Response to Geraint Wiggins

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In response to the contribution to this volume by Geraint Wiggins, I ask what music theory is for, and argue that, through education and the activity of composers, it has an influence on the very music it aims to describe. I defend Schoenberg from the charge of ignoring musical perception, and claim his music is successful even if not in the way he had envisaged. The music theoretic enterprise, including its mathematical branch, has an effect on musical culture, but that effect might be difficult to predict.

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Geraint Wiggins presents his contribution in what some call ‘first-movement form’. What second movement should follow? I do not feel sufficiently inventive for a set of variations, nor inspired for a lyrical slow movement in a relaxed subdominant, so let me instead attempt a scherzo with a trio in defence of Schoenberg.

The influence of music theory

I find myself in agreement with much of what Geraint Wiggins says in answering his question of what music theory is, but in response I want to ask what it is for. Geraint Wiggins has already given three answers to this question: ‘to facilitate teaching’, ‘to bootstrap [...] musical introspection’, and ‘to underpin music analysis’. It achieves this in part by virtue of one of its ontological statuses: as a language for the communication of musical ideas.

It is important to realise, though, that the ideas communicated are not used only in abstract discourses. Beginning students of music in the UK typically take graded ‘music theory’ examinations through institutions such as the Associated Board of the Royal Schools of Music. The subject of these exams is, for the most part, the concepts required in order to read standard music notation. In other words, the purpose of music theory here is to allow musicians to read a score. Readers of this journal might object

that the theory we deal with is far more sophisticated than that, but sophisticated theory is also regularly used for reading a score when that score contains figured bass. While the essential principle is easily expressed—a figure below the bass note indicates that one or more notes should be played one less than that number of scale steps above the bass note, plus any non-negative number of octaves—in practice not all the notes to be played are specified by figures and occasionally alterations of the required notes are not specified. The reader needs to know additional theory about harmony and counterpoint in order to be able to infer the missing notes and understand what should be played when the figured bass is realised.

Geraint Wiggins contrasts music theory with scientific theories which make predictions which can be tested in the real world. Music theories can be predictive, though they are rarely used in this fashion. For example, the theory of functional harmony can be used to predict that a passage ending on a perfect cadence will sound more final than one ending on an imperfect cadence, and in one sense the role of the theory for a music student is to be able to predict the musical effect of a particular configuration of notes. Importantly, though, the prediction only comes true in situations when the listener is suitably acculturated in western music. There is no absolute reason why perfect cadences should sound final, otherwise every piece everywhere would end on a perfect cadence, and pieces which begin with the configuration of a perfect cadence (such as the trio from Mozart's 'Jupiter' symphony in C major, K. 551) would be impossible. Furthermore, the theory on which the prediction is based has itself had a role in the acculturation. Geraint Wiggins asks whether knowledge of music theory has an effect on music perception, but even if it did not, there is an effect on the entire process of perceiving closure at perfect cadences. While it cannot be claimed that composers put perfect cadences at the end of their pieces *because* they learned to do so

from music theory classes, those classes cannot but have some effect on their compositional practice. This practice in turn influences the learned expectations of listeners, who become acculturated partly on the basis of the music which composers write. Here is another way in which music theory is not like theories of the physical world: a theory of matter does not affect the way subatomic particles interact, but a music theory does influence the way music is produced, and so the way it is heard also. Music theory influences the very phenomenon it is intended to describe.

On the question of whether or not knowledge of music theory affects music perception, it is worth remarking that many empirical studies show distinct differences in response patterns between those with musical training and those without in tests probing the perception of tonal relations where no difference is found in other respects (e.g., [1]). While we might presume that this training includes study of music theory, I am not aware of knowledge of music theory having been tested directly in such studies. Furthermore, a very interesting partially conflicting result comes from a brain-based study by Bresson [2]. ERP responses (roughly, voltages indicating localised brain activity) were measured for different groups of subjects hearing short melodies during a task in which they were asked to identify the kind of change made to the last note. Subjects with musical training showed greater success in identifying out-of-key changes in unfamiliar melodies and in-key changes in both familiar and unfamiliar melodies, and also showed greater ERP responses to the same stimuli. However, when subjects were asked simply to listen and not to identify the kind of change, there were no significant differences between those with musical training and those without. We can infer that in this experiment the musically trained subjects perceived differently *only when performing a task which explicitly required the application of music-theoretic*

knowledge, so the effect of knowledge on perception might be task-dependent and absent in 'pure' listening.

In defence of Schoenberg

Both Geraint Wiggins and Guerino Mazzola make criticisms (actual or implied) of Schoenberg. In Guerino Mazzola's case, though Schoenberg is not mentioned by name, his serial music is implicitly criticised for its 'purely formal approach' devoid of 'semiotic depth'. While a defence could be mounted on the basis of the presence of semiotic depth (think of *A Survivor from Warsaw*), I wish to claim here that the compositional approach is not purely formal. If it were so, then any rendition of a piece which had the same set of formal serial relations would be equally legitimate and be, in a sense, a performance of the same piece. The music could be performed backwards, for example, since this would preserve all inverse and retrograde relations. Schoenberg's pieces are not performed backwards, and he chose to write particular notes and rhythms rather than to simply present serial relationships. His choices were presumably motivated by musical, and even perhaps semiotic, concerns. Writers, including sometimes Schoenberg himself, might emphasise the formal aspects, but the music is not purely formal.

The criticisms Geraint Wiggins makes are on different grounds: Schoenberg ignores the 'framework of music perception' which should inform theorising about music. I agree that Schoenberg failed to write music devoid of traces of functional tonality, because listeners continue to perceive that kind of relation in his music, and it cannot be denied that Schoenberg's music has not caught the interest of the public. While even Schoenberg himself might have lamented both these as a lack of success, they do not mean that Schoenberg wrote unsuccessful music. (It must be acknowledged that Geraint Wiggins did not state that he did.) I am that rare creature: a Schoenberg fan.

Geraint Wiggins states that by removing tonal relations Schoenberg has removed one of the mechanisms which aid in musical perception and memory, and I find evidence for this in my own experience. While I listen regularly to Schoenberg's *Variations for Orchestra,* I find it difficult now to recall much of the piece except the opening and the use of the BACH figure. I do not believe, however, that this prevents me from enjoying listening to the piece; the experience is different from listening to variations by Brahms, but no less musical.

Furthermore, while Schoenberg 'emancipated' dissonance, he did not seek to reverse consonance and dissonance. Instead, consonance is simply largely absent from his pieces. Schoenberg chose not to use a device which acoustics and music perception makes available to composers—the dichotomy of consonance and dissonance—but I do not think he ignored the 'framework of music perception' to the degree of attempting to go against that framework.

Theory and culture

I argued above that music theory, music education, music practice and music perception exist in a circle of relationships. Other factors intervene, so the relationships are not necessarily direct, and by the time theory has influenced perception via practice and acculturation the phenomena of perception might be very different from the phenomena described by the theory. To return to Schoenberg briefly, history suggests that listeners have not become acculturated to hearing tone rows. Maybe twelve-note serial music simply has not been heard enough, but more likely hearing tone rows is simply too difficult to be picked up by acculturation. (For one thing, twelve pitches are too many to be held simultaneously in working memory.) What listeners hear in twelve-note serial music is something different from tone rows. The compositional technique has consequences which probably are picked up by listeners: ubiquitous use of all twelve

pitch classes and recurrent interval patterns in particular. Furthermore, it would be difficult to deny that Schoenberg had an influence on music history, probably even on the history of tonality. The music of John Adams, for example, is tonal in a rather different way from that of Richard Strauss, and part of the reason is probably the experience of the atonal project of which Schoenberg's serial music was a part.

For the elements of a compositional technique, and associated theory, to be difficult or even impossible to hear does not mean that the theory has no influence. Music history has a number of cases of inaudible compositional technique which nevertheless probably has audible consequences. The cantus firmus in notes too long to be heard as a melodic line found in some late medieval music is an example. Rock music regularly includes inaudible lyrics, but these have undoubtedly had an effect in the process of composition.

Music theory, including mathematical music theory, even if it does ignore the 'framework of music perception', has an effect on music. Mathematicians and theorists do not live on Mars but are part of the musical culture about which they theorise. What effect would we like to have on music? Even if we could answer this question, history and the confounding factors which intervene between theory and perception suggest that we cannot be certain of having the effect we desire. To be sure, we would need a meta-theory which accounts for the effects of music-theoretic developments, perhaps building on the kind of theorising about theory which Geraint Wiggins exemplifies, but that really would be a theory whose predictions none of us would be able to test!

References

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[2] M. Bresson, *Electrophysiological studies of music processing*, in *Perception and Cognition of Music*, I. Deliège and J. Sloboda, eds., Psychology Press, Hove, 1997, pp. 217–250.