Vague Music

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Abstract
Is listening to (purely instrumental) music like looking through a kaleidoscope? Formalists contend that music is meaningless. Most music theorists concede that this austere thesis is surprisingly close to the truth. Nevertheless, they refute formalism with a little band of diffusely referential phenomena, such as musical quotation, onomatopoeia, exemplification, and leitmotifs. These curiosities ought to be pressed into a new campaign against assumptions that vagueness can only arise in the semantically lush setting of language. Just as the discovery of extremophilic bacteria led biologists to revise their opinions about the scope and preconditions of life, the marginal forms of reference that survive in the semantic desert of absolute music should lead philosophers to revise their assumptions much about scope and preconditions of vagueness.

Claude Debussy's 'Clouds' begins with a calm, harmonic murmur. Out of this static background emerge fragmentary melodies. The chords are light, the tempo slow, the meter irregular. Debussy's stated goal is to render 'the immutable aspect of the sky and the slow, solemn motion of the clouds, fading away in grey tones…'.

Georg Hegel believed that clouds are vague in themselves. In contrast, the vagueness of Debussy's nocturne is at the level of illustration. This makes the vagueness of Debussy's music more akin to the vagueness of the *word* 'cloud'.

Bertrand Russell accuses Hegel of projecting the vagueness of 'cloud' onto clouds.[1] Many vagueness theorists agree that Hegel committed the fallacy of verbalism. For instance, supervaluationists insist that all vagueness is linguistic.

If music were a language, then musical vagueness would be just another species of linguistic vagueness. Certainly, the *notation* for producing and describing music is vague. And music does have a

[1] Bertrand Russell, 'Vagueness', *Australasian Journal of Philosophy and Psychology* **1**, (1923), 84–92. Russell extends vagueness beyond language to maps and photographs. He does not distinguish between vagueness as the possession of borderline cases (as in 'thirty-ish') and vagueness as underspecificity (as in 'thirty-something' which encompasses a wide but precise interval).

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rich syntax.[2] However, music is too semantically impoverished to literally be a language.[3] This austerity prevents musical representations from being universally precise. Whatever is meaningful and yet fails to be precise must be vague. Consequently, there is a residue of musical vagueness. Four species of vagueness will be distinguished: vague exemplification, onomatopoeic self-identifications, leitmotifs and musical quotation.

1. Language and Music are Mutually Exclusive

The perceptual competition between language and music is manifest in definitions that aim to separate poetry from music. To listen to sounds as music is to refrain from listening to them 'primarily as symbols of discursive thought'.[4] More positively, listening to music requires listening to sounds under *musical* concepts such as pitch and rhythm.[5]

There is a psychological rationale for definitions that emphasize rivalry between music and language. Listening to music and speech each involve the analysis of sound. However, music perception is directed to the sound itself while speech perception is directed to those causes of the sound that reveal the speaker's communicative intentions.

According to the motor theory of speech perception, we perceive spoken words by identifying the vocal tract gestures that originate them. When you listen to me talk, you empathically match what you heard with how you would try to produce my utterances. Since your matching repertoire comes in discrete categories, you reconstruct the sounds as discrete even if they are continuous. For instance, since you can only articulate ba's and pa's, you hear only ba's and pa's, nothing in between (despite the sounds varying along the voicing

[2] Fred Lerdahl and RayJackendoff, *A Generative Theory of Tonal Music* (Cambridge: MIT Press, 1996). A wrong note is like a grammatical error. Just as a native speaker can identify a solecism in a sentence he never heard before, members of a concert audience can identify a wrong note in a novel composition.

[3] Stephen Davies, *Musical Meaning and Expression* (Ithaca: Cornell University Press, 1994) chapter 1.

[4] Jerrold Levinson, 'The Concept of Music', in his *Music, Art, and Metaphysics* (Ithaca, New York: Cornell University Press, 1990), 267–78, 272.

[5] Andy Hamilton *Aesthetics and Music* (New York, NY: Continuum Press, 2007), 40–55.

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continuum). So you exaggerate the similarities within a category and exaggerate the differences between categories.

When you listen to sounds as speech, you figure out how you would have produced those sounds. When you listen to sounds as music, you listen to the sounds themselves. Since you are no longer using the categories of *speech* production to shape what you hear, the sounds are heard differently. The need to perform this analysis quickly and reliably suggests that there is special hardware for speech perception and music perception. They are as specialized and modular as face perception.

This contrast between speech and music is preserved even when the linguistic medium is a musical instrument. The Banda can hear drumming as music (focusing on the beats) or hear drumming as language (focusing on what the beats signify).[6] When listening to drumming as music, the Banda are intolerant of distractions and mistakes. When listening to drumming as language, the Banda are more forgiving because they regard the sounds as a means to an end. If they can look at the drummer, they will supplement their ears with their eyes and let vision shape what is heard (as dramaticized by the McGurk effect and other intermodal illusions). Whereas musical repetition must incorporate interesting differences, linguistic repetition can be straight repetition – resending the message. While in this linguistic mode, the Banda become intolerant of divergent interpretations. Listeners need to arrive at the same meaning.

In summary, physical sounds are parsed differently depending on whether they are to be heard as music or heard as language. The perceptual incompatibility of music and language prevents the Banda – and us – from reducing the vagueness of music to the vagueness of language.

2. The Analogy with Pidgins

Musical genres resemble pidgins – stripped down languages that arise when different groups regularly interact without the benefit of a common natural language. Whereas a pidgin is syntactically simplified, music is *semantically* simplified:

[6] Frances Cloarec-Heiss, 'From natural language to drum language: An economical encoding procedure in Banda-Linda, Central African Republic' *Language diversity and cognitive representations* edited by Catherine Fuchs, Stéphane Robert, (Philadelphia: John Benjamins Publishers, 1999).

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	Semantic Wealth?	Syntactic Wealth?
Natural language	***Yes***	***Yes***
Pidgin	***Yes***	***No***
Music	***No***	***Yes***
Animal Communication	***No***	***No***

Pidgins have a small lexicon of between 200 to 2000 words with an average of about 500. However, all pidgins contain words for negation and conjunction or some other combination of logical connectives that is expressively complete (at least with respect to the truth-tables of sentence logic). For instance, the Eskimo pidgin used by sailors and the Inuit can specify any combination of commercial goods.

Due to the low syntactic sophistication of pidgins, pidgin descriptions require lengthy circumlocutions, redundancy, and contextual assistance. This underspecificity makes each pidgin a vague medium (in the sense that if we hold length constant, messages in pidgin are less informative than messages in a natural language).

In *Close Encounters of the Third Kind* extra terrestrials use music to facilitate a visit with the human beings. The scene has anthropological verisimilitude. Groups ease the tension of initial encounters with music. Music is even more accessible than pidgins. The Inuit do not need to understand the *lyrics* of a sea shanty to coordinate with sailors in rowing or pulling up an anchor.

3. Expressive Handicaps and Honest Signals

Statues are more precise than pictures because they have three dimensions rather than two. Pictures are in turn more precise than music because music has no spatial dimensions. Music is the vaguest medium.

Adam Smith wondered why artists imitate a chair with a *painting* of a chair rather than another chair: 'The most perfect imitation of an object of any kind must in all cases, it is evident, be another object of the same kind, made exactly as possible after the same model.'[7] Smith's solution is that appreciation of imitation varies *inversely* with the natural resemblance that the medium bears to what is being represented. Peter Kivy illustrates Smith's principle with Antonio Canova's statue of Venus reclining on a comfortable bed. Although the medium is literally as hard as rock, the pillows look soft.

[7] Adam Smith, *Philosophical Subjects* (London, 1795), 133.

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Kivy's musical illustration of Smith's inverse principle is Honegger's *Pacific 231*. A steam engine has little resemblance to the sounds of an orchestra. Yet the composer illustrates this heavy piece of machinery without importing special sound makers (such as the anvils of Modest Mossolov's *The Iron Foundry*). 'Far from impairing musical representation, the lack of fidelity dictated by the nature and conventions of the musical medium – which is to say, its aesthetic recalcitrance – aesthetically enhance it.'[8]

Peter Kivy modernizes Adam Smith's principle to make it viable within contemporary aesthetics. Smith's theory can be further updated by casting it as a corollary of Amotz Zahavi's handicap theory of honest signaling.[9] The luxurious tail of the peacock baffled biologists. How could such ornamentation *evolve*? Zahavi's solution is that the peacock's tail is a difficult to fake sign of fitness. Surviving despite the added costs of such luxuriant plumage is a sign of vigor.

A behavioral example of the handicap principle is the elaborate singing of birds. Lengthy, distinctive songs annoy rivals, attract predators and scare off prey. The complexity of the songs taxes the brain and lungs.

Singing relies heavily on the autonomic nervous system. For human beings, this involuntariness amplifies the honesty of the signal sent by complex songs.

The greater the handicap, the more reliable the signal. Representing objects with just the sounds of instruments may be the most extreme handicap.

As Peter Kivy emphasizes, what counts is *perceived* recalcitrance. Real artists cheat. They exploit fortuitous resemblances that provide a running start. A sculptor will choose a stone that already resembles a head (or choose to depict a head because the stone already looks like a head).

Instrumental sound bears a fortuitous resemblance to vague representations. Unlike objects, sounds fill the air around the listener. This makes our ability to answer 'Where is the sound?' enigmatic.[10] For practical purposes, we locate sounds by their sources. But in

[8] Peter Kivy, *Sound and Semblance* (Princeton University Press, 1984), 101.

[9] Amotz Zahavi, 'Mate selection – a selection for a handicap' *Journal of Theoretical Biology* **53** (1975), 205–214.

[10] Robert Pasnau, 'What is Sound? *Philosophical Quarterly* **50** (1999), 309–24.

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listening to music, we ignore the source.[11] We close our eyes and attend to the sound itself.

The navigational poverty of musical sound makes it perspectiveless. 'When it is fictional of the listener that she hears a brook gurgling, is it fictional that she hears it from upstream or downstream, from the side or from above, from near or from afar?'.[12] Listeners are immersed in the indeterminacy instead of being isolated by it (as in the walled-off indeterminacy of the cinema or painting).

Indeed, we even surrender the psychological distinction between inside and outside. This dissolution of boundaries precipitates a thrill of transcendence. This feeling is cultivated by religious music.

The intimacy of music mixes with the impression of candor generated by the honest signaling. The non-discursive aspect of instrumental music preludes insincerity. It is impossible to lie with a flute.

Nor, of course, can one give honest testimony with a flute. What we are really experiencing is relief from the threat of a lie (which is particularly menacing in courtship and group assemblies). Music, like pictures, can still mislead. Propagandists exploit the fact that we let down our guard when listening to music.[13] Although most musical propaganda employs lyrics, the absence of lyrics can make for a more compliant listener:

> I think Americans (and many other nationals for that matter) brighten at the tempo of a stirring march because it appeals to their fighting instincts. Like the beat of an African war drum, the march speaks to a fundamental rhythm in the human organization and is answered. A march stimulates every center of vitality, wakens the imagination and spurs patriotic impulses which may have been dormant for years. I can speak with confidence because I have seen men profoundly moved by a few measures of a really inspired march.[14]

Debussy exploits the generic vagueness of musical sounds. Instead of struggling against music's limited palette, Debussy accentuates the

[11] Roger Scruton, *The Aesthetics of Music* (Oxford: Clarendon Press, 1997) 221.

[12] Kendall Walton, *Mimesis as Make-Believe* (Cambridge, Mass., MIT Press, 1990), 340.

[13] Arnold Perris, *Music as Propaganda: Art to persuade, art to control* (Westport, Connecticut: Greenwood Press, 1985).

[14] John Philip Sousa, *Marching Along* (Waterville, Ohio: Integrity Press, 1994), 358.

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lack of definition. His orchestration is crafted to evince stereotypical features of vagueness: continuity, ambivalence, and indecision.

The philosophically interesting kind of vagueness is the possession of borderline cases (rather than mere lack of specificity). For that is the only sense that generates the sorites paradox. 'Ms. Clinton' is vaguer than 'Miss Clinton' or 'Mrs. Clinton' but not in the sense of 'vague' that challenges classical logic.

Nevertheless, vagueness in the underspecificity sense does provide Debussy with a means of conveying vagueness in the other sense. Puns are an acceptable means of communication (even if unacceptable as a means of inference). In the opening of 'Creation', Joseph Haydn represents darkness with subdued tones and low registers in the key of C minor. This sets up a sudden transition to C major by the full orchestra – 'Let there be light!'.

4. Adam Smith's Theory and Medium Independence

Our interest in the challenge posed by recalcitrant media may also relate to an interest in generality. When experimenters make a discovery, they try to reproduce the result with different experimental apparatus. After a theorem is proved, mathematicians try to deduce the theorem with different rules of inference and different premises. Varying the medium makes the message stand out more clearly. Different media are generally tied to separate lines of evidence. So the consilience gives the result greater weight and assures us that the principle is not an artifact of special circumstances.

Interest in *musical* vagueness is itself an instance of the desire for consilience. Generalizations about vagueness should extend beyond natural languages. Consider the language of thought postulated by psycholinguists. Since we understand sorites arguments and they essentially involve vague predicates, Mentalese must be vague.[15] This language of thought cannot be ambiguous because you cannot think an ambiguous thought. Just try it! Mentalese is the medium for disambiguations and so the buck stops at Mentalese. The essential univocity of Mentalese undermines Kit Fine's characterization of vagueness as hyper-ambiguity.[16] Mentalese is innate. This side steps

[15] Roy Sorensen, 'Vagueness within the Language of Thought', *Philosophical Quarterly* **41** (1991), 389–413.

[16] Kit Fine, 'Vagueness, truth and logic', *Syntheses* **54** (1975): 235–259, 282. Reprinted in *Vagueness: A Reader*, Rosanna Keefe and Peter Smith (eds.), (Cambridge: MIT Press, 1996), 119–150.

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Crispin Wright's explanation of vagueness as arising from the vagaries of language learning. Mentalese has no conventions.[17] This side steps Scott Soames' effort to trace all vagueness to incomplete definitions.[18] The autistic aspect of Mentalese reveals the asocial nature of vagueness.

Music has an opposite profile of impoverishment. Like natural language, it is social, conventional and emotionally expressive. Yet music differs even more strongly from natural language than Mentalese. Music is a separate system of sound analysis. Perhaps music evolved from speech. Perhaps speech evolved from music. Or perhaps each evolved from 'musilanguage'.[19] But under all these etiologies, 'Music is language' is only a metaphor.

Despite my emphasis on the semantic poverty of music, I agree with most philosophers of music that formalism is an insight that goes too far. Listening to music is not quite like looking through a kaleidoscope. Some musical expectations are managed with referential devices. I shall begin with the most primitive devices, keeping an ear tuned for those forms of reference most illustrative of my thesis that music is vague.

5. Musical Communication and Vague Exemplification

Before an orchestral performance, there is the cacophony of the individual musicians' solitary warm ups. This solipsism ends after the concertmaster cues the oboist to tune the orchestra. The oboe is chosen because it has the clearest, most penetrating tone. By playing an A, the oboist communicates 'This is the right pitch'. But the oboist's A is not a mere signal. It differs from the conductor rapping the music stand to call the orchestra to attention. For the oboist's note *exemplifies* the right pitch.

The oboist could miscommunicate. His reed might malfunction. He might make a slip and play a B. Or his note might only vaguely exemplify the correct pitch.

[17] Crispin Wright, 'Language Mastery and the Sorites Paradox' in Evans and McDowell (eds.) *Truth and Meaning* (Oxford: Clarendon Press 1976), 223–247.

[18] Scott Soames, *Understanding Truth* (New York: Oxford, 1999), 206–212.

[19] Steven Brown, 'The "Musilanguage" Model of Music Evolution' in N. L. Wallin, B. Merker, and S. Brown (eds.) *The Origins of Music*. (Cambridge: The MIT Press, 1999), 271–301.

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The vagueness of the oboist's A leads to behavior characteristic of vagueness. Members of the orchestra may request clarification or ask for another sample or diverge on what pitch is correct. Timothy Williamson conjectures that

> Even in a language without negation, vagueness can arise in virtue of borderline cases. In some contexts, a negationless signal may be neither clearly true nor clearly false. A sorites series may be possible for it: for instance, a series of contexts, each indiscriminable from the next, in the first of which it is true and in the last of which it is false. Although one needs logical constants to formulate the sorites reasoning explicitly, one does not need them merely to have difficulty in using the signal correctly in such a series of contexts. For example, the case may be classified differently depending on which end of a sorites series it is approached from. Without the logical constant, one cannot properly reflect on the significance of the phenomena of vagueness, but at least some of the phenomena themselves occur.[20]

Williamson goes on to draw a lesson about the nature of borderline cases. Typically, the speaker is pictured as suspended between a proposition and its negation. A vague but negationless signal would show that this model cannot be primary.

Although music is not a language, it is a representational system that lacks negation. Thus it bears some of the instructive austerity of Williamson's hypothetical language.

Dreams and the unconscious are sometimes characterized as representational systems that lack negation. According to Sigmund Freud, 'There is no negation in dreams'. He regards dreams as the royal road to the unconscious, a realm of ideas that involves

> No negation, no doubt, no degree of certainty. . . To sum up: *exemption from mutual contradiction, primary process* (mobility of cathexes) *timelessness*, and *replacement of external by psychical reality* – these are the characteristics which we may expect to find in processes belonging to the system Ucs.[21]

[20] Timothy Williamson, 'Truth and Borderline Cases' in Korta and Larrazabal (eds.) *Truth, rationality, cognition, and music* (Dordrecht: Kluwer Academic Publishers, 2004), 45–66; 54.

[21] Sigmund Freud, 'The Unconscious' in *The Pelican Freud Library* (Hammondsworth: Penguin Books, 1984) vol. 11, 190–191.

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As in the case of music, dreams and the unconscious are vague and yet lack the minimal logical properties that seem necessary for vagueness. It is tempting to consolidate our difficulties and hope that a demonstration of the vagueness of one of these logically impoverished systems will transmit insight to the remaining two. On an analogy with the strategy of semantic ascent, my hopes are invested in musical ascent.

6. Onomatopoeic Self-identifications

The tuba introduces itself with a self-referential oompah that says 'Here I am'. It relies on the audience's recognition in the same way a husband relies on his wife's voice recognition when he announces, 'Here I am'.

Voices can be faked. The banjo introduces itself with a twang. But a guitarist can fake the twang. For instance, the best-known rendition of 'Dueling Banjos' is from the movie 'Deliverance', and that pits a *guitar* against a banjo. Intermediate between the self-identifications that are definitely true or definitely false are those played by hybrid instruments such as the banjo-mandolin or the banjo-ukulele. Their self-identifications with the banjo's signature twang are neither definitely true nor definitely false.

Hans Reichenbach offered a token-reflexive definition of the indexicals: 'I' is synonymous with 'the utterer of the sentence token', 'here' means 'the place at which the sentence token is uttered', and so on. These *definitions* would force us to enrich music with predicates such as 'speaker' and 'time'. We should prefer David Kaplan's leaner analysis of indexicals. Kaplan provides rules that merely fix the reference rather than supply synonyms. This is independently more plausible because it avoids making 'I am not speaking' express the *semantic* contradiction 'The person who is speaking is not speaking'. 'I am not speaking' is merely a pragmatic contradiction – a sentence refuted by a fact about how it is uttered. When studying the semantic properties of music, the philosopher of language must take an oath of poverty.

The instruments used for onomatopoeia are normally not self-identifying. In Sergei Prokofiev's 'Peter and the Wolf', the instruments represent characters in a story. The flute represents the bird, the oboe is the duck, the clarinet is the cat, and so on.

More commonly, the instruments are used to produce sounds that resemble the sounds made by their referents. The level of the sound perception can be more abstract than the simple onomatopoeia of

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thunder, birdcalls, and train whistles. The conventionality of the sound can also vary. A xylophone as in the Dance Macabre conventionally represents dancing skeletons. Claude Saint-Saëns exploits this convention when he uses the xylophone to represent fossils in the 'The Carnival of Animals'.

Iconic language can convey numeric information precisely (as in the Roman numeral III) or vaguely (as in 'The lumberjack went chop chop chop'). The same goes for iconic music in the shower-stabbing scene of Alfred Hitchcock's 'Psycho'. In addition to suggesting violent hand motions, the volume, dissonance, and pitch are scream-like and expressive of terror and the sharpness of the knife. No definite number of stabs is represented (nor is there represented a definite lower or upper bound as in the coroner's report 'Victim was stabbed between six and ten times').

7. Leitmotifs and Demonstrative Identities

When the United States Marine band introduces Barack Obama with 'Hail to the Chief' and precedes it with four ruffles and flourishes, they officially express the proposition 'Here is the president of the United States'. If they played it for an imposter, then the proposition expressed with the leitmotif would be false.

'Leitmotif' ('leading motif') was introduced by E. W. Jahns in 1871 to describe Carl Maria von Weber's operas. A leitmotif is a denoting melody or harmonic progression. The mode of reference can be refined by a particular key or orchestration. The mode of reference can be varied to convey degrees of formality (just as one can substitute the more elevated 'statesman' for 'politician'). Richard Nixon preferred the social distance emphasized by 'Hail to Chief' (Barack Obama prefers informality and rarely has himself introduced with this leitmotif).

The manner of denotation can carry Gricean implicatures (which is not surprising because as Grice himself notes, his maxims 'of conversation' apply to any cooperative activity). For instance, 'Hail to the Chief' is normally played at a sprightly pace to convey vigor. Playing it at a doddering tempo can constitute an insult. Musical performances partake of much of the vagueness associated with hinting and insinuating.[22]

[22] Justin London, 'Musical and Linguistic Speech Acts', *The Journal of Aesthetics and Art Criticism* **54** (1996), 49–64.

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8. Identities Flanked by Leitmotifs

Richard Wagner elaborated leitmotifs with revolutionary ingenuity and intricacy. His 'music-drama' *The Ring* heavily influenced movie sound-track composers and advertisers. These purveyors of mass entertainment and mass marketing are responsible for the most recognizable leitmotifs. In the original 'Star Wars' movie, John Williams established the Imperial March as the leitmotif for Darth Vader. In the prequel, 'The Phantom Menace', a leitmotif is introduced for Anakin Skywalker. Anakin's leitmotif eventually segues into the Imperial March after making references to the leitmotifs for Luke and Lea (Darth Vader's two children).

In 'Sweeney Todd' there is a leitmotif for the barber's wife. There is also a leitmotif for a beggar woman. As the opera progresses, the leitmotifs gradually converge to signal that the barber's wife is the beggar woman. This alarms the audience because the barber, unaware of the identity, plans to murder the beggar woman.

The opera illustrates how music can represent precise propositions of the form a = b where the flanking referential devices are leitmotifs. There is no clear point at which an antecedently naïve audience knows the identity. The revelation is intended to creep up imperceptibly, each identification being a clearer foreshadowing than its predecessor.

The Sweeney Todd progression suggests a strategy for deriving vague identities: just truncate the resolution in a sequence of paired leitmotifs. This makes it indefinite whether a = b.

9. Deictic Leitmotifs

In 'Jaws', the shark leitmotif means 'The shark is near'. Variations that increase volume, tempo, and pitch mean 'The shark is approaching'. These warnings exploit the Doppler effect. They are therefore capable of modulating which indexical thought is being expressed.

The dimension of comparison can be developmental. In the 'Star Wars' prequel, 'The Phantom Menace', the childish version of Darth Vader's leitmotif suggests 'Anakin Skywalker is Darth Vader'. As Anakin begins to show villainous predispositions, the leitmotifs bear a growing resemblance to the Imperial March.

Sorites reasoning entices the weak-willed with a chain of seductive alternatives.[23] Choose *now* between a significant, immediate gain and

[23] Stephen P. Schwartz, 'Soritic thinking, vagueness, and weakness of will', *New Ideas in Psychology* **27** (2009), 18–31.

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a *later*, insignificant cost. It seems *irrational* to resist any of the temptations.[24] Music that exemplifies this slippery slope is an incipient explanation of the mode of corruption.

Logicians define an enthymeme as an argument with an unstated premise or conclusion. Philosophers see enthymemes everywhere in ordinary speech. But often speakers are merely exhibiting the resources that could be fashioned into arguments. Musicians are capable of the same gesture.

10. The Shepherd Tone

Allusion to the sorites can also be achieved with an auditory illusion. At Bell Laboratory, Roger Shepherd constructed a tone that seems to ascend endlessly in semitone steps.[25] After twelve semitone steps, when the pitch has risen one octave, the new spectrum of stimuli is the same as the original spectrum. However, the listener fails to recognize that he has traveled in a circle because of the momentum of his auditory journey. Instead of recognizing that he is back where he started, the listener misinterprets the starting point as being higher in pitch than the last semitone in the circuit. So he is poised to repeat the ascent. After a number of circuits, the listener realizes that the tone cannot really have risen so many steps.

The illusion can be formulated as a mathematical induction:

1. Base step: The tone ascends for one semitone.
2. Induction step: If the tone ascends for n semitones, then the tone ascends for n + 1 semitones.
3. The tone ascends for one hundred semitones.

The resemblance with the sorites is even stronger when the Shepherd tone is presented as a continuously rising tone rather than in discrete steps. Unlike a sorites paradox, audio equipment can pinpoint where the induction step fails, exactly at $n = 12$. Nevertheless, this is an illuminating approximation of the sorites paradox. For instance, epistemicists can reason that since this threshold is nearly impossible to detect, other thresholds are fully impossible to detect. (Analogy: If campers hang their food so high that it is nearly impossible for a bear to reach it, they can hang it yet higher to make it fully impossible for a bear to reach it.)

[24] Warren Quinn, 'The puzzle of the self-torturer', *Philosophical Studies* **59** (1990), 79–90.

[25] Roger N Shepherd, 'Circularity in Judgments of Relative Pitch', *Journal of the Acoustical Society of America* **36** (1964), 2346–2353.

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The Shepherd Tone is difficult to reproduce on musical instruments. It is best produced by computer and best heard through headphones. Nevertheless, the illusion is robust enough to be incorporated in the endless staircase of the 'Super Mario 64' video game.

In addition to metaphorically exemplifying vagueness, the Shepherd tone metaphorically exemplifies impossibility. The presented tone is impossible and so nothing can cause it. Thus the Shepherd tone is a resource for representing the strongest kind of reference failure.

11. Musical Quotation

Claude Debussy quotes disparagingly from Wagner's 'Tristan und Isolde' in the Golliwogg's Cakewalk. Staccato chords that sound like chuckles serve as quotation marks.

Quotation incorporates a competence-performance distinction. One edits out distracting slips and disfluencies. However, Charles Ives quotes the music played by drunkards and amateurs. This creates borderline cases in which it is not clear whether Ives is correctly quoting a mistake or is misquoting a correct performance.

There are also cases that are borderline between stylistic imitation and quotation. Arthur Sullivan impersonates great composers so well that it is sometimes impossible to demarcate the boundaries of the quotation. When does Sullivan stop referring to other music? This referential indeterminacy enhances the musical interest of his compositions.

Musical quotation is an accepted legal defense against the charge of plagiarism. One concedes that the resemblance was intentional but denies that the composer was presenting the work as his own. Instead, the defendant claims he was attributing the melody to another musician.

Documenting musical quotation is difficult because there is no tradition of footnoting in music. However, we can still ask composers and consult records. In the 'Florestan' section of *Carnaval*, Schumann quotes a theme from his earlier work *Papillons*, Op. 2. He explicitly acknowledged the quotation in his score by writing '(Papillon?)' underneath the notes.

The citation practices are better developed for variations (in which a composer takes a theme from another composition and then alters it). Commonly, the source of the variation is in the title as in Johannes Brahms' 'Variations on a Theme by Joseph Haydn'.

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Musical reference is most salient when it runs between different genres. Charlie Parker quotes Stravinsky's *Rite of Spring* in his jazz solo on 'Repetition'. It is important not to hear Parker's solo as imperfectly played classical music.

12. Musical Tautologies

When Robert Schumann was asked for the meaning of one of his compositions, he replied by just replaying the piece. This response has the air of a tautology – truth in virtue of meaning. If Schumann had instead replied with a funeral march, then his response would have had the air of an obvious falsehood.

Music needs enough repetition to frame expectations.[26] However, the composer must also add differences that challenge the ear. Bored listeners will ridicule composers:

> Knock knock. Who's there? Philip. Philip who? Knock knock. Who's there? Knock knock. Who's there? Philip. Philip who? Philip. Philip who? Knock knock. Who's there? Philip. Philip who? Knock knock. Who's there? Knock knock. Who's there? Philip. Philip who? Philip. Philip who? Philip. Philip who? Philip. Philip who? Philip Glass.

To preserve interest, conductors delete the musical tautologies of fugues.

Schumann was explaining rather than performing. By repeating what he played instead of paraphrasing it in words, Schumann communicated his belief that there was no more informative answer than the piece itself.

Logicians distinguish between syntactic tautologies (those made true by the meanings of the logical constants) and semantic tautologies (which further rely on the meanings of other words). The strong syntactic aspect of music gives initial momentum to the analogy. However, the scarcity of logical constants drastically curtails the range of literal, syntactic tautologies.

13. Paraphrase and Parody

One reservation about Schumann's musical tautology is that it borrows too much content from a *question*. One remedy is to make

[26] David Huron, *Sweet Anticipation: Music and the Psychology of Expectation* (Cambridge: MIT Press, 2006).

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the music react to other music instead of a question. Mozart's 'A musical joke' showcases musical mistakes in the same spirit as William Hogarth's engraving 'Satire on False Perspective'.

Falsehood figures in the concept of caricature. Mozart exaggerates errors to make them more recognizable. The caricature is not intended as accurate quotation. It is a kind of deliberate misquotation.

One of the puzzling aspects of reference is our apparent ability to refer to non-existents. Compounding the puzzle are cases that are borderline between referring to what exists and referring to what does not (or perhaps, failing to refer at all). Nineteenth Century Viennese composers quote or 'quote' Chinese music. They play to Western stereotypes of Chinese music to evoke an exotic setting.

14. Ambiguity vs. Vagueness

In music, silence is ambiguous. Most commonly it means 'This is the end'. But it can also symbolize death. For instance, in the 'Crucifixus' section of J. S. Bach's *Mass in B Minor*, silence denotes the death of Jesus (and sets up a resounding resurrection sequence). Sometimes, silence works like onomatopoeia. In Debussy's *Prelude to the Afternoon of a Faun*, silence marks the intervals between the inhalations and exhalations of the daydreaming faun.

In yet other cases, silence means nothing at all. It is just a pause. Joseph Haydn exploits these meanings and non-meanings. His Opus 33 (popularly known as 'The Joke') contains several false endings. When the string quartet goes silent, the deceived audience begins to applaud. The music then continues, embarrassing the audience into quieting down. The cycle continues, drawing the audience into the joke, leaving everyone laughing.

Musical ambiguity is resolvable by further development of the piece. Vagueness lacks this resolvability. Consider Peter Tchaikovsky's last symphony (No. 6 in B Minor, Op. 74 'Pathétique'). Its character as a requiem is signaled in the first movement by trombones quoting a Russian Orthodox chant for the dead. The finale is unconventionally slow and mournful, trailing off into silence. It is indefinite when the silence stops meaning death and starts marking the end of the composition. The boundary between representing an absence and an absence of representation is left poignantly indefinite.

What can be done with silence and can also be done with noise. When playing 'Wild Thing', Jimi Hendrix would play his electric guitar in a progressively, unconventional, beserk fashion. He rubbed the guitar against the microphone stand, pounded the

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guitar on ground, and then smashed it. Some time before the total destruction of the instrument (often by fire), Hendrix had passed the threshold from music to noise. The indeterminacy of the boundary allowed Hendrix to smuggle in some of the disorganization of noise into his music.

15. Precisifying Music?

Rudolph Carnap believed that language *progresses* toward precision. He suggests that we wait out the philosophical challenges posed by vagueness. Eventually language will become so precise that the sorites paradox will no longer be expressible.

Carnap's prediction of a completely precisified language is unrealistic. Bas van Fraassen reframes Carnap's idea as a Kantian regulative ideal.[27] Language is an incomplete representation that strives to become ever more complete – even if completeness is unattainable. According to van Fraassen, this *ideal* completeness entitles us to apply the method of supervaluations to vague statements. If Jack is a borderline case of a tall man, then 'Jack is tall' is neither true nor false. However, 'Either Jack is tall or it is not the case that Jack is tall' is true by virtue of the fact that it comes out true under all the ways of making 'tall' completely precise. In this way, the supervaluationist preserves all the tautologies of classical logic.

Carnap and van Fraassen assume that language has the potential to become precise. This is plausible because each natural language is expressively complete. Anything that can be said in one language can be said in any other. Music lacks this semantic potential.

Of course, one can overwrite messages on to music. In the Sherlock Homes 1946 movie 'Dressed to Kill', a prisoner makes three music boxes. Each states part of the location of stolen Bank of England engraving plates. When his accomplices fail to purchase all the music boxes sold through the prison workshop, Holmes has an opportunity to deduce the message encoded in the remaining music box. His intensive study of the music is completely unmusical.

The mutual exclusivity of language and music prevents us from analyzing the vagueness of music in terms of its possible precisifications. Music necessarily lacks the means of making itself fully precise.

[27] Bas van Fraassen, 'On a Kantian Conception of Language', in R. M. Martin (ed.) *The Paradox of the Liar* (New Haven: Yale University Press 1970), 59–66.

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Trying to analyze Debussy's 'Clouds' by surveying all of its potential precisifications is like trying to analyze Woody Allen's intentionally black and white movie 'Manhattan' by reviewing all of its potential colorizations. 'Manhattan' at least has potential colorizations. Debussy's 'Clouds' does not.

Black and white photography has survived the development of color photography partly in virtue of its *inability* to express hues. This color blindness makes subtle features of light visible. Semantic blindness makes subtle features of sound audible. Like Ulysses, we lash ourselves to the masthead of meaninglessness to hear music.

But that is formalistic overstatement. In truth, music is tied together with translucent threads of demonstratives, indexicals, names, quotation, and identity. The formalist insight is that these semantic connections are scanty. Are they negligible remnants of speech? Are they living fossils from whence speech evolved? Or are these threads as functional as those of a spider?

Regardless of their functionality, the semantic devices of music demonstrate that vagueness can arise in a non-linguistic medium. Observing how vagueness survives in this austere setting may reveal features that are otherwise obscured by the luxuriant growth of natural language.

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