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## Micro-Diatonicism and Formal Structure in 20th-Century Music

### ABSTRACT

#### Background

20th century music engages with the diatonic collection in new and fascinating ways, however, coming to specific terms with the 20th century use of the diatonic collection is challenging. Composers all have a slightly different relationship with diatonicism; some openly embrace it, others seem to abandon it completely, and many fall somewhere in between. Though 20th century composers explore new sounds, many ideas from previous musical generations persist, including the use of motives as the building blocks of melodies. The pitch element of these building blocks can be reduced into a set class representation, which takes an infinite pool of ideas and groups them into a finite number of sets, each member of which, though different, bears a familial resemblance. This process allows a melody whose theme or phrase length, that is macro-, pitch collection is not clearly related to a known scale entity to be associated to one on a motivic, or micro-, level.

Though composers use many different interesting scales, throughout history, none is more fundamental than the diatonic collection, so this paper studies melodies' interaction with the diatonic collection on a motivic level, or micro-diatonic analysis.

#### Aims and Repertoire Studied

Examination of 20th century melodies shows that, though Britten's melodies do not stay in one scale on a theme by theme level as Schubert's do, the motivic level diatonicism, or micro-diatonicism, in both Britten's and Schubert's melodies are quite similar. Learning more about how composers engage with the diatonic collection will lead to recognition of syntactic patterns. These patterns lead to diverse conclusions, such as formal delineation and text painting. This paper aims at learning insights into music by 20th century composers, including Britten, Webern, Hindemith, and Bartók, but in order to better contextualize these 20th century composers' use of micro-diatonicism, this paper compares them to some musical examples by common-practice composers, such as Schubert and Schumann.

#### Methods

To study and quantify melodic micro-diatonicism, I designed a computer program that runs on a Python platform using the Music21 library. To measure micro-diatonicism, the program scans the music in a fixed window-size and discerns the set class of each set. Along with the statistical data, the program also reproduces the score with each non-micro-diatonic set marked with set-class identification. This methodology bears some similarity to Dmitri Tymoczko's macro-harmonic analysis from his book *A Geometry of Music*. As the terms imply, though, his text studies how different

works gather pitch collections in an ever increasing window size, from one note through the entire length of a piece, whereas micro-diatonic analysis examines how a composition is built using smaller diatonic or non-diatonic blocks. The small fixed window size, though not a perfect system, is meant to be representative of the typical three or four note length of most motives.

There are two main goals in using a computer program to aid in the gathering and analysis of data. The first is to make studying a large quantity of music easier, which will ultimately yield more reliable statistical data. The second is to minimize the partiality of the analysis. Asking a computer to perform a human task forces us to question each of our biases. The strict set of rules inherent in coding a computer program minimizes any inherent biases and expectations.

#### Implications

This paper shows that in some works by composers such as Benjamin Britten and Paul Hindemith, the melodies are primarily built out of subsets of the diatonic scale. The times where non-diatonic subsets occur align with functional or expressive moments. In his *Sonate für Harfe*, Hindemith's primary and secondary theme melodies are individually 100% micro-diatonic, but the transition between them is delineated with a striking non-micro-diatonicism: the melody moves from A-flat, to F, and then landing on E natural, creating set class (014). This (014) acts as a herald to the listener of a change in character and form.

Similarly, in Britten's 'Sonetto XXXI' from his *Seven Sonnets of Michelangelo*, amongst an overwhelmingly micro-diatonic landscape, each verse of the melody is separated by a non-diatonic subset. The only other non-diatonic subset in the melody text-paints a reference to heaven.

Along with delineation of form, study of micro-diatonicism provides a way to quantitatively show that Webern's tone rows are not only perceptually not-diatonic, but actively crafted to avoid diatonic relationships. A new listener to Webern music might interpret Webern's music as random sounding, but this statistical approach shows just how much more adiatonic Webern's tone rows are than random.

Though computer-aided analysis is not a novel idea, analysts have only begun to explore all of its myriad applications. This program studies melodies' interaction with diatonicism, but the same base data could also provide insight into other collections, or the program could be applied to harmonies rather than melodies. Alternatively, a temporal window rather than a fixed note length window may yield additional insights. Though new technologies require patience and persistence, they also unlock an array of diverse applications.

#### Keywords

Form, Melody, Diatonicism, Set Theory, Advanced Tonality, Post-Tonal Music.

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