

Commentary on Microtonal Analysis of "Blue Notes" and the Blues Scale by Court B. Cutting

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ABSTRACT: This commentary relates to the target paper by Cutting on the microtonal analysis of pitches in the vocal lines of fifteen blues recordings. After relating Cutting's study to Jeff Todd Titon's *Early Downhome Blues*, some of its merits and shortcomings are discussed. Finally, it is suggested to surpass the study of an abstract blues scale with research on blues modes, including characteristic ornamentations such as glides as well as typically employed patterns that specify certain blues songs or song types.

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THE study by Court B. Cutting contributes to the vast literature on the so-called "blue notes" by developing new methodologies rooted in music information retrieval and statistics. Cutting's pioneering study builds on automatic measurement of vocal lines within fifteen blues recordings and statistical clustering of these pitches. Since this approach has parallels with Jeff Todd Titon's study of the "blues scale", I will start with a short description of Titon's methodology and findings. Then, I will discuss the innovative methods, results and shortcomings of Cutting's research, and make some suggestions regarding how to proceed in this area of research.

In 1977, ethnomusicologist Jeff Todd Titon published *Early Downhome Blues. A Musical and Cultural Analysis*. One of the merits of this ground-breaking study on early blues recordings was the attempt to formulate a song-producing system for the downhome blues genre (Titon, 1977, pp. 59-189). This cognitive production system is based on transcriptions of the lyrics and vocal lines of 44 blues songs recorded by seminal blues singers between 1926 and 1930; additionally, three vaudeville blues songs were investigated. In most cases, Titon transcribed the first stanza only, but in some cases the whole songs were depicted. Within the staff notation, he indicated microtonal deviations from notated pitches by arrows (upward and downward), and slurs from and to either definite or indefinite pitches. All transcriptions were transposed to C as a tonic to enable comparisons. In the section on "motional organization" (pp. 152-66) the pitches of these transcriptions were counted and annotated with arrows, to develop a "pitch lexicon" (p. 153) and, finally, a "downhome blues scale" (p. 154). Since longer notes seem to be more important than shorter notes, he counted "stems" to weigh the pitches with differing tone durations. Moreover, he followed the intuition that the pitch usage could differ between different octave positions, with reference to the tonic. The result is a frequency distribution of 41 pitches including pitch categories with upward and downward arrows, and ranging over two octaves from G below the tonic C to G' above the octave C'. Along with C (365 stems) and C' (275 stems), most of the notes lie within four pitch complexes: The E complex ranging from Eb to E (346 stems), the G complex (Gb to G, 471 stems, most of them G), the B complex (Bb to B, 108 stems), and the E' complex (204 stems). As Titon puts it, these complexes are often termed "blue notes". It is worth mentioning that Titon did not stop his study with the construction of that "blues scale", but continued with an examination of the usage of the pitches within the vocal lines, looking for a blues mode: "While a scale simply identifies the pitches in a group of songs, a mode indicates their potential uses." (Titon 1977, p. 154). I will come back to the idea of a blues mode at the end of my commentary.

While Titon transcribed the pitches by ear and related them to the chromatic system (or twelve-tone equal temperament, short: 12 tet), Cutting utilized spectral measurements of the recordings. This leads to more exact and subtle results. Additionally, he did not label the pitches as deviations from 12 tet; on the contrary, he used a clustering procedure to find areas of predominantly used pitches which are not dependent on the 12 tet grid. Following Titon's suggestion, Cutting determined the pitch complexes and a blues scale by counting pitch incidences, but does not try to weigh certain pitches with the durations of the corresponding tones. The results are depicted in both Table 2 and figure 2, and are then discussed in detail.



Cutting's overall aims were, firstly, to contribute to the theory of the blue note (i.e., its empirical identification and theoretical foundation), and secondly, to distinguish personal blue note styles across individual singers. Although he selected two recordings of Vera Hall, Son House and Charley Patton each, the data sample of only fifteen songs was too small to pursue this second goal. In table 2, only 1,006 notes are listed which could be assigned to one of the eleven clusters. Compared to more than two thousand stems in Titon's exploration, this is a relatively small dataset.

However, there are two very clear and rather astonishing findings: Firstly, the data clustering clearly indicated that there is a broad cluster of the third with almost a quarter of all tones (235), and a mean of almost exactly the neutral third (352.2 cent). Therefore, the claim of several blues scholars that this important blue note area is not built up by deviations from the major and/or minor third, but rather has a neutral third at its center and basis, appears to be true. Secondly, the second important blue note around the tritone is clustered together with the fourth scale degree (153 notes with a mean of 534.3 cent) – and not, as the widespread term “flatted fifth” may suggest, with the fifth degree. This may lead to a new understanding of this blue note area. The findings regarding the third blue note complex around the flat seventh with only 78 notes divided in three clusters are not so clear to me and, therefore, Cutting's corresponding conclusions seems to be rather speculative.

This brings me to the main shortcoming of this pioneering study: the quantity and representability of the data. Compared with Titon's corpus, the dataset of Cutting's study is small. He examined only fifteen songs that are less homogenous, since their recording dates range from the late 1920s to the 1960s. To make valid conclusions with regards to blue notes, blues scales and personal styles, the study should be extended by building up and exploring a larger corpus.

More crucial are two further limitations. Firstly, Cutting excluded all tones where the vocal line interferes with the instrumental accompaniment. Secondly, he excluded all tones with glides, i.e., with changing pitches. Of course, both restrictions are due to difficulties they cause for automated measurements. Unfortunately, there is no information about the percentage of these excluded tones in relation to all tones of the vocal lines in the recordings. Following the transcriptions of Titon, tones with glides are widespread in vocal blues performance, encompassing at least twenty percent of all tones sung (and often the longer and more important ones). Presumably, there are also many vocal tones masked by the accompaniment. Therefore, it could not be excluded that the data explored in the study is systematically distorted. For example, an examination of recordings by Charley Patton clearly indicates that he very often sings a long slur from the minor to the major third in his blues recordings, such as in his recordings of “*Down the Dirty Road Blues*” (1929) and “*34 Blues*” (1934) (cf. Hähnel 2015; Hähnel, Marx and Pfeleiderer 2014). There are more examples of slurs within the crucial blue note areas in recordings of other blues singers. It could even be hypothesized that many blue notes are glides through certain pitch areas, rather than definite pitches.

It is not an easy task to avoid these data distortions. However, one may combine manual transcriptions of the vocal lines with procedures of score-informed isolation of the vocal lines, followed by a detailed automated measurement of the pitches and pitch modulations within these isolated lines. A promising methodology to do that has been proposed by Abeßer et al. (2017) using manual transcriptions of solo improvisations from jazz recordings (cf. also Abeßer and Frieler, 2017). In a first step, one can take the 47 transcriptions of downhome and vaudeville blues songs which Titon published in his book, and determine the exact pitches and pitch modulations of the vocal lines isolated by using algorithms proposed by Abeßer et al.; this would be a promising approach for improving both the quality of the corpus, and the representability and validity of the results.

Of course, to determine exactly how pitches glide does not solve the problem of determining the central pitch within the gliding movement. Often, as Titon suggests, the pitch of a tone can be assigned to the starting or final pitch that the movement is gliding from or to. However, one could go a step further, skip the task to determine a blues scale with definite pitches, and, instead, describe a *blues mode* for a certain song, a personal style or the whole genre of downhome blues. This mode may include typical melodic patterns and melodic contours such as those described by Titon, as well as characteristic ornamentations such as, in blues music, pitch glides and bents. This perspective allows for describing a certain repertoire of blues songs as a modal system – in accordance with the concept of modality prevalent in many music cultures of the world such as Indian and Arabic music. As an example, Indian raga is defined not only by its scale with a tonic and a certain hierarchy of the pitches, but by certain melodic cells and patterns as well as characteristic ornamentations, so-called gamaka (see Bor, 1999). It might be a

promising approach to not only look for a blues scale but, at the same time, for melodic patterns and ornaments such as glides and bents which all together characterize a blues mode.

At this point, it seems to be valuable to recall how Harold Powers defines modality in his article on “mode” for the second edition of the New Grove Dictionary:

“Taking the term in the modern, twofold sense, mode can be defined as either a ‘particularized scale’ or a ‘generalized tune’, or both, depending on the particular musical and cultural context. If one thinks of scale and tune as representing the poles of a continuum of melodic predetermination, then most of the area between can be designated one way or another as being in the domain of mode. (...) When modes (or their equivalents) are constructed as primarily scalar, they tend to be used for classifying, for grouping musical entities into ideal categories. When the melodic aspects of modality are its predominant features, the modes are seen as guides and norms for composition and improvisation. (...) In this same vein, a modal system may be a rational construction, devised or revised by the learned; or it may be a traditional assemblage of musical entities used and retained by the working musician” (Powers 1980, pp. 377f).

Maybe it is time to leave theoretical speculations about the “rational constructions” of blues scales behind, and start to focus on the analysis of blues modes as played and sung by blues musicians (i.e. typical usages of pitches in tone patterns and ornamentations within a certain repertoire). Methodologies and algorithms from the fast-growing field of content-based music information retrieval may significantly contribute to this area of blues research.

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NOTES

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