Music, Metaphor, and Creativity

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Abstract
Research in cognitive linguistics over the past three decades has contributed much to our understanding of processes of meaning construction, and to the role mappings between different domains play in the imaginative resources manifested through metaphor and metonymy. In this chapter I explore how meaning construction is shaped when one of the domains involved in such mappings involves patterned non-linguistic sound—that is, music. Mappings of this sort challenge (in a helpful way) some of our basic presuppositions about processes of meaning construction (since they suggest that "meaning" can be built up either wholly or in part through extra-linguistic means) and point to uniquely creative resources for human expression. My exploration of cross-domain mappings that involve music will be illustrated by examples drawn from a variety of genres (including oratorio, Hindustani raga, and the symphony) and will consider how musical utterances offer unique resources for the construction of meaning and thus for creativity.

Introduction

A musical bestiary

Let me begin with a musical example that will illustrate some of the key issues circulating around music, metaphor, and creativity. The short musical passage shown in Figure 1 comes about two-thirds of the way through No. 21 of Joseph Haydn's oratorio *The Creation* (a work that was premiered in April of 1798). The text for the oratorio was assembled by Baron Gottfried van Swieten from portions of Genesis and the Psalms, and included lines reworked from Milton's *Paradise Lost*; in the part of the oratorio in which No. 21 occurs the focus is on the spectacle of God filling the world with life. Just prior to No. 21 Haydn had built up to a grand chorus (in No. 19) that reflected on the sublime wonder of God's work, and had set the stage with a brief recitative (in No. 20) in which the angel Raphael described the command through which God caused the earth to be populated with creatures of every kind. Now, in No. 21, Raphael describes the result: in the opening bars of the movement we are introduced to the lion, the tiger, the stag, and the horse, the character of each animal made clear by Haydn's musical accompaniment. Over the course of these introductions the flow of events has been rather uneven: although the overall tempo is marked as fast ("Presto"), Haydn's strategy has been to provide first an aural depiction of the animal—the roars of the lion, the leaps of the tiger, the bounds of the stag—followed by a short section of recitative that fills out the picture with a verbal description, such that the music moves by fits and starts. The music has also shifted between keys, with the number opening in B♭ major, shifting to A♭ major, and then moving on to D♭ major, all in little over a minute. It is at this point that the music shown in Figure 1 is heard: the tempo is now a relaxed "Andante," the key changes to A major

(rather distant, harmonically, from D♭ major), and the roars of the lion or bounds of the stag have been replaced by a lilting melody in six-eight time, played by the flute. So what animal might this be?

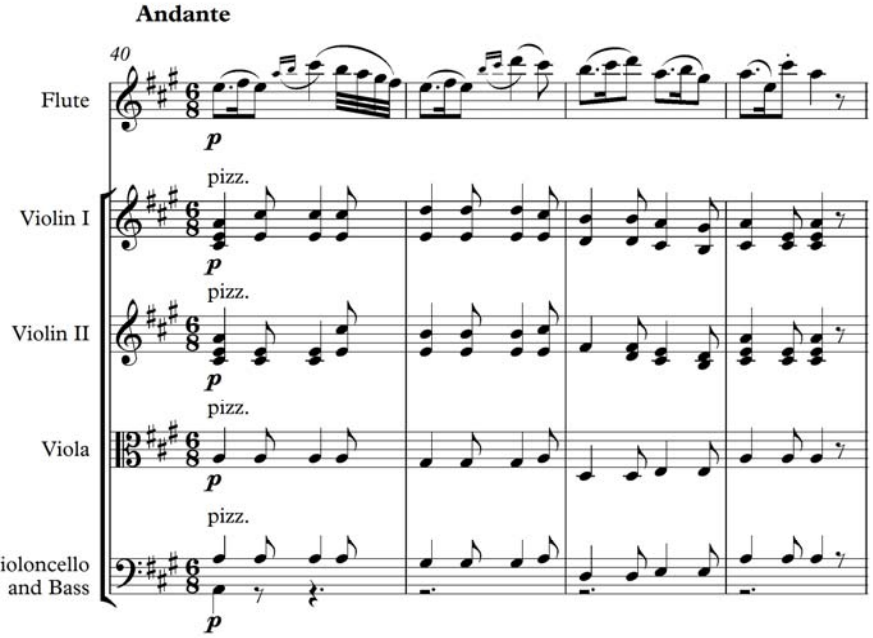

Figure 1: Joseph Haydn, *The Creation*, No. 21 (recitative), "Gleich öffnet sich der Erde Schoß" ("Immediately the earth opens her womb") bars 40–43

Allow me to speculate on how two sorts of listeners might respond to this question. The first listener is one not acquainted with Haydn's music but who perhaps knows a little bit about the musical practice of late eighteenth-century Europe, a practice that yielded the music we now call "Classical" (as distinct from the music we call "Baroque" or "Romantic"). That listener would encounter music which is quite orderly: the accompaniment provides a regular rhythmic pattern, the harmonies follow one another in a predictable way, and the melody progresses by easy stages, with bar 41 building on and expanding bar 40, and bars 42 and 43 providing a satisfying riposte that culminates in a graceful arrival. In terms of the sonic materials through which this order is expressed, there is a pleasant contrast between the fluid, clear voice of the flute and the subtle pulses created by the pizzicato strings. As a whole, then, the music shown in Figure 1 sets up a relatively relaxed, perhaps even contemplative musical environment, one that conforms with safety and security rather than danger and drama: my imaginary listener would thus understand that this is music meant to represent some sort of domestic animal. My second imaginary listener is one more familiar with the musical language of Haydn and his peers. This listener would almost assuredly recognize that Haydn has provided us with an example of a siciliana, a musical type which first emerged in the seventeenth century as a species of dance and which, by the end of the eighteenth century, was firmly associated with the legend and mythology of pastoral scenes. For this listener there is no doubt about what animals are being summoned: these are animals of the pasture like cattle and sheep, an inference confirmed by Raphael's next words. And so while both listeners would recognize that Haydn (and van Swieten) had moved from thrilling and perhaps dangerous animals like the lion, tiger, and stag to creatures altogether more placid, only the second listener would have a definite idea about what sort of animal was being depicted.

The different kinds of meaning to which the music of Figure 1 might give rise—approximate for one listener, rather more exact for another—hint at the ways sequences of musical sound may shape the understanding. The first type of meaning is driven primarily by material properties of the sounds themselves—the pitches they comprise, the arrangement of these pitches over time (that is, their rhythmic disposition), and the instruments that give voice to these sounds—while the second type is largely conventional. I would like to propose that, in both cases, the attendant thought processes are shaped by the way musical sounds are organized. Put another way, the modes of thought prompted by music—and this includes conceptual metaphors activated by musical passages like Figure 1—reflect the ways sequences of patterned nonlinguistic sound are shaped into musical utterances.

Fleshing out this proposal will, of necessity, require a bit of groundwork. The preponderance of the work done on conceptual metaphor has focused on language, and although there are studies of the way conceptual metaphors are manifested in descriptions of music (reviewed in Zbikowski 2008) there is relatively little work that focuses on musical utterances as a *basis* for metaphorical thought. To demonstrate this, especially in written form, requires using language to describe a mode of communication that is, in fundamental respects, independent of language. To get a sense of what such descriptions may offer and what they may fail to capture, let me offer an approximate illustration with an example taken not from music, but from sonic materials developed in the course of research into speech perception.

Sine-wave speech and words about music

As a means of exploring just what features of human language were essential for the comprehension of speech, in the early 1980s Robert Remez and his colleagues developed a form of artificially degraded speech called sine-wave speech that captured only a small amount of the information from the normal speech stream (Remez, Rubin, Pisoni, & Carrell, 1981). To do this, they analyzed a recording of normal speech and then generated time-varying sinusoids to match the center frequencies and amplitudes of the first three formants. This created a replica of the core features of the original utterance, but without any of the local details that typically distinguish speech. The result of manipulations such as these sounds like a random sequence of whistles and bleeps—listeners often describe it as something they might hear in a science fiction movie. At this point, I would encourage the reader to visit http://www.mrc-cbu.cam.ac.uk/people/matt.davis/sine-wave-speech/ to experience sine-wave speech firsthand, which can be done by clicking on the first loudspeaker icon on the page.

On their first encounter, most listeners find examples of sine-wave speech to be pretty much unintelligible. What is remarkable, however, is what happens after listening to the original utterance (which can be done by clicking on the next loudspeaker icon on Matt Davis's web page). Listeners who then return to the sine-wave replica of the utterance typically find that it has become quite intelligible: the random sounds have resolved themselves into a meaningful unit of speech. Most of us would be hard-pressed to describe the salient aspects of the sine-wave replica—which, again, sounds to most listeners like a succession of random whistles and bleeps—yet after hearing the original utterance it becomes clear that there is indeed a coherent structure to the replica (revealed through our ability to comprehend the linguistic utterance from which it is derived). The situation presented by sine-wave speech, then, provides a rough approximation of the challenge of coming to terms with a musical utterance: although, with patience, we may be able to describe some of the salient features of such an utterance (just as we might for an example of sine-wave speech), such a description would fall far short of the experience of actually comprehending the utterance.

Again, I offer this example as an illustration of the challenge of coming to terms with an unfamiliar sequences of sounds (whether those sounds be related to language or to music). In what

follows I will do my best to describe as accurately as possible the salient features of various musical utterances and to explain how they might serve as a basis for metaphorical thought—that is, I will use words to try to describe a mode of communication that, from a linguistic perspective, is unintelligible. As would be the case with linguistic descriptions of sine-wave speech, these descriptions will be, at best, approximate guides to the relevant features of the musical utterances with which I shall be concerned; as with the example of sine-wave speech, much can be learned by becoming acquainted with the utterances themselves.

Metaphor, analogy, and metonymy

One of the strategies I shall use to ground my accounts of musical utterances will be to approach the resources they offer for meaning construction from the perspective of a process related to but distinct from metaphor: analogy. Within the literature, the boundary between analogy and metaphor is at times fuzzy: researchers on metaphor have tended to ignore analogy, and researchers on analogy have tended to view metaphor as simply a particular species of analogy. In my recent work on musical grammar I have nonetheless found it productive to distinguish between analogy and metaphor, not least because analogy offers a useful way to think about processes of meaning construction that are independent of language. From this perspective, then, the connection between a sequence of sounds such as that illustrated by Figure 1 and the image of a peaceful animal (or simply a peaceful situation) relies on a capacity for making analogical connections between sounds and other phenomena. I believe this capacity can then serve as a resource within more complex networks of knowledge of the sort typically accessed through conceptual metaphors and which are deeply connected with creative thought.

A related matter concerns the relationship between metaphor and metonymy. In the simplest terms, metonymy can be thought of as a process of intra-domain mapping in which a part gives access to a larger whole (Kövecses & Radden, 1998). On closer inspection, however, metonymy offers additional resources for communication, not least because the relationship between part and whole can be wonderfully complicated (Langacker, 1999, pp. 62–67, 198–200). As it happens, part-whole relationships—if of a rather different sort—abound in musical practice. One example is provided by theme and variations form (which was especially common in Western music of the eighteenth and nineteenth centuries), in which individual variations point both to the theme and to the work as a whole. Another example is provided by the involved instrumental displays of many jazz musicians, which often make scattered reference not only to prominent features of the main tune over which they are improvising but may also quote characteristic snippets from other tunes. Indeed, musical utterances can be seen to offer a range of interesting and possibly unique uses of metonymy, and thus invite further reflection on the basic phenomenon of part-whole relations in the service of meaning construction.

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As will emerge, I regard the production and reception of music as inherently creative acts—that is, productive of novel and valuable thought—not least because making sense of a musical utterance requires an act of the imagination through which patterned nonlinguistic sound is endowed with an immediate if ephemeral meaning. To be sure, there is not equal novelty or value in all musical utterances, but my concern here will be less with developing a metric for evaluating these features as it will be with developing an account of how musical materials are arranged to create possibilities for the construction of meaning that engage with metaphorical and metonymic thought.

In the first section that follows I shall offer a brief summary of research on analogy and show the part analogical thinking plays in our understanding of musical utterances. In the second section I shall explore the relationship between analogy and metaphor, and sketch how musical

utterances can provide a basis for conceptual metaphors. In a third section I shall take up the matter of musical metonymy, and in a concluding section I shall offer some summary reflections on music, metaphor, and creativity.

Analogical Thought and Musical Understanding

Another animal in the bestiary

As a way to set out more clearly the issues with which I shall be concerned, let me turn to another passage from No. 21 of *The Creation*, one that occurs just a moment or two before the one I have already introduced. This bit of music, shown in Figure 2, occurs immediately after the lion has been introduced (with low-register trills simulating his roars), and in it Haydn aims to summon the leaps of the tiger (the next animal in van Swieten's compressed bestiary). There is not really anything like a melody in this passage, only a sequence of brusque upward strokes that outline an A♭ arpeggio (in the upper strings, from A♭3 to the arrival on the E♭4 of bar 14, then from C4 to the A♭4 of bar 15, and finally from E♭4 to the C5 of bar 16), an ascent that is replicated in compressed form by the

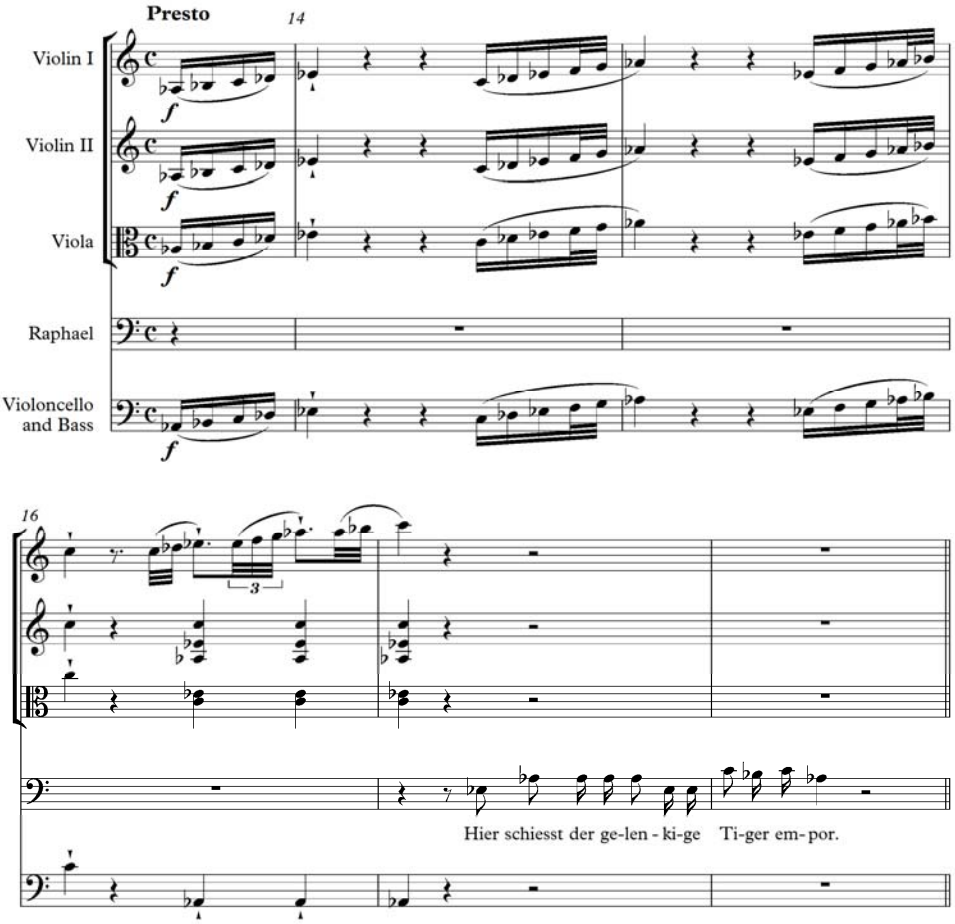

Figure 2: Joseph Haydn, *The Creation*, No. 21, bars 14–18. Text translation: "Here the supple tiger springs upwards"

first violins in bar 16. There is also not much by way of rhythm: to be sure, we are led forcefully to the downbeat of each bar, but it is only with the regular quarter-note chords of bar 16 that rhythmic progress takes on any discernible order. And with respect to harmony, the passage is quite static, simply prolonging an A♭ chord for its duration.

In their accounts of passages like this one, music scholars have typically availed themselves of the notion of "tone painting," through which a sequence of musical sounds is understood to represent, or "paint," a striking visual image. Thus the music of Figure 2 would be regarded as painting a picture of the tiger. Although such extramusical effects have long been appreciated for their novelty, they have also been deprecated as a sort of *tromper l'orielle* not worthy of accomplished artists. Indeed, Haydn himself, in a letter from 1801 in which he commented on similar effects in his later oratorio *The Seasons*, characterized this sort of effect as "Frenchified trash" (Haydn, 1959, p. 197). That said, while it seems quite natural to correlate sequences of sounds like those shown in Figure 2 with sudden, energetic movements by a tiger—and it is worth noting that, whatever Haydn or anyone else may have said about such tone painting, its success was broadly acknowledged—just why this should be so is somewhat difficult to explain. After all, within the natural world sudden energetic movements do not, as a rule, yield sounds anything like those produced by Haydn's orchestra—indeed, the leaps of most successful predators are largely soundless. The explanation typically given during the eighteenth century, which is that the musical sounds mimicked sounds that could be heard in nature (Dubos, 1748, pp. 360–361), will simply not do. A better explanation is provided by research on analogy, which suggests that humans' ability to correlate sound sequences with phenomena that might themselves be soundless relies on a cognitive capacity for analogical thought, a capacity that, in its fullest form, appears to be unique to the human species and that is connected with the kind of novel and valuable thought that characterizes creativity (Hofstadter & Sander, 2013).

Research on analogy

Most discussions of analogy begin with similarity, since it is the similarity of one thing to another that forms the basis for any analogy. For instance, a pen and a pencil are similar to each other both in appearance and in function, although the kind of marks these tools make on a writing surface (permanent or impermanent; of relatively consistent coloration or subject to gradation) are different. Analogy takes as its point of departure similarity judgements of a more abstract sort. For example, a finger is analogous to a pen in that it is an approximately cylindrical structure that ends in a point; unlike a pen or pencil, however, the finger leaves no discernible marks on the writing surface and its "cylinder" is firmly attached to the larger structure of the hand. Making the analogy between a pen and a finger, then, involves drawing structural correlations between the two: the cylindrical shape of the pen maps on to the shape of the digits of the finger, and the point of the pen maps on to the tip of the finger. With the analogy in place, we can imagine using a finger to "write," or a pen as an extension of our hand. More generally, analogies involve mapping systematic structural relationships between a source domain (such as that which includes writing instruments) and a target domain (such as that which includes bodily appendages) for the purpose of extending knowledge from the source to the target, and—in at least some instances—from the target back to the source (Gentner, 1983; Gentner & Kurtz, 2006; Holyoak & Thagard, 1995, chap. 2; Holyoak, 2005).

It bears emphasis that analogy is not simply about correlating elements from one domain with elements in another domain but about mapping relationships between these domains. It is thus often described as concerned with relations among relations (or "second-order" relations): in the analogy between a pen and a finger, for instance, the relationship between *pen* and *finely tapered device*

for delivering ink (by which I mean the business-end of the implement) is correlated with the relationship between *finger* and *tapered appendage for guiding communication*.[1] And so, while other species are able to make some very sophisticated similarity judgments—there is research suggesting that chimpanzees can understand the second-order relations basic to analogy (especially for spatial reasoning; see Oden, Thompson and Premack 2001, and Call and Tomasello 2005) and that bottlenosed dolphins can perform sophisticated body-mapping analogies (Herman, 2002)—current evidence indicates that no other species comes close to making or using analogies with the facility and speed of humans (Gentner, 2003; Holyoak & Thagard, 1995, chap. 3). Of equal importance for human communication and reasoning, this capacity appears to be available from a very early age: children as young as ten months are able to solve problems by analogy, and by the age of three years analogical abilities are quite robust (Goswami, 1992; 2001; Gentner, 2003).

Analogical thought and tone painting

I would like to propose, then, that we hear the leaps of van Swieten's tiger not by chance but because of our ability to draw analogies between sound sequences and movements (or, more generally, between disparate domains). To create a sonic analog for the energetic actions of this powerful animal Haydn carefully organized his musical materials to provide correlates for the distinctive features of such actions. The rapid upward strokes in the strings correlate with the continuous movement of a leap; the overall ascent in register and expansion of the interval spanned by the upward strokes (from a perfect fifth in bars 13–14 to an octave in bars 16–17) correlate with a succession of larger and more energetic leaps; the silences introduced by the notated rests correlates with the moments of repose that occur between such leaps; the forte dynamic and the sound produced by the massed strings correlate with the bulk and power of the animal; and the combination of a static harmonic field with the activity suggested by these other features correlates with the physical tension we might feel—frozen between a desire to flee and a fascination with the unusual—when suddenly confronted by a dangerous animal.[2] The music of Figure 2 is thus a skillful representation through sound of a complex phenomenon that has no significant sonic component, imaginative both in its production and reception. That is, Haydn had to be creative in his use of musical resources to summon the leaps of the tiger (because there was no established convention for representing such energetic actions), and listeners had to be creative in correlating a somewhat unusual succession of musical events with the activities of a remarkable beast.

Previous treatments of tone painting have typically focused on more or less compact images that are summoned by music—the image of a tiger, in the case of the music of Figure 2, or a spinning wheel, in the case of another favorite of musicologists, the piano accompaniment for Franz Schubert's "Gretchen am Spinnrade" ("Gretchen at the Spinning Wheel," D. 118). It would, however, be more accurate to say that in each case the music evokes a dynamic process rather than a static image: in Haydn's *The Creation*, the leaps of the tiger; in Schubert's "Gretchen," the continual movement of the spinning wheel.[3] Further examination shows that tone painting invariably involves

1. The notion that fingers provide a "tapered end for guiding communication" reflects work by Michael Tomasello and others on the role of pointing—most typically, with individual fingers—in human communication. See Tomasello (2006), and (2008).

2. A further aspect of the music of Figure 2 is the physical action through which it is rendered in performance—that is, the successive bow strokes of the string players. There is some evidence that actions like these are, to a certain extent, encoded into the musical sound. See, for instance, Leman 2008, chapter 6, and Godøy 2010.

3. It also bears mention that musical materials may bear more than one imagistic interpretation: in the case of Schubert's "Gretchen am Spinnrade," the distinctive accompaniment for the song—made up of repetitive

the analogical correlation of a sequence of musical events with a dynamic process—that is, a sequence of phenomena distributed over time and typified by parametric modulation or change. Indeed, in other work I have proposed that sonic analogs for dynamic processes are basic to musical utterances, and used not only for the depiction of exceptional or unusual phenomena but also to represent emotions, gestures, and the patterned movements of dance (Zbikowski, 2017). Although linguistic expressions can make recourse to sonic analogs through onomatopoeia and prosody, the prevalence of sonic analogs in musical utterances points toward a species of meaning that is substantially different from that upon which language relies.

Two further points should be made about analogical thought and its relationship to musical understanding. First, analogies are typically made within a contextual framework: there are, for instance, any number of similarities between a pen and a finger—both are concrete objects, both can be found in domestic situations, both occur in a variety of colors—but in the example I offered above I focused on only those features relevant to the process of human communication. The alignment of features and structure that typifies analogy is thus constrained by contextual goals that are distinct from the analogical process proper (Holyoak & Thagard, 1995, chap. 1; Medin, Goldstone, & Gentner, 1993). It follows, then, that a listener who did not understand German or who was unable to follow the general plot of *The Creation* might not make a connection between the music of Figure 2 and the energetic actions of a powerful animal. The second point, related to the first and of moment for my overall argument, concerns the constraints a given sequence of musical events will impose on analogical interpretations. Although our hypothetical listener might not imagine the leaps of a tiger, given the structural features of the music shown in Figure 2—the brusque upward strokes, the minimal melodic information, and all the rest—it would nonetheless be unlikely that she would imagine that the music is meant to evoke a lullaby or, for that matter, a pastoral setting. Successful analogies, whether musical or otherwise, are based on the correlation of elements and relationships between two different domains. Thus while a given sequence of musical events might admit of a range of analogical interpretations, the most successful of those interpretations will draw on extensive mappings between the elements and relations of the musical and non-musical domains.

Let me now return to the music of Figure 1, and to the two imaginary listeners I introduced in my discussion of how the passage might be understood. My first listener knew something about Classical music but had not been previously acquainted with Haydn's contribution to the repertoire. (It bears mention that this listener could have been one situated in the late eighteenth century as well as the early twenty-first, although in the former case she would have hardly called the music "Classical.") This listener understood the overall context for the tone painting that occurs in No. 21 from *The Creation*, and has already been taught by Haydn how behavior associated with the lion, tiger, stag, and horse might be inferred from short musical passages. Given her capacity for analogical thought (and a modicum of imagination) she is able to infer from the music of Figure 1 (and the sudden shift of key center which it enacts) that Haydn means to evoke an animal altogether different from those introduced up to this point, one imbued with a sense of grace evident not so much in its movement but in its fitness for its peaceful surroundings. Developing a characterization of the second listener's understanding of the passage—that is, the listener knowledgeable about musical conventions of the eighteenth century—is a somewhat more complicated endeavor. On the one hand, his understanding of most of the tone painting previous to the music of Figure 2 would be much the same as that of the first listener, given that the means through which Haydn

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sixteenth-note arpeggios that set out harmonic progressions which flit from key to key without ever settling down—can also be understood to represent Gretchen's psychological tumult, and in particular her dysfunctional obsession with Faust. For further discussion see Zbikowski 2009, pp. 367–369.

represented the behavior of various animals has not exploited any particular musical conventions. (The one possible exception is the representation of the horse which, if not exactly conventional, is quite similar to representations used by other composers; for a discussion, see Monelle 2000, pp. 45–73.) On the other hand, the second listener's recognition of the music of Figure 2 as a siciliana, and thus making reference to pastoral topics, opens up a rich network of connections that far exceeds anything set up by the analogical representations used up to this point. I would like to propose that the activation of this network has the potential to move our listener's understanding from the realm of analogy to the realm of conceptual metaphor. As I would like to explore in the following, much of this realm is the property of language, but I believe that Haydn's evocation of a pastoral scene in *The Creation* also demonstrates the contributions music can make to conceptual understanding, not least because the sequences of sound materials deployed by composers offer a way to represent, in a compact and immediate form, a range of dynamic processes.

From Musical Analogy to Musical Metaphor

Analogy and metaphor

As already noted, researchers on analogy tend to view metaphors as a particular species of analogy (Gentner, Bowdle, Wolff, & Boronat, 2001; Holyoak, 2012). Dedre Gentner has offered perhaps the most persuasive account of this perspective, proposing that where analogy is focused primarily on relational structure, metaphor is focused primarily on attributes (Gentner, 1983; Gentner & Markman, 1997). Thus in a comparison between tires and running shoes, an analogy would correlate relations: tire is to car as shoe is to person. A metaphor (or, more properly, simile) such as "Tires are like running shoes" focuses on attributes: running shoes provide traction on uncertain surfaces, serve as a cushion against irregularities in the road, facilitate speed of locomotion, and wear out, all of which could be said—with a bit of imagination—of tires. Although there is much to be said for this approach (which has provided a useful framework for computational models) I prefer to view metaphor as activating and drawing upon rich networks of knowledge. Thus "Tires are like running shoes" activates tactile knowledge ("feeling the road" through the shoe or tire), ideas about species of locomotion (running is a competitive activity, which may also be true of driving), and agency (the driver is in control of the car, and the runner in control of her body), all of which embed the process of meaning construction within a broader context.

Making a sharper distinction between analogy and metaphor has two benefits for exploring how musical utterances contribute to the construction of meaning. First, the resources for reasoning provided by analogy offer a principled way to explain how sound sequences of the sort shown in Figure 1 could be correlated with the behavior of and surroundings for a fairly large domestic animal, stopping short, however, of expectations that the music would specify much more than this. Put another way, music similar to that which Haydn used to evoke a pastoral scene could be pressed into service for other ends, ones in which any thought of the pastoral was put rather far into the background: this is, after all, music that is relaxed and soothing. It could even be used, within a religious context, to express love for the Almighty as a source of all that is good (as J.S. Bach indeed does in the second movement of his cantata "Ich liebe den Höchsten von ganzem Gemüte," BWV 174; for further examples see Jung 1980, pp. 201–205). Second, thinking of metaphors as activating and drawing upon rich networks of knowledge invites reflection on how such networks are organized, along with how nonlinguistic forms of communication like music can guide the paths we take through their branching structures. In what follows, I would like to explore two approaches to metaphorical knowledge exemplified by research on musical meaning. The first, which is generally called topic theory, connects with the field of semiotics, and the second with conceptual metaphor theory.

Musical topics and musical meaning

Musical topic theory had its modern origins in the work of the musicologist Leonard Ratner (1980), who proposed that composers of the late eighteenth century made use of a body of widely-shared and relatively specific musical figures to shape their compositional discourse—that is, musical topics. Ratner's proposal was persuasive to a number of scholars, not least because it provided a way to draw together the diverse influences evident in the music of Josef Haydn, Wolfgang Amadeus Mozart, and their contemporaries—influences that ranged across national styles as well as the various uses to which music had been put—and to explain how a uniquely pellucid species of musical meaning was engendered.[4] On the understanding developed by topic theorists, the vocabulary of topics was shared by both composers and listeners, and formed a basis for musical communication beyond the ordering principles of tonality and meter. The specificity of the figures was not limited to the configurations of pitches and rhythms that distinguished one topic from another but extended to the network of cultural associations activated by each topic.

Among the topics identified by Ratner was the pastoral: his rather minimal characterization frames it as a kind of rustic music associated with the droning sound of the bagpipe (1980, p. 21). Raymond Monelle, who was one of the guiding forces behind applications of linguistic and semiotic theory to music (Monelle, 1992), observed that, while Ratner's theory offered a secure framework for developing a theory of musical meaning, many of his characterizations of topics were rather too minimal and given limited support by eighteenth-century writers on music (Monelle, 2000, p. 33), something quite evident in Ratner's rather compressed account of the pastoral. To correct this situation Monelle suggested that each musical topic needed a full cultural study to capture the range and depth of its signification. In a later publication Monelle offered just this sort of study of three topics, one of which was the pastoral (2006). In an account that began with evocations of the pastoral in the writings of Theocritus and Virgil and that spanned nearly ninety pages, Monelle endeavored to sketch the extensive cultural heritage of the pastoral and its use to invoke not only the rusticity of the shepherd but also celestial realms inhabited by figures from myth and legend. This rich network of knowledge was accessed musically through the use of instruments associated with pastoral contexts (such as the bagpipes or the flute) and a discrete set of compositional strategies that emphasized simplicity and directness. The most common of these strategies, at least since early modern times, are those exemplified by Figure 1, and include the rhythmic figuration of the siciliana, a very simple harmonic plan, and a regularly-structured, singable melody. From Monelle's perspective, then, these features signified the pastoral, and would lead Haydn's listener not simply to an image of cows and sheep grazing but also to ideas about a lost Golden Age in which humans were in deep harmony with nature (Monelle, 2006, chap. 12).

The account of musical meaning offered by topic theory, especially in a fully-ramified version of the sort offered by Monelle, provides one way to situate Haydn's evocation of the pastoral in *The Creation*—that is, as the use of a signifier that functions within a dense web of knowledge that stretches back to antiquity. That said, while an awareness of this network of knowledge has the potential to add much to our appreciation of musical topics, it can also take us far away from the immediacy that is a hallmark of musical communication. Put another way, once we begin to follow the various branching paths of this network the import of the original musical utterance fades into the background, and our thought is guided by language rather than music. The metaphorical expressions we might use to describe this music would then be drawn from the web of knowledge associated with the topic.[5]

4. Representative work includes Agawu 1991, 2009; Hatten 1994, 2004; and Monelle 2000, 2006.

5. For a similar perspective on the process of meaning construction associated with musical topics see Danuta Mirka's recent overview of musical topic theory (2014), especially pp. 30–32.

Although the brief summary I provide here can give only a glimpse of what topic theory might offer for our understanding of how musical utterances can construct meaning, it should give a sense of the broader context within which Haydn's evocation of the pastoral was situated. Another way to view this context—and to gain a slightly different perspective on the contribution musical utterances make to meaning construction both without and within language—is through the lens of conceptual metaphor theory, with particular attention to the role embodied knowledge plays in shaping our thought processes.

Conceptual metaphor theory and music

The metaphor of the pastoral. One of the basic claims of conceptual metaphor theory, of course, is that there are consistent patterns of thought (that is, conceptual metaphors) that guide the production of linguistic expressions and, arguably, other modes of communication. With respect to the pastoral, however, it must be acknowledged at the outset that linguistic expressions that draw on ideas about shepherds or pastures filled with grazing animals are not very common in post-industrial first-world contexts. Although one can encounter idioms such as "I'm in clover" (meaning "I am in a very favorable situation") and "gentle as a lamb," on the whole expressions that evoke the pastoral are relatively rare. That said, images of lush green fields and peaceful animals are familiar enough to provide a ready basis for the construction of meaning. Consider, for instance, the first two verses of Psalm 23 of the Christian Bible in the King James version: "The Lord is my shepherd; I shall not want. He maketh me to lie down in green pastures: he leadeth me beside the still waters." It seems likely that most individuals, upon reading these verses (which, of course, reflect a distant world in which pastoral scenes played a large part), would understand that the deity is not literally a shepherd and that the pastures and waters described are figurative evocations of a protected, comforting environment. We might render the conceptual metaphor that frames such an understanding as PASTORAL SETTINGS ARE PLACES OF SAFETY AND SECURITY.

It bears mention that the pattern of thought that underlies this conceptual metaphor plays only a minor role in the account of the pastoral topic sketched by Monelle. Although notions of safety and security are certainly present (especially in connection with the pastoral as representing an idyll from which contemporary life is estranged) these at best formed a substrate for the complex of ideas built up around the topic. In the case of Haydn's use of the pastoral topic in *The Creation*, however, the design of the movement as a whole suggests that the activation of something like PASTORAL SETTINGS ARE PLACES OF SAFETY AND SECURITY was of central concern. Recall that the music of Figure 1 comes after a rapid succession of sonic analogs meant to evoke thrilling and dangerous animals; this tumultuous sequence is then abandoned through a sudden change of key, tempo, orchestration, and rhythmic figuration. Having been buffeted by highly dramatic music, the listener is then suddenly placed in the midst of a domain in which cows and sheep might safely graze. Although this domain is one that the listener might certainly connect with idylls that include bucolic shepherds and lazing demigods, its main effect is simply to surround her with a sonic evocation of safety and security.

I believe a case can be made, then, that Haydn's music activates a conceptual metaphor that could provide a framework for a range of linguistic utterances associated with pastoral contexts. More importantly, however, Haydn's music offers a sonic analog for the sort of feelings that might be summoned were one to inhabit such a context. Were such feelings to become activated, the conceptual metaphor PASTORAL SETTINGS ARE PLACES OF SAFETY AND SECURITY would be one that is fully embodied: linguistic utterances based on this particular instantiation of the metaphor would

thus be informed by embodied knowledge that has been activated by musical sounds.[6] This possibility suggests that the contribution music makes to the construction of meaning is different from that of language in that music's primary focus is on dynamic processes with deep and immediate links to embodied experience. The conceptual metaphors activated by the sonic analogs created by sequences of musical sound are thus not simply grounded in embodied knowledge, but thoroughly imbued with that knowledge.

Music and conceptual metaphors. As a way to fill out the picture of the contribution musical utterances make to conceptual metaphors, let me shift the cultural and historical context from late eighteenth-century Europe to early twenty-first century India and the United Kingdom. Some fifteen years ago the ethnomusicologist Martin Clayton, in the course of a consideration of musical communication occasioned by the performance of a South Asian raga, described an informal experiment he conducted with a recording of the khyal singer Veena Sahasrabuddhe performing Shree raga (Clayton, 2005, pp. 365–372). As is typical within this performance tradition, Shree raga is regarded as having a marked character—in the case of Shree, one that is strong, calm, and powerful (although Clayton notes that the range of associations is rather broader than this simple sequence of adjectives might suggest). As a way of exploring whether there was a substantive basis for communication of the character associated with Shree raga through musical means, Clayton played a seven-minute excerpt from Ms. Sahasrabuddhe's performance for a range of listeners, including individuals at the Indian Institute of Technology, Bombay (the IITB; some of these individuals were Ms. Sahasrabuddhe's students) and at the University of Cambridge Music Faculty. He provided listeners with a blank sheet of paper and asked them to note down any thoughts, feelings, images, or associations that came to mind, responding with words and drawings as they thought appropriate. As might be expected, the responses of the listeners were quite varied. From one listener at the IITB, "It gives the feeling of the Sun rising;" from another, "A quiet evening; peace and repose descend." From one listener at Cambridge, "Sailing slowly down a river in hot, humid weather at dusk;" from another, "Seems somehow to hold back, like having anxiety or other emotions that are not let out, but held in" (2005, pp. 370–371). What Clayton found remarkable, however, was that despite considerable variation among the listeners' responses there was nonetheless an overall conformance with the general characteristics traditionally associated with the Shree raga—this despite the fact that some of the listeners had no knowledge of that tradition. As Clayton observed in his summation, "in all the responses there is no mention of anger, jealousy, fear, doubt, disappointment, unrestrained joy, rapid, mechanical or graceless movement, dancing, or any kind of social meeting or relationship (2005, p. 372)."

Again, Clayton offered this informal study to demonstrate musical communication effected through the performance of a raga. That said, his study also demonstrates two contributions music can make to conceptual metaphors. First, music can prepare the groundwork for conceptual metaphors: Ms. Sahasrabuddhe's performance activated concepts and emotions that listeners connected with the sun, evening, a river flowing, and restraint, each of which could be linked to specific conceptual metaphors. Second, all of the images put into play had a dynamic component—the sun *rising*, peace and repose *descending*, *sailing* down a river, *holding back* emotions—connected with embodied experience. There are nonetheless two important caveats to add. First, music guided listeners' thought processes in only a general way: although, as Clayton noted, certain ideas never made an appearance in listeners' responses, those that did varied widely. The accounts of the ideas

6. There is a wealth of research that indicates that music can indeed induce emotions, although the precise means by which this occurs, along with the nature of the emotions induced, is the subject of considerable debate. For a summary of research on music and emotion, along with one explanation for how emotions might be induced, see Zbikowski 2010, pp. 39–48.

put into circulation by music, then, seem closer to those that might be prompted by poetry than to those that would be prompted by the narration of a simple story. Second, we lack a sense of what listeners did with concepts once they had been activated by music. Did, for instance, the sun or evening become central to a conceptual metaphor that guided a listener's thought processes, or were these subsidiary concepts that did no significant work in the flow of ideas set in motion by Ms. Sahasrabuddhe's performance? These caveats notwithstanding, Clayton's study would seem to indicate that musical communication was indeed accomplished by Ms. Sahasrabuddhe's performance of Shree raga, and that listeners were able to use sequences of musical sounds as the basis for the construction of meaning with a strongly metaphorical component.

Summary. As I hope to have shown, there is a range of evidence—from examples of tone painting such as those found in *The Creation*, to anecdotal accounts such as that offered by Clayton in his study of musical communication—that sequences of musical sounds can make significant contributions to the conceptual metaphors through which humans guide their thinking. These contributions are of a general sort—involving rich, embodied images rather than crisp concepts—but what they lack in specificity they make up in immediacy.

It seems apparent that hearing sequences of nonlinguistic patterned sound as representing anything—be it the leaps of a tiger, a pastoral scene, images of the sun rising, or the sensation of floating down a river—is a highly imaginative act. I would also like to propose that it is also creative, in the sense that the sequence of sounds in each of these cases is not an imitation of natural sounds, and that hearing the sounds as referring to relatively concrete images and sensations has a particular kind of value for humans (such that every human culture of which we have knowledge has something like music). That said, I believe that these uses of musical sound are also shaped by the goals of communication: were a musician to propose that the music of Figure 1 was an adequate representation of a fierce and threatening animal I would hold that she was in error: the sonic analogs created by that musical passage simply do not have enough (or, indeed, any) correspondences with the features we associate with fierce and threatening animals. Our creative imagination is thus constrained by the way sequences of sounds are organized, a constraint also evident in the characteristics listeners did *not* associate with Ms. Sahasrabuddhe's performance of Shree raga. And so while the experience of hearing a sequence of nonlinguistic patterned sound may be an opportunity for a creative act, our creativity will be limited by the specific features of how that sound is organized and the context within which the sequence is intended to function. The creative opportunity may be extensive, but it is not unbounded.

Music and Metonymy

As I noted in my introductory observations, part-whole relationships are very common in music. This owes much to a distinctive feature of many musical utterances, which is that they constitute integrated wholes that are often reinforced, whole or in part, through repetition. Popular song is a good example: such songs are typically saturated with repetition, and in the case of those we have listened to a number of times any one of these repeated fragments, heard in isolation, is enough to prompt a recollection of the song as a whole.[7] Fragments like these thus serve as metonyms for the song; where the song is part of a beloved collection (for instance, a favorite release by one of the singers we follow), it may in turn serve as a metonym for an entire album.

Despite the ubiquity of part-whole relations in musical utterances (and a broader interest in conceptual metaphor from music scholars) I know of only two studies that engage with the phenomenon from the perspective provided by research in cognitive linguistics, both doctoral

7. For a fuller discussion of the role of repetition in music see Margulis 2014.

dissertations (Kemler, 2001; Chuck, 2004). I suspect this is so not because part-whole relations in music are unremarkable as it is because the advantages of studying these relations within the context of the conceptual processes associated with metonymy have not been fully appreciated.

To some extent, the issue of metonymic relationships in music can be approached in terms of processes of categorization (Lakoff, 1987, chap. 4), which can be seen to operate both within musical utterances and when musical utterances connect with other domains. With respect to the former, a distinctive musical motive can, in some cases, summon a much larger complex of musical materials. One of the most familiar examples is provided by the opening of Ludwig van Beethoven's *Fifth Symphony*: the familiar DA–DA–DA–DUM! with which it opens almost immediately evokes a category of similar motives within the first movement of the symphony (of which the first version is an exemplar), and the theme as a whole (of which the motive is one component; for further discussion of how processes of categorization may guide our apprehension of the opening of the *Fifth Symphony* see Zbikowski 2002, pp. 34–49). The opening motto of the symphony thus serves as a part which guides the understanding through its connection to the larger whole (the category of motives of which it is a part, the theme in its entirety, and finally the superordinate category of the first movement as a whole). With respect to musical utterances that connect to other domains, the passage from No. 21 from Haydn's *The Creation* with which I started again provides an example: the peaceful sonic domain evoked by Haydn can be seen to be metonymic for a notion of the pastoral of the sort set out by Monelle in his comprehensive study, such domains being understood to be a part of the larger category comprehended by the pastoral.

Musical metonymy can, however, be somewhat more complex than this, as one further musical excerpt will show. Among the most famous examples of works with connections to pastoral topics within the repertoire of Western classical music is a composition that was premiered on the same concert as his *Fifth Symphony*, the *Pastoral Symphony* (which is Beethoven's sixth symphony in the traditional numbering of the works). Beethoven not only gave the symphony the descriptive title, he also provided each of the symphony's five movements with a brief description. For the first movement, "Awakening of happy feelings on arrival in the countryside"; for the second, "Scene by the brook"; for the third, "Merry gathering of the country people"; for the fourth, "Storm"; and for the fifth, "Shepherds' song. Joyful, grateful feelings after the storm." There have been extensive discussions of the various ways Beethoven's music evokes the pastoral (Jones, 1995; Will, 2002, chap. 4; Monelle, 2006, pp. 242–245), and each of these could be seen (as was Haydn's) as metonymic for the pastoral as a whole. I would, however, like to focus on a moment at the end of the second movement that provides a somewhat fuller sense of how metonymy may function in musical contexts.

The moment comes just as Beethoven is bringing the movement to a close (a section known as the coda). Having accounted for all of his tonal, thematic, and motivic materials, he suddenly introduces three small, but quite prominent, bits of new material; the final bars of the movement, in an arrangement for piano four hands, are shown in Figure 3. Beethoven identified these as representing the nightingale (played by the solo flute), quail (solo oboe), and cuckoo (two clarinets). Before considering the metonymic aspects of these interjections, two aspects of them should be noted. First, while these woodwind instruments offer reasonable approximations of the sound of each of these birds what the listener hears is nonetheless an artful representation of birdsong rather than its exact imitation. Second (and as pointed out by David Wyn Jones), the emergence of the woodwinds at this point is to some extent prepared by the solistic roles they have played earlier in the movement (Jones, 1995, pp. 66–67), roles in which the imitation of birdsong played no part.

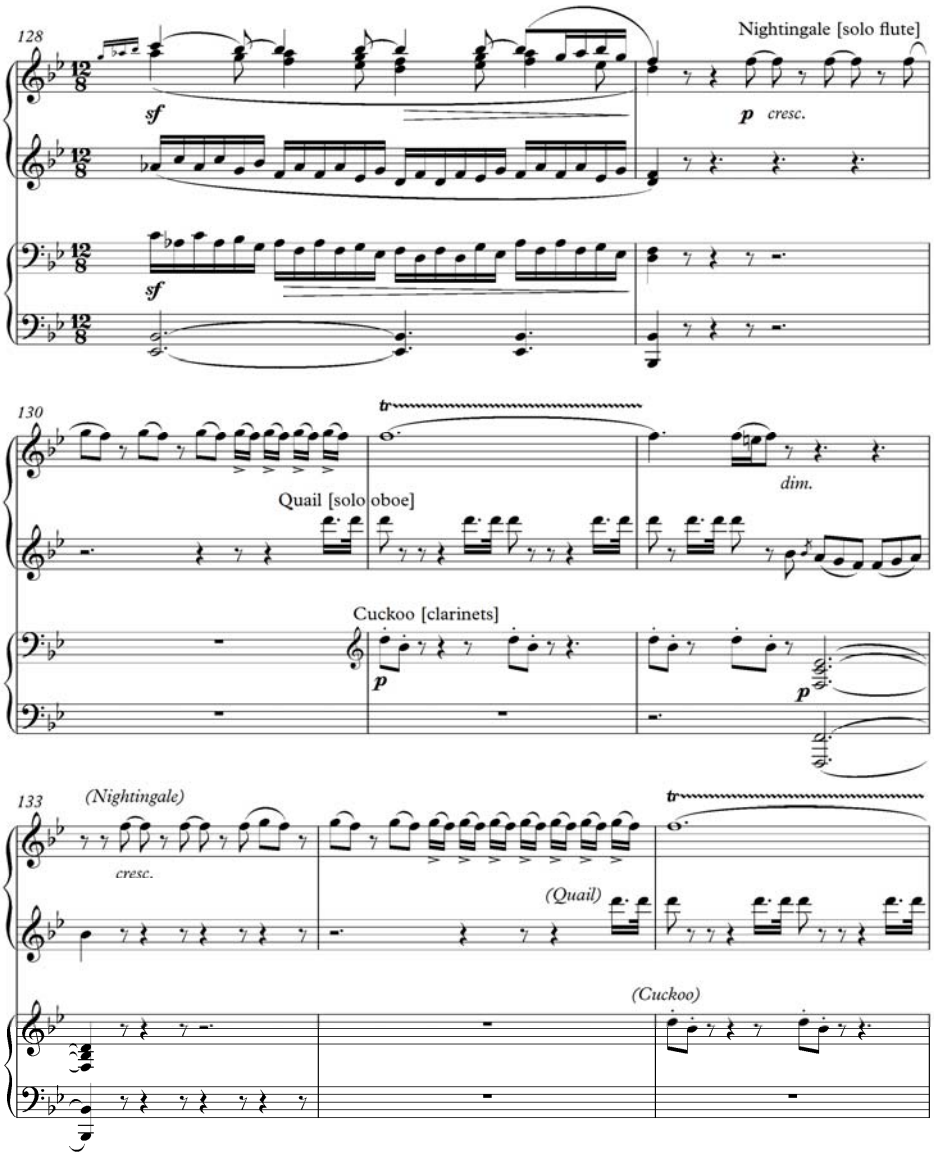

Figure 3: Ludwig van Beethoven, *Pastoral Symphony*, second movement, bars 128–139; arrangement for piano four hands

With respect to metonymy (and to some extent signaled by Beethoven's captions), the sounds played by the woodwinds act as trajectors (in Langacker's terms) or vehicles (in Kövecses and Radden's terms) that carry thought toward the birds with which they are associated. Because not one but three birds are evoked by Beethoven's music, the interplay of these sounds also suggests that the birds all occupy approximately the same physical space; because each of the calls is set out in a deliberate way and repeated with no variation, there is also a sense that the imaginary birds are roosting or at least relatively motionless. These various possibilities point to one of the remarkable things about musical metonymies, which is that they have the potential to summon a rich, dynamic conceptual tableau through the interaction of different layers of musical sound.

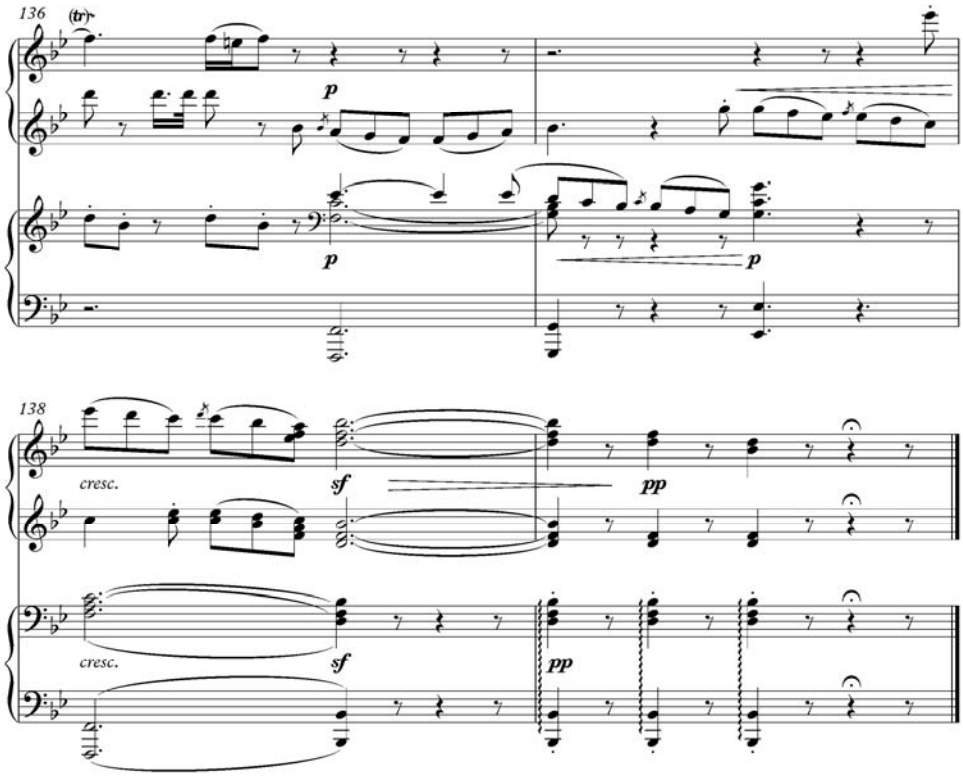

Figure 3 continued

Of course, the sonic analogs for the different birdcalls also connect with the topic of the pastoral (a connection that would be thoroughly natural within the context of Beethoven's symphony). This connection is common enough that Monelle reckoned birdcalls to be a subtopic of the pastoral genre (Monelle, 2006, pp. 235–236). A case could be made, however, that the connection is a relatively tenuous one: there is a long tradition of imitating birdcalls with music (Leach, 2007, chap. 3), and as such the connection may simply be to a natural scene of some sort rather than a full-fledged pastoral scenario.

Perhaps the most interesting metonymic connection forged by the interjection of the birdcalls into the end of the second movement of the *Pastoral Symphony* operates within a somewhat more technical context. In the practice of instrumental music of late-eighteenth and early-nineteenth-century Europe it is quite unusual to introduce new material in the last moments of a movement—indeed, Beethoven only brought them into the movement at a late stage in his compositional process (Jones, 1995, p. 67). As such, then, the birdcalls can be heard as metonyms for extra-musical sounds, pointing toward a world of sonic phenomena outside the orderly world of symphonic music.

Quite a bit more might be said about musical metonymy, not least because, as these last observations suggest, much depends on the use of compositional strategies to draw attention to part-whole relationships. Of some importance for research on metonymy—but presenting a considerable barrier to scholars less familiar with the intricacies of musical organization—at least some of the metonymic relationships that are realized in music will involve only musical materials, and will thus have their proper home in a domain within which language is at best an awkward intruder. Our assessment of creativity in such domains may, in consequence, stretch to the limits of

our ability to imagine and to capture meaning that proceeds in ways that are largely independent of the conceptual resources offered by language.

Creativity in and around Musical Utterances

In the introduction to this chapter I took the view that thinking *in* music was an activity distinct from thinking *about* music. The latter process is one that is typically facilitated through language, whereas the former is one difficult to capture with the resources language offers. Indeed, I likened being able to think in music to being able to make immediate sense of a sentence transformed into sine-wave speech: in both cases, what is to one listener a seemingly random sequence of sounds is to another a thoroughly intelligible and meaningful utterance. I further proposed that, in the case of music, the reason for this state of affairs was that music did not, for the most part, rely on standard conventions through which a sequence of sounds was associated with a particular unit of meaning but instead offered sonic analogs for different sorts of dynamic processes (a perspective developed more fully in Zbikowski 2017). Musical meaning construction is, in consequence, an inherently creative task, one in which musical passages are heard to connect not only with other musical passages but also with a wide range of extra-musical phenomena.

According to this perspective, the meaning we make through listening to music always has some measure of novelty. Whether this listening also has value—another component in the notion of creativity pursued in this volume—is another matter. In this connection, it bears mention that musical interactions are always, to some extent, social interactions, involving as they do composers, improvisers, performers, and audience members. (While it is certainly the case that the practice of listening to a musical recording in isolation from others challenges this notion of social interaction, I would argue that it still frames and conditions the apprehension of musical meaning.) In a recent consideration of creativity (framed in terms of the notion of the agile mind) Tony Veale, Kurt Feyaerts, and Charles Forceville noted the importance of such social interactions to the construction of meaning in creative contexts, writing

> we are not individuals working alone in front of an audience, but collaborators working together to arrive at a shared state of mutual understanding. As such, every successful act of mental agility in a social context must be reciprocated with a corresponding agile turn by our intended audience. In this respect, it is helpful to think of social interaction as a dance, in which our mundane, everyday interactions are highly-choreographed affairs (Veale, Feyaerts, & Forceville, 2013, p. 27).

The key word here is "successful": as I have noted, it may well occur that, in at least some cases, a musical utterance fails to achieve its purpose. While there still may be novelty in interpreting that utterance, if the audience cannot respond to it with "a corresponding agile turn" its value will be deprecated to the point of becoming negligible.

A further factor may be the amount and kind of imagination required of listeners. In some cases (as with Beethoven's evocation of various woodland birds) a sonic analog will have so much fidelity to the phenomenon to which it refers that its interpretation will be seemingly effortless. In other cases, as in Haydn's use of a pastoral topic in No. 21 from *The Creation*, the full interpretation of a sonic analog may require additional knowledge of the sort assumed by musical topic theory. On the one hand, the latter case may connect musical listening to a rich web of signification of the sort explored by Monelle in his account of the pastoral, a connection that would no doubt inflect the metaphorical knowledge activated by the musical passage. On the other hand, the immediacy of Beethoven's sonic analogs for birdsong might well allow the listener to remain a bit longer within

the domain of music, and to entertain conceptual metaphors more directly connected with the embodied dynamic processes to which sequences of musical sounds give access.

As others have noted, there is now a considerable body of research which demonstrates that the process of mapping knowledge from one domain to another—a process in evidence in analogy, metaphor, and metonymy—is a distinctive aspect of human thought and contributes much to the mental agility that marks human creativity. Inasmuch as musical practice is a distinctively human enterprise, it seems likely that cross-domain mapping would inform the thought processes that guide this practice and that are reflected in the creative uses to which sequences of patterned nonlinguistic sound are put. And, to the extent that musical communication is *not* like linguistic communication—that is, to the extent it offers unique resources for the expression of thought—it also seems reasonable to expect that music can tell us much about the way processes of cross-domain mapping are deployed for the purposes of constructing meaning, and how music contributes to and demonstrates human creativity.

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