Comments on Alistair Isaac's "Physicalist vs Ecological Accounts of Perceptual Content: Lessons from Timbre"
SSPP, Austin, TX
March 2, 2013
Casey O'Callaghan (Rice University)

According to Alistair Isaac, a physicalist account identifies timbre with some physical property of sound waveforms, and an ecological account identifies timbre with an aspect of the macroscopic event or process that produces sound waves.

Isaac argues that contemporary musical practice provides evidence that favors an *ecological* rather than a physicalist account of audible timbre.

This is noteworthy because he also suggests that contemporary visual artistic practice provides evidence that favors a *physicalist* rather than an ecological account of visible color.

Isaac argues for each of these claims by appealing to the idea that if we can systematically *control* sensible quality experiences by manipulating some range of external properties, then this suggests that we have correctly identified the external features with which sensible quality experiences correlate. Isaac thinks that artistic practice is the place to look for evidence that we have systematic control over various sensible quality experiences.

In the case of color, Isaac suggests that the external correlates of color experience are light-reflective physical properties rather than ecological properties like *ripeness*, *edibility*, *conspecific*, or *ruby*. Painters capture color appearances of things in the world. They are able to manipulate color experience by mixing pigments. But, he argues, many of these pigments are artificial, rather than naturally occurring---they are not "fashioned from substances of biological interest on an evolutionary scale" (3), and, presumably, many of them do not occur in nature at all. Thus, we can mimic natural colors with physically different substances, and we can generate novel artificial colors, simply by taking advantage of the light-reflective properties of substances.

However, Isaac's claim is that the same is not true of timbre. To manipulate timbre, rather than appealing to properties of sound waves such as their harmonic structures, we need instead to have a grasp on the kinds of macroscopic physical or mechanical processes that tend to produce sound waves, such as *scratching*, *grating*, or *splashing*. He seems to have in mind the following contrast with the case of color: we don't need to know about the nature of bananas or fire engines to match their colors.

To assess the argument in the case of timbre, it may help to consider things this way: What would the parallel arguments be if the evidence were to favor a physicalist over an ecological account of timbre, as in the case of color?

First, musicians (or sound engineers) would be able to capture the timbre

appearances of sounds in the world and, thus, to manipulate timbre experiences through artificial means. And they should be able to do so by creating very different physical sound-producing events which nonetheless cause similar timbre experiences in virtue of their acoustical spectral properties.

But, of course, technology does make this possible. A stereo speaker's vibrating paper cone makes sounds through a very different sort of physical process than does a person's body splashing into Barton Pool, but they may match in timbre. In artistic practice, the violin is said to mimic most closely the emotionally expressive sounds of the human voice, though a violin produces sounds in a different manner from the human voice. And the sound waves don't need to match in order for timbre to match. The sound spectrum of your voice differs greatly when heard over the phone, but it matches in timbre.

It is not a good objection to timbre physicalism that sounds whose acoustical properties differ may lead you to experience the same timbre. Metamerism shows that surfaces that differ in light reflectance may match in color appearance. Reflectance physicalists respond that colors are light reflectance types, and timbre physicalists may respond that timbres are acoustic spectral profile types.

Second, however, if the evidence favored a physicalist over an ecological account of timbre, then musicians and sound engineers should be able to produce novel artificial timbres that do not exist in nature---ones that are not "fashioned from [acoustical events] of biological interest on an evolutionary scale".

Of course, there are plenty of sounds that don't occur in pre-modern nature. Just consider beeps and blenders. According to Isaac, however, the critical test case is the musical synthesizer. Despite manipulating overtones, the synthesizer has not yielded an entirely new *range* of timbres that cannot themselves be understood just in terms of ecologically intelligible *ways of making sounds*---that is, in terms of the kinds of macroscopic sound-making processes that might occur in nature: scraping, rattling, breaking, and so on. Isaac contends that the synthesizer yields just one new timbre: "*electronic*" (6). And this is supposed to tell against physicalism and in favor of an ecological account.

But the synthesizer indeed does generate lots of new timbres. Synthesizers (not to mention other modern devices) do create a wide variety of novel *determinate* timbres. And, moreover, the fact that they all seem to belong to a common "electronic" family just means that they *do* constitute a novel *determinable* or *type* of timbre. These *electronic* timbres *are* recognizably artificial rather than naturally occurring or "fashioned from [acoustical events] of biological interest on an evolutionary scale".

Nevertheless, Isaac's point, I think, is that this novel type of timbre in fact *is* akin in one important respect to those associated with *scratching*, *rattling*, and *brushing*. All of these timbres are individuated and typed in terms of *activities*---the macroscopic physical events or processes---that generate them, rather than in terms of the small

scale physical properties of sound waves.

For instance, Isaac says that modifying instruments does not produce entirely new types of timbres. Instead, he says the new timbres are best characterized in terms of types of sound-making activities, such as clapping and sawing, that generate them.

So we have a potential contrast with colors. Isaac's central claim must be that we're not inclined to characterize or individuate colors in terms of the things that tend to bear them, but we are inclined both to characterize and to individuate timbres in terms of the macroscopic happenings that generate them.

I want to conclude with four quick comments for discussion.

The first is that this leaves no good explanation for color characterizations such as *ruby*, *scarlett*, *ochre*, *moss*, *ebony*, *indigo*, *aquamarine*, and *orange*.

The second is that the timbre physicalist shouldn't accept a too-simple view that identifies particular timbres with particular acoustical waveforms. Given the possibility of acoustical metamerism, the physicalist should say that timbres are types or classes or disjunctions of determinate acoustical waveforms. And types of sounds, such as *electronic*, *scratching*, etc., might be even more greatly disjunctive.

The third is that acousticians and psychoacousticians will dispute the claim that these canonical types lack a distinctive, predictable sound signature. "Electronic" sounding timbres tend to be very "clean" sounds marked by harmonics of a simple sinusoid. Sawtooth waves at the same frequencies have a characteristic timbre more akin to that of a bowed instrument.

The fourth is that the physicalist need not identify timbres with properties of sound waves at the ear. Instead, a physicalist can be a distal sound theorist and accept that timbres themselves are physical properties of the events or processes that generate sound waves. On this view, timbres are physical features of disturbance events that involve the activities of a source.

Together, this all suggests to me that there is a great deal less evidence to distance color from timbre with regard to ecological and physical theories.