing *music* as opposed to mere disorganized sounds. I claim that it is important to think of these categories--i.e., categories for scales, chords, melodic patterns, and so on--as perceptual patterns. In addition to perceptual patterns we may apply abstract mathematical ideas of musical relations to our listening, and we may also apply the music-theoretical terms that denote the perceptual patterns that we hear. But it is only these latter two items that are unarguably conceptual; on some views of concepts, one might argue that perceptual patterns are non-conceptual. What matters for my purposes is ultimately not whether we must claim that the contents of perception are conceptual or non-conceptual, but that we respect the auditory nature of the structural patterns used to parse sounds into ordered music.

In Chapter 4 I present recent research in cognitive psychology and neuroscience on musical imagery, arguing that it supports and gives empirical grounding to my phenomenological claims. I present this information in the context of a discussion of the

ontological problem of the image. I do this in order to clarify the distinction between the nature of our imagery experiences and the characteristics of the mental representations (or processes) that support these experiences. Past philosophical arguments have addressed the conceptual incoherence of having actual pictures in the mind, and of having an internal organ that would “view” these pictures. Some philosophers, as well as some behavioral psychologists, have argued that due to the privacy of imagery experiences it is futile to discuss their causes, and that discussion should be limited to how they are used, or how they are described.

I argue that especially with the progress of research in neuroscience, which builds upon several decades of work in cognitive psychology, it is no longer futile to attempt to explain the causes of musical and auditory imagery. Evidence from behavioral studies supports the intuition that whatever storage format the brain uses to store auditory images, these images are stored with accurate information about the phenomenal properties of pitch and rhythm. Accessing auditory imagery seems to involve something like the revival of a previously experienced auditory perception, and does not seem to involve the mediation of linguistic categories. Evidence from neuroscience that imagery takes place in brain locations shared with auditory perception, and distinct from verbal processes, further confirms our pretheoretical intuitions that the experience of imagery is like the experience of perception.

Thus, I take this final chapter to provide evidence that supports the conceptual claims made in Chapter 3 by linking phenomenology and empirical research. I do not claim, however, that this evidence amounts to a discovery of an organ called the “mind’s ear”, or to the discovery of imaginary sounds in our heads. Rather, I take the research to explain, if only in a preliminary way, the causes of some of the functions we infer that the mind must perform if we are to have subjective experiences of the type we believe ourselves to have.

Some Methodological Choices Addressed

The methodology of this dissertation was to approach the topic of musical imagery from four angles: first, from the point of view of the intellectual history of the imagination; second, from the point of view of phenomenology; third, from an analytic or conceptual point of view; fourth, from the point of view of cognitive psychology and neuroscience. While I found this approach to be necessary for several reasons that I will illustrate below, those philosophers who might think only a conceptual approach is necessary could raise methodological objections against each of the other three chapters.

First, one might argue that if the phenomenon under discussion is imagery and the idea of a “mind’s ear”, it is sufficient to treat this topic only in these terms, and not to make the more problematic move of situating imagery within the broad and varied field of imagination. Instead of speaking of the imagination, one might simply speak of something the mind does that results in experiences of musical imagery.¹

I chose the more difficult task of addressing musical imagery in the context of the intellectual history of the imagination primarily because I find it necessary to consider the history of a concept in order to fully understand it. In this case, the results of a foray into intellectual history show that there are interrelated mental functions and activities that have been referred to as the “imagination” over the centuries. If it were just a matter of several unrelated things being called by the same name, there would be little benefit to simply making a list of all these things for the sole sake of being comprehensive. Likewise, if it were possible to find out that we had been thoroughly misguided about the nature of the imagination, and we now have a clear characterization, either philosophical or scientific, that shows us what the imagination is *really*, combing through intellectual

¹ I credit this objection to Peter Kivy.

history would be no more useful than a discussion of the four humours in the context of our current medical understanding of the circulatory system.

The imagination is not like either of these examples of useless applications of intellectual history. The term “imagination” has picked out functions that are related for the very reason that the concept itself has evolved through extensions of its then central application. For example, “imagination” in the Latin *imago*, and the Greek counterpart *phantasia* refer to both images and appearances, and so in the application of the term to the mental domain, the original sense of imagination includes the having of mental imagery or internal mental pictures. But the idea of an internal picture is sometimes taken to be simply a mental representation. Thus, the term “imagination” can refer either to the mental experience of imagery, something that takes place in conscious experience, or to the storage of categorized information, which is a sense of imagination that became prevalent in the early modern period. This is a natural extension of usage, not an arbitrary reapplication of a term.

Taken from the point of view of mental functions and activities, however, it is an empirical question whether there is some single entity, the imagination, responsible for imagery experiences and the processes involved in mental representation. It is plausible to think that there is some relationship between imagery and memory storage, but it need not follow from the existence of this relationship that because the term “imagination” covers both these functions that there must be single mental faculty that produces mental images.

Despite this point about empirical investigation into mental functions, it is reasonable to now refer to *each* of the mental functions previously named by the term “imagination” as a type of imagination. It is likely that the current phenomenon of imagery in humans hasn’t changed. If it has, we can do little more than apply our current understanding of our subjective imagery experiences to what we take to be past descriptions of *phantasia*. So, if auditory imagery is one thing that imagination has long

been thought to include, it is necessary show the relationship between imagery and the other current uses of the term imagination, since this usage has evolved in a traceable fashion from its Greek origin, and this is what I take myself to have done in Chapter 1. In addition, I note that it is unlikely that a philosopher could bring about the discontinuation of the use of the term “imagination” as applied to musical imagery, which provides further motivation to clarify in just what sense musical imagery is a kind of imagination.

Turning to the justification of my use of phenomenology, I appeal to the threefold description of musical imagery--phenomenological, conceptual, and empirical--and argue that none is sufficient on its own. The arguments for the conceptual, analytic, and criterial claims made in Chapter 3 rely heavily on intuitions about the subjective character of perceptual and imaginative experience, as such arguments typically do. I use the results of Chapter 2 in combination with the results of the studies reported in Chapter 4 in order to mitigate accusations of mere intuition-mongering or of idiosyncrasy. Chapter 2 provides an extensive and systematic description of the phenomenology of auditory and musical imagery that compares that phenomenology to that of perception and hallucination, as well as to imagery in other modalities. It draws on the subjective reports of others as well, it is for these reasons more difficult to dismiss than are isolated intuition about auditory imagination typically made as asides in the context of an argument about sensory imagination heavily focused on vision. As mentioned above, Chapter 4 serves to ground these intuitions in scientific work. In addition, both the phenomenological and empirical literature provide an account of the range of auditory imagery experiences, something than cannot be done through a single person’s intuitions.

What philosophical purpose does it serve to show that there is a neural connection between perceiving and imagining, and a lack of necessary connection between imagery and both language and concepts? Musical sounds, especially pitches of instrumental

sounds, are not the sorts of thing that we can comprehend through multiple sense modalities. If we are to imagine musical sounds, and not just *that* there are musical sounds, or that something is true of a musical sound, this imagination must be perceptual, and it must be specifically auditory. It is not enough to say, as some have done, that imagination is simply supposition, or pretend belief. This opens the way for specifically perceptual cognition, and demonstrates that the propositional imagination cannot coherently explain imagined content that has a perceptual, and not propositional, structure.

Thus, shedding light on the neural underpinnings of auditory imagery provides support for the claim that there is something that performs the functions of the musical imagination, and elucidates an important component of the musical listening experience. Auditory memories seem to be stored as past auditory percepts, and can be recalled in a way that reproduces the pitch and temporal details of the original auditory experience. Zatorre and Halpern review evidence that suggests that it is plausible to think that composers who report “hearing” their compositions internally are drawing on the same capacity for auditory imagery used to rehearse a remembered piece of music.²In addition, gifted composers are likely to have this capacity developed to a high degree—a link between one sort of imagination and creativity. Musicians who “rehearse” pieces internally are also reporting vivid imagery experiences. Hearing a piece that one already knows involves reviving an auditory image of that piece, drawing upon memory stores that function as a kind of constructive imagination.³ All of these are functions of the imagination as that concept developed in the 18th century.

² Zatorre, Robert J., and Andrea R. Halpern. “Mental Concerts: Musical Imagery and Auditory Cortex.” *Neuron* 47 (7 July 2005): 9–12.

³ Huron, David. *Sweet Anticipation: Music and the Psychology of Expectation*. Cambridge, MA: MIT P, 2006.

In addition, these studies can contribute to our understanding of musical appreciation. Cognitive neuroscience demonstrates that musical capacities are highly variable, and that both listening to and performing music seems to alter the very structure of the brain.⁴ Arguably, what is happening is the formation of aural/musical categories for the components of music as well as for entire compositions. As a result, it may not be advisable to give a univocal philosophical account of musical understanding. This variability in musical imagery capacities might explain why non-experts tend to understand music through various non-musical aids, while highly trained musicians and musical formalists insist that it is improper to summon visual pictures to accompany one's experience of purely instrumental music. Further, if it is the case that the musical ability relevant to music listening can be developed later in life, then those who insist on formalist listening are not asking the impossible. If, however, there are limits to what listening capacities many people can develop, whether or not audiences appreciate complex, abstract, atonal music is not merely a matter of conservative or progressive tastes. Rather, most people simply have not developed the musical categories needed in order to hear this music as coherent, let alone enjoyable.⁵ The studies and results discussed in Chapter 4 demonstrate that cognitive neuroscience can help determine whether philosophical paradigms of music listening are consistent with physiological facts about the psychological processes that underwrite our engagement with performances of musical compositions, and, as a result, contribute to aesthetic issues related to musical understanding and appreciation.

⁴ Pascual-Leone, Alvaro. "The Brain that Makes Music is Changed by It," in The Cognitive Neuroscience of Music, eds. Isabelle Peretz and Robert J. Zatorre (Cambridge, MA: MIT Press, 2007), 396-409.

⁵ Huron, David. Sweet Anticipation: Music and the Psychology of Expectation. Cambridge, MA: MIT P, 2006. 344.

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