

Clarke, Eric and Nicholas Cook, eds. 2004. *Empirical Musicology: Methods, Aims, Prospects*. Oxford and New York: Oxford University Press.

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*Empirical Musicology* is a collection of articles exploring the potential for a greater integration of empirical methods into musicology and music theory. This volume is particularly timely given the increase in available personal computer power over the past ten years and the subsequent development of software that may be used to extract, analyze, and/or compile musical data. Nicholas Cook and Eric Clarke begin by asking the question, "What is empirical musicology?" and proceed to argue that in reality all musicology is *empirical* to some degree, in the sense that it is based in an observable reality that may be explored, explained, and generalized. The editors subsequently redefine the issue as the extent to which current musicology makes use of the methods of empirical observation, including the ways in which these observations are regulated by the discipline's discourse and the ways in which these methods may be applied and regulated in future research. What is proposed is not so much a paradigm shift as a paradigm expansion; the empirical musicology described here applies empirical methodologies to the meaningful data already collected on a wide range of musicological topics. For the editors, the adoption of the term empirical musicology

does not deny the self-evidently empirical dimension of all musicology, [rather, it] draws attention to the potential of a range of empirical approaches to music that is as yet, not widely disseminated within the discipline. And just as it is not a matter of empirical versus non-empirical, so we do not wish to draw an either/or distinction between the objective and the subjective. (5)

In the realm of traditional musicology, this objective/subjective distinction between data and interpretation reflects the distinction between the data of the score and the interpretative act of analysis. Though there are shades of subjectivity in score-based data, due primarily to the various editorial decisions made in the process of score publication, there is an objective/subjective distinction between score-based data and the way in which it is interpreted that takes the raw data as an objective measure and its interpretation as a subjective act. As an empirical musicologist considers data beyond the score, there is an additional degree of subjectivity inherent in collecting, assessing, and relating this data to the music; the objective/subjective distinction

thus extends to the data itself. The degree of subjectivity ranges from lower levels, such as the close relationship between a performance and its recording, to higher levels, as in the more interpretative relationship between a performance and relevant social and economic factors. The entire range of objective and subjective approaches found between these two margins resides comfortably in the empirical methodological landscape painted by all of the articles in this volume. As a group, the authors of *Empirical Musicology* embrace and employ a wide variety of quantitative and qualitative methodologies, providing a broad overview of the most widely practiced types of empirical musicology. These methodologies are presented in such a way as to make them accessible to non-empirical musicologists, so that they can address those areas of the musical experience that are not explicated in the score of a musical work or by its historical context.

Throughout the book, and the field of empirical musicology in general, the distinction between quantitative and qualitative approaches is far from exact. The simplest way to distinguish them is between those methodologies that are based on objective data and those that are based on subjective data. This distinction, however, fails to consider that, as I have suggested, empirical data and methodologies encompass both the subjective and the objective to varying degrees, and it is this nuance that makes the methodologies of empirical musicology relevant to the fields of musicology and music theory at large. I will take up the issues related to the qualitative and quantitative aspects of these empirical approaches in greater detail shortly.

In their introduction, Clarke and Cook attempt to situate empirical musicology as a distinct, and in some ways novel, approach to the study of music. They are careful to distinguish between empirical musicology and other existing empirical methodologies, including the positivist formalism found in certain brands of postwar musicology and theory—the spirit of which was articulated in Milton Babbitt’s statement that “there is but one kind of language, one kind of method for verbal formulation of ‘concepts’ and the verbal analysis of such formulations: ‘scientific language’ and ‘scientific method’” (Babbitt 2003:78) and later embodied in a variety of ways in the work of Benjamin Boretz (1977), Allen Forte (1973), Fred Hofstetter (1979), Michael Kassler (1967), and Arthur Komar (1971). Cook and Clarke criticize the positivist approach for being more empiricist than empirical in that it uses data to validate existing analytical approaches rather than to explore new analytical avenues that might be suggested by that data. The editors consider these positivist works to have been “more a matter of appearances than of substance, [and that this was true] even at the time” (6). Conversely, the empirical program posited in this volume, with its plurality of methods, is motivated by what the data may reveal rather than by which

existing notions it can prove, and in this way it is more discovery-driven than the work of post-war positivists.

The editors also want to draw a marked contrast between their approach and those in which informal musical statements, experiences, and phenomena are reduced to formalized propositions for the purposes of testing and theory building. They set their approach to empirical musicology in diametric opposition to theory building and the division of labor that is often associated with the construction of empirically grounded music theories. As an example of this type of labor division, Cook and Clarke cite the 1993–94 seminar Carol Krumhansl organized at Stanford University among the music theorists Robert Gjerdingen, Fred Lerdahl, and Eugene Narmour, and music psychologists Jamshed Bharucha and Caroline Palmer. All of the participants worked on the same piece and the outcomes were published in volume 13 of *Music Perception*. Cook and Clarke describe how the division of labor is made apparent by the way in which the music theorists presented theoretical models and talked past one another while the psychologists contextualized and tested the theorists' work. In contrast, one of the few points of consensus in the definition of empirical musicology as it is presented in this volume is that it is an endeavor in which the musicologist works through both the technical and interpretative stages of the research—thus allowing for maximal interaction with the material at hand.

The strength of an empirical musicological endeavor derives from the ability of its practitioners to achieve and maintain an objective distance from the data. Well-defined methods of data collection and interpretation are essential to fulfill the discipline's promises of relatively unbiased discovery; or, as Clarke and Cook put it, such methods are needed to create a "context in which to understand objective analyses" (7). The creation of such a context requires an active discussion of the methods and aims of empirical musicology and how they relate to musicology. The most general aim of *Empirical Musicology* is to encourage these necessary discussions and inquiries. More specifically, the stated aims of the book are to systematically document the areas of musicology in which empirical methods may be most useful, discuss issues related to the applications of these methods, cite studies that have already made use of the methods, and consider the theoretical consequences of employing such methods (9).

In order to explore these issues, the editors have assembled a range of musicologists and theorists to survey the most prevalent empirical methods currently employed. The articles are of two main types. The first type examines methodologies by laying out a set of techniques that address a certain type of empirical question. The second type focuses on how to address a specific topic by combing techniques from a range of empirical approaches.

## Current Musicology

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The ordering of chapters highlights the range of qualitative and quantitative methods available to the empirical musicologist. The balance between quantitative and qualitative empirical approaches is reflected in each author's conception of empirical musicology and it is through their discussions of the qualitative and quantitative aspects of their work that the authors both demonstrate the greatest amount of self-reflection and engage most directly with one another's work. The chapters of the book progress from a qualitative focus to a more quantitative one, though there are a number of interesting exceptions that will be discussed in detail in the chapter synopses below.

Jonathan P. J. Stock provides an overview of the methodology of ethnomusicological fieldwork in "Documenting the Musical Event" (chapter 2). Stock discusses ethnographic participant-observer techniques and how an empirical musicologist might apply them. Though his discussion of participant-observer methodology is thorough, his engagement with traditional musicology is cursory. This engagement consists of two brief suggestions of how fieldwork may be a useful tool for the traditional musicologist: first, fieldwork provides a way of investigating contemporary music as a process rather than just as a product, and second, it allows access to historical music for which there is minimal or no written documentation. Both applications, however, are presented only in passing as Stock discusses methods of participant-observation and fieldwork in detail.

Stock provides a guide for empirical fieldwork and explores issues of representation and interpretation, as well as concepts of authority. He thus provides a balance between the available areas of quantitative investigation (data related to recordings, empirical descriptions of instrument building and learning, concert-going and CD-buying habits) and the predominantly qualitative nature of ethnographic fieldwork (interviews, observation of music making in person and/or with video documentation). In the course of his discussion, Stock demonstrates that there is a large amount of data available from the study of music making and offers some general ways of categorizing data, though he fails to address how this might be done for historical investigations. Beyond these propositions (and the additional suggestion that musicologists should look at music reception outside of the academy), there is no real point of connection between ethnographic fieldwork and traditional musicology in Stock's chapter. He fails to identify practical contexts for applying fieldwork methods within the scope of traditional musicology, and so the chapter, while useful, remains merely instructive rather than posing questions or proposing solutions. It is left to the subsequent chapters, particularly Tia DeNora's, to contextualize Stock's work.

DeNora surveys "action-oriented" sociological methods in her chapter "Musical Practice and Social Structure: A Toolkit" (chapter 3) and places

them in opposition to the “inherently” structuralist approaches espoused by Adorno and practitioners of “new musicology,” i.e., Lawrence Kramer (2002) and Susan McClary (2000). In particular she claims that the textual focus of “new musicology” does not allow for any real investigation of the social settings, spaces, or experience of music. DeNora critically examines a wide range of methodologies in historical musicology and sociology in order to contextualize her sociological toolkit (the author’s term for a group of methodologies). She also provides a context for the ethnographic methods presented by Stock in the previous chapter, particularly in her discussion of the relationship between musical taste and identity (Willis 1978; Frith 1996) and of music as a means of producing emotional states within social and/or cultural constraints (Gomart and Hennion 1999; Bull 2000; DeNora 2000; DeNora 2001).

Throughout her chapter, DeNora argues that the sociology of music is balanced between the empirical and the philosophical. Sociological methodology traditionally includes the use of representative sampling as a way of producing generalizations and it has expanded in recent years to include ethnographic methods, which augment her toolkit with additional qualitative and quantitative approaches.

The middle of the book (chapters 4–7) is more subject-oriented, focusing on specific topics that can be usefully understood through empirical study. In “Music as Social Behavior” (chapter 4), Jane W. Davidson discusses how a variety of quantitative and qualitative empirical methods may be used to explore the socio-behavioral basis of music making. Davidson’s chapter conceptually follows DeNora’s survey of music-related sociological methods. Like DeNora, Davidson acknowledges that music has only recently been investigated as a social act, though she is interested in examining music from a psychological rather than a sociological perspective. Davidson explores the ways in which the subjectivity of individual experience is captured by the participant-observation and in-depth semi-structured interview techniques of the humanistic psychological approaches employed in New Paradigm Research and related methods (Smith, Harré, and Van Langenhove 1995). After surveying how these approaches might be useful for research into musical skill acquisition, musical taste, and performance ensemble dynamics, Davidson discusses specific studies that address the role of social and family background in a child’s music skill acquisition (Howe and Sloboda 1991a; Howe and Sloboda 1991b; Borthwick and Davidson 2002), the differences between social groups in terms of their musical taste (North and Hargreaves 1996), and the effects of social and musical interaction on the group dynamics of a string quartet (Murnighan and Colon 1991).

Davidson argues for the value of data gleaned from single-subject studies and proposes that such subjective data can be useful in a broader

context, particularly by way of her examination of the role of interpretative qualitative approaches in studies of music skill acquisition (Borthwick and Davidson 2002). Towards the end of the chapter she moves into the realm of quantitative analysis with a discussion of the application of personality tests, which arguably reveal causal components in musicians' social interactions and behaviors. In sum, the range of qualitative and quantitative approaches presented by Davidson allows for psychologically-oriented investigations of musicians both as individuals and as members of larger societal groups.

In "Empirical Methods in the Study of Performance" (chapter 5), Eric Clarke surveys approaches to the study of piano performance. Clarke aligns the growth of empirical methods for the study of performance both with a general movement away from equating scores with music and with increased interest in music by cognitive psychologists. The latter has been something of a mixed blessing for musicology, as the interests of psychologists lie in generalizable qualities, while musicologists tend to examine individual cases or localized trends. Clarke focuses on piano performances for numerous reasons: the large amount of solo repertoire available (which allows for the examination of the performer in a context to which he or she is accustomed, in contrast to instruments which are more typically part of ensembles), the piano's percussive nature (which facilitates the study of rhythmic skills), the required concurrent activity in both hands (which provides useful data for studies related to coordination), and, perhaps most importantly, the ease with which one can get accurate, minimally intrusive performance measurements from a pianist via MIDI technology. Clarke also discusses the potential of using audio and video data for such analysis and suggests how such data collection methods may become more viable as technology improves, thereby opening up the field of empirical performance studies to performances on a wider range of musical instruments. Although he focuses on the details of piano performance for practical reasons, Clarke's theoretical discussion examines the study of performance practice in general terms. Unlike a musical score, which only provides the instructions set out by the composer, a performance includes the performer's interpretation of the music. By using proper techniques of data extraction and analysis, the musicologist may observe general trends, such as expressive tendencies related to dynamics and tempo, and personal idiosyncrasies, such as physical movements by a performer or composer.

Clarke's chapter is primarily quantitative in its focus. He does, however, dedicate a section to evaluative and qualitative methods. Here he points out that the data extracted from a recording only provide a partial view of what is going on in a performance and, referencing Davidson, he argues that even when it is possible to quantify a social characteristic, it may still be valuable

to examine it through a qualitative lens. Specifically, Clarke discusses “talking analysis,” a method where performers comment on their performance and then both the commentary and recording are assessed and analyzed. He argues that the integration of qualitative analysis is important here because it allows the performance to be treated as a process rather than as a rarified event preserved by the recording, thus avoiding a common pitfall of score-based analytical approaches.

In “Computational and Comparative Musicology” (chapter 6), Nicholas Cook surveys a number of ways in which score-based musicological and music theoretic study, as data-rich disciplines, may computationally examine large bodies of music in order to find systematic patterns. Cook argues for a renewal of “comparative musicology,” which had been supplanted by ethnomusicology’s culture-centric focus in the 1950s, marking a shift away from cross-cultural analysis. He surveys issues of data representation and comparison and then proceeds to a case study of the Humdrum Toolkit (Huron 1997), a modular software framework that provides both a syntax for representing musical materials and a set of tools with which to perform a variety of analytical functions. The Humdrum Toolkit receives substantial treatment and promotion in this chapter precisely because it allows a musicologist to build his or her own analytical system component by component. The flexibility of the toolkit approach, whereby each analytical component is selected or written individually and implemented sequentially, also allows the user to control the interpretative processes that are undertaken in the analysis. Humdrum’s usage and potential is explored through a survey of five studies by Huron and his collaborators that implement the Humdrum Toolkit extensively: the first is a study of the melodic arch in folksongs (Huron 1996), the second concerns the “gap-fill” model of harmony (Von Hippel and Huron 2000), the third is a reconsideration of Allen Forte’s 1983 analysis of Brahms’ String Quartet op. 51, no. 1 (Huron 2001b), the fourth is an examination of the distribution of the major and minor modes in Eastern European folksongs (Arden and Huron 2001), and the fifth is an attempt to characterize idiomatic organization in music (Huron and Berec forthcoming). In Cook’s chapter, however, the extent to which one piece of software is detailed and promoted is problematic in that it shifts the chapter’s focus away from a more general discussion of comparative techniques to one that is waylaid by a discussion of the logic, operation processes, strengths, and weaknesses of a specific piece of software.

Cook takes a predominantly quantitative approach that examines the potential for a renewal of comparative musicology allowed by new data-mining technologies. He does, however, consider the subjective aspects involved in generating the objective data representations that form the basis of his

computationally-oriented comparative musicology, specifically in terms of how the particular musicological endeavor being undertaken must be used as a yardstick to determine exactly how the data should be represented.

Anthony Pople takes a more piece-centered approach in “Modeling Musical Structure” (chapter 7), surveying a range of formalist, quasi-formalist, and modeling approaches to music analysis. He focuses on the ways in which musical analysis may be modeled and automated, with special emphasis on the ways in which such models demonstrate and explore the relationship between analysis and theory. Pople sees this relationship as running parallel to the relationship of hypothesis and experiment in the sciences, noting that this paradigm has allowed scholars from the fields of cognitive psychology and computer science to engage in musical research. The first part of the chapter focuses on various ways in which music theorists have attempted to model analytical practices informally (the abstract representation of music theoretical constructs in Babbitt 2003, and Forte 1973), quasi-formally (the rule-based systems of Lerdahl and Jakendoff 1983, Lerdahl 2001), formally (the artificial intelligence approach of Winograd 1968, and formal rule-based system of Tenney and Polansky 1980), and with the more advanced techniques of neural networks (Gjerdingen 1990) and statistical analyses (Schellenberg 1997)—though ultimately all of these approaches are dismissed as “theory-building.” As alternatives, Pople examines both his own *Tonalities* project (Pople 2004) and David Temperley’s modeling of analytical practices with preference-rules (Temperley 2001). Ultimately Temperley’s system is judged as having a great potential that is currently unfulfilled due to a number of weaknesses in terms of musical judgment—the range of styles it can adequately address and the depth of analysis it can provide make it inoperable in a number of musical contexts. Pople’s *Tonalities* project, on the other hand, is described as being capable of providing a sufficiently wide range of musical judgments with sensitivity to musical context such that it might serve as a “junior partner” in an analysis project. The manner in which the *Tonalities* project is presented is similar to Cook’s discussion of the Humdrum Toolkit, in that the explicit promotion of a theoretical tool distracts the reader from the authors’ discussions of the merits of related methodological approaches.

Though score analysis is nuanced by individual thought and judgment, Pople posits that it is predominantly a quantitative exercise, since it is based on a series of steps and decisions that can be formalized. He argues that a potential benefit of formalized methods of analysis is that their quantitative approach may offer insight that may either challenge or reconfirm more qualitative analyses made by humans (Temperley 2001, Pople 2004).

Stephen McAdams, Philippe Depalle, and Eric Clarke detail a range of techniques for analyzing acoustical and psycho-acoustical signals in “Ana-



lyzing Musical Sound” (chapter 8). They argue that recordings can yield data not explicitly available in scores. Such data is relevant to the acoustical properties of sounds, i.e., frequency and amplitude, as well as the perceptual implications of their organization, particularly regarding issues of timbre and timing. Technical descriptions in this chapter are geared towards the acoustics neophyte and are clarified by a number of visual representations of idiomatically diverse musical signals in both the time and frequency domains. After basic concepts are explained, they are then exemplified by relevant works in the field, specifically the spectrogram-related work of David Brackett (2000), Robert Cogan (1984), and Peter Johnson (1999) and the “perceptual principles” work of David Huron (2001a), Richard Parncutt (1989), and Lee Tsang (2002). The chapter by McAdams, Depalle, and Clark, focusing on acoustical and perceptual representations and analyses of sound, is exclusively quantitative, although in practice their data may be used for a variety of qualitative applications in performance studies.

The last chapter of the volume is W. Luke Windsor’s primer to statistical analysis, “Data Collection, Experimental Design, and Statistics in Musical Research” (chapter 9), which acts, along with Stock’s chapter, as a conceptual bookend for the volume. Where Stock provided a discussion of fieldwork techniques for collecting and recording data, Windsor provides a survey of statistical methods for analyzing and interpreting data. Windsor, however, goes beyond the description of particular tools, especially when he addresses the potential for flexible exploration within an experimental method, i.e., the various ways in which a single set of data might be examined or experimented on to extract richer and more varied information from it. Here Windsor examines how quantitative methodologies may be appropriately implemented and discusses other alternatives for data collection.

Overall, Windsor’s thorough discussion of statistical methods serves to clarify the muddiness of the previous chapters, not only by supplying a technical explanation of statistical analysis, but also by illustrating how such analysis is useful in the context of the types of empirical musicology described therein. Likewise, the bulk of Windsor’s chapter is dedicated to number crunching, while the last section moves into a more qualitative realm with his discussion of the distinction between real-world correlation and controlled experiments. Here he discusses both the technique of triangulation, in which different types of data and methods are applied to the same question, and the value of informal data collection before trying to demonstrate causation in controlled studies. This discussion picks up on a number of the techniques discussed in previous chapters, providing a more detailed methodological discussion with a theoretical underpinning.

Ultimately, Clarke provides the most comprehensive synopsis of the challenge of a qualitative/quantitative balance in the field. He notes that

while interpretation is a component of all empirical work, it is a slightly more straightforward process with quantitative methods since their interpretative processes can be easily agreed upon. Qualitative methods are newer and carry with them less-established methods of interpretation. Thus their interpretation is often inconsistent. Clarke, however, takes issue with the idea that qualitative methods are *necessarily* more interpretative than quantitative ones:

The objection leveled at qualitative research of this kind is that it is too speculative—that it sets itself up as empirical, and then goes about its business in a manner that looks more like literary criticism. This objection partly reflects the fact that the interpretative assumptions of most quantitative methods have simply become so deeply embedded as to be invisible, but it remains the case that qualitative methods have yet to attain the systematic and explicit character of empiricism in the eyes of many. (92)

A full integration of quantitative and qualitative methods, along with the movement towards widespread acceptance of both as a basis for empirical inquiry, is a necessary condition for the field of empirical musicology to move further into mainstream musicology and music theory. These methods embrace a variety of topics and approaches, and may also function as points of connection with other disciplines.

Unfortunately, the discussion of quantitative and qualitative methodology is the only area in which there is any real interaction between the authors and their respective methodologies. For the most part, they are talking past one another and never really engage with the others' approaches. On one level, this fits the editors' vision of empirical musicology as a predominantly solitary endeavor wherein the practitioner undertakes the data collection, representation, and interpretation alone—in contrast to other empirical areas of inquiry where there is a division of labor between technical and subject-area experts (i.e., theorists and experimentalists). Such proximity to the data arguably fosters more nuanced interpretations and applications, but does it necessarily follow that one may only obtain such proximity by isolating oneself from other empirical musicologists? Such isolation risks a loss of perspective and often does not allow for the sort of experience that can be brought to a problem when two experts collaborate—such as has occurred in the field of music cognition, to cite the example used by the editors in their introduction. This situation may change as the field matures; currently empirical musicology exists in the periphery of musicology, rather than as a point of intersection between various disciplines, and such a placement naturally fosters a culture of solitary inquiry. If the methods of empirical methodology become more widespread, it is likely that they will be applied to a variety of problems beyond those set out in this book.

Ultimately, *Empirical Musicology* is more about presenting a variety of methods than asking higher-level questions. And the volume does this rather well, by painting a broad picture of how the empirical methods might be applied in a diverse range of musicological endeavors. The book would serve as a good introduction to those musicologists and music theorists looking to integrate empirical methods into their own work. For the more seasoned empirical musicologist, it offers a window into the use of empirical methods outside of one's own field of specialization and may suggest ways of expanding one's own repertoire.

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