48. Analytical Ethnomusicology: How We Got Out of Analysis and How to Get Back In

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Analysis has had a long and somewhat tenuous history under the umbrella of ethnomusicology. In this chapter, we examine the trajectory of analytical ethnomusicology, from its parallel beginnings in late 19th-century Europe and North America through its relative obscurity in the field in the mid-20th century to its panoply of new methods in the late 20th and early 21st centuries. The aim of the chapter is threefold. Looked at in one way, it is a simple historical overview of analysis in ethnomusicology: an examination of the major players, from Erich Moritz von Hornbostel to Alan Lomax to many of today's central scholars, as well as the major trends and intellectual frameworks influencing its execution, from cultural evolutionism to cultural relativism to interdisciplinarity. Yet it is also designed as an exploration of the myriad methods and approaches in the analytical ethnomusicologist's toolkit, from transcription and trait listing to structural analysis, computational analysis, and the new comparative analysis. And finally, woven throughout is the story of the place of analysis in ethnomusicological research: its strengths and weaknesses, successes and mistakes, practitioners and detractors. Through these discussions, we then begin to unpack the ebbs and flows of its use, reception, and usefulness in the field.

Analysis has had a long and somewhat tenuous history under the umbrella of ethnomusicology. Beginning as one of the central activities of both North American music ethnologists and European comparative musicologists in the late nineteenth century, it fell out of favor in the post-World War II era with the rise of anthropology-based ethnomusicological studies, and since the late 1960s has been rather relegated to a status of red-headed stepchild within in the discipline. *Joseph Kerman*'s provocatively titled *How We Got into Analysis, and How to Get out* might equally have been leveled at ethnomusicologists [48.1]. Yet there has remained throughout a subset of ethnomusicologists dedicated to developing newer, more applicable, and more culturally sensitive analytical methods, which have increasingly diversified through the twenty-first century to include computational and interdisciplinary approaches, among others. This chapter will explore the changing trajectory of analytical ethnomusicology over the course of the last 130 years, examining its practitioners and detractors, its insights and mistakes, and its mosaic of methods.

48.1 Ethnomusicology's Analytical Roots

In this first section, we will explore the analytical methods that arose in the early history of the field – both in Europe and in North America – and examine some of the larger goals behind these early analyses. Some of this history will be familiar to scholars of systematic musicology (SM), particularly as regards the early European scholars. Yet, while the current chapter will act as a complement to other chapters in this volume, it is designed as an overview of analytical techniques used by ethnomusicologists and their predecessors, and

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will thus not focus on those techniques unique to SM. Readers interested in the historical connections between these fields should refer to *Albrecht Schneider*'s 2006 article on the topic [48.2].

Although the commonly accepted narrative of ethnomusicology's history has its inception in mid-1880s Europe, we will begin instead by examining some of the studies of early North American music ethnologists. Generally less concerned with formulating grand, far-reaching theories of musical evolution and origins than their European counterparts in comparative musicology, these North American scholars tended to present more modest lists of musical traits. Starting our examination of ethnomusicological analysis here will allow us to begin grappling with analytical techniques and concepts from a simpler vantage point before then turning to the methods of European comparative musicologists.

48.1.1 Modest Beginnings: North America

The beginnings of ethnomusicological research in North America were largely focused on preservation: early American music ethnologists like Alice Cunningham Fletcher (1838–1923) and Frances Densmore (1867–1957) set out to collect and transcribe what they considered to be dying traditions, mostly Native North American musics. This was actually a key interest of many late-19th and early-twentieth century music scholars, including important European collectors not discussed in depth in this chapter. Among these were Hungarian scholars Béla Bartòk (1881–1945) and Zoltán Kodály (1882–1967), who compiled extensive collections of folk music from across Eastern Europe, as well as the less-often-cited Finnish folk music collector Ilmari Krohn (1867–1960), whose folk music categorization method later influenced both Bartòk and Kodály. Key to the efforts of all such scholars, of course, was the invention of Edison's phonograph in 1877, which allowed music scholars, for the first time, to record music in the field and then replay it for more accurate transcription and analysis.

Both Densmore and Fletcher were prolific collectors of Native American music. Densmore, for instance, *studied the music of* 76 *tribes, recorded more than* 2500 *songs, and published at least* 22 *monographs and* 175 *articles*, all between 1901 and 1940 [48.3, p. 53]. Many of these publications involved song classification and categorization alongside basic analysis, and all relied very heavily on transcriptions in Western notation. *Densmore*'s 1910 collection of Chippewa songs [48.4], for instance, comprises transcriptions of 200 songs categorized according to their social function. In this study, Densmore engages in two main styles of analysis, both of which were common in these early years: trait listing and descriptive analysis.

Trait Listing

The most basic analysis style in Densmore's study is trait listing. In this approach, the analyst begins with a list of seemingly objective musical parameters regarding scale type, melodic characteristics (range, contour, and intervals), ornamentation, tonal organization, rhythm and rhythmic organization, and form. S/he then makes a chart with all parameters listed and fills in the details for a given piece. Trait listing may be used to analyze characteristics of a single piece of music or to present a tabulated analysis of multiple songs. Figure 48.1 shows Densmore's tabulated analyses of accidental use and rhythm in Chippewa songs.

Trait listing was designed to be scientific and objective, a central goal of many nineteenth and early twentieth century music scholars. And, though more complex and comprehensive forms of analysis have arisen in the interim, similar approaches are still used today, subsumed under Mervyn McLean's category of *standard analysis*. This componential approach to music, *McLean* maintains, *is simple, relatively easy to apply, and* [. . .] *has served its purpose well* [48.3, p. 292].

Descriptive Analysis

The second approach that Densmore and other early American music ethnologists used was descriptive: prose outlining general facts about the music as well as presenting more specific observations on individual songs. In Densmore's work, each song category is first introduced with a few paragraphs for cultural context, and each song is given a handful of sentences regarding its source. Then, following each transcription is a brief analysis of its individual musical characteristics. Figure 48.2 shows an example of *Densmore*'s transcription and descriptive analysis style, this time from her study of Native songs in British Columbia [48.5].

This descriptive analysis, like basic trait listing, makes no special attempt to either uncover or reinforce a larger theory; it is simply an outlining of the observable musical characteristics of a single song. In this example, Densmore's analysis focuses on meter, phrase length, pitch use (in relation to an assumed tonic), and the more subjective evaluation of melodic character. Other analyses in the same collection touch on small-scale thematic development, melodic motion, interval use, and so on. Yet, what will hopefully be immediately apparent is that these descriptions and trait analyses are as much an analysis of the author's *transcriptions* as they are of the songs themselves. Thus, one of the first lessons we learn from examining the work of these early scholars is that transcription is, in fact, a form of analysis.

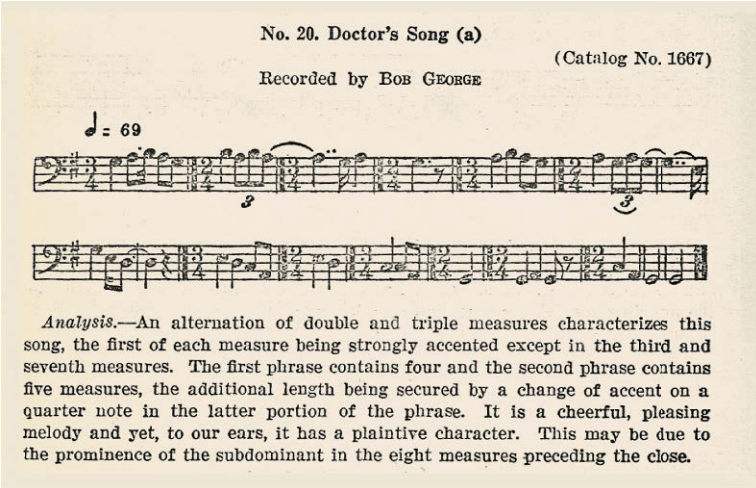
ACCIDENTALS

Songs containing no accidentals	3	112, 203, 224
Sixth lowered a semitone	1	181
Total	4	

RHYTHMIC ANALYSIS

Beginning on accented portion of measure	2	181, 203
Beginning on unaccented portion of measure	2	112, 224
Total	4	
Metric unit of voice and drum different	3	181, 203, 224
Recorded without drum	1	112
Total	4	

Fig. 48.1 *Densmore*'s trait listing, tabulated analysis (after [48.4, p. 160])


No. 20. Doctor's Song (a)

(Catalog No. 1667)

Recorded by Bob George

♩ = 69

Analysis.—An alternation of double and triple measures characterizes this song, the first of each measure being strongly accented except in the third and seventh measures. The first phrase contains four and the second phrase contains five measures, the additional length being secured by a change of accent on a quarter note in the latter portion of the phrase. It is a cheerful, pleasing melody and yet, to our ears, it has a plaintive character. This may be due to the prominence of the subdominant in the eight measures preceding the close.

Fig. 48.2 *Densmore*'s descriptive analysis (after [48.5, p. 37])

Transcription as a Form of Analysis

Undertaking transcription of oral musics involves myriad decisions. In Fig. 48.2, for instance, how does Densmore choose the key of the piece? Is a Western conception of tonal hierarchy even relevant in this tradition, and if so, how did Densmore establish that it was? Further, why the changing meter in this transcription? *Densmore* has stated of her collections that *the transcription of a song is divided into measures according to the vocal accent* [48.4, p. 5]. But why discount the possibility of syncopation within a stable metric framework, or even the idea that the music is not strictly metered at all? Further, what about allowance for variation in song performance? Densmore often records multiple versions of a single song, but only one is ever transcribed [48.5, p. 39]. Without a discussion of the differences between variants or the reasons for one particular variant being chosen over others, this reifies a single version of the song for analysis. Even seemingly small details must be decided upon when transcribing. For instance, how accurate should a transcription be in terms of pitch placement? *Densmore* admits that *ordinary musical notation does not, in all instances, represent the tones sung* in the music she transcribes [48.4, p. 3], but still staunchly clings to the idea of music based in tones and semitones, ignoring *Alexander Ellis*' strong arguments to the contrary [48.6]. She states [48.4, p. 4]:

> *At present the only standard generally available for the measurement of musical intervals is the tempered musical scale. This is artificial, yet its points of difference from the natural scale are intervals less frequently used in primitive music than those which the two scales have in common. Chippewa*

> *singers have been found who sang all the tones correctly except the fourth and seventh.*

Here I draw the reader's attention to the use of the term *correctly*, which *presumes* a musical system that uses a Western European standard of tuning, and implies that the Chippewa singers have simply not yet mastered it. Thus, every decision in transcription comes with a set of assumptions. John Comfort Fillmore (1843–1898), who often collaborated with Alice Fletcher as a music expert, had even more audacious ideas about this question of precision in pitch placement for ethnomusicological transcription. To Fillmore, the actual pitches sung were *a matter of comparatively little importance*. He claimed that [48.7, p. 288]:

> *the really important question is what tone* [the performers] meant *to sing, and on this point there can be no doubt whatever. The song as given* [in the transcription] *is exactly as they meant and sang it.*

What's more, Fillmore often transcribed Native American melodies with piano accompaniment, erroneously presuming that *the forms assumed by primitive songs are determined (unconsciously to those who make them) by a latent sense of harmony* [48.8, p. 305].

Some early scholars of non-Western music attempted to avoid the potential misrepresentation exhibited by Densmore, Fillmore, and others, either by including an enormous level of detail in their transcriptions or by creating unconventional staves. Hungarian music collector and composer Béla Bartòk was known for his meticulous detail in pitch placement (with the use of arrows to show deviance from tempered tuning) as well as in the notation of rhythm and ornamentation. American music scholar *Benjamin Ives Gilman* (1852–1933) went a different route, inventing a 45-line quarter-tone staff for the notation of Hopi songs [48.9]. Unfortunately, while putatively objective and exact, the visuals of such a transcription lead to an analysis that favors the minutiae of pitch placement and intervallic content over melodic motion or phrasing, for instance, which are visually obfuscated by the level of pitch detail present.

The choices made in the transcription process, then, are very much a part of the analytical process. As *Hornbostel* has stated, *notation, in order to be readable, must reduce facts to formulas* [48.10, p. 38]. And when a scholar's analysis is based not on the performance but on the transcription (and all of its assumptions and reductions), much of the music's nuance can be lost. That none of these early scholars performed the music they studied is equally relevant; there was no opportunity to verify their findings cognitively or experientially, nor to discuss questions of performance practice or cognition with the culture-bearers themselves. Through our twenty-first-century lenses, of course, it's easy to see the ethnocentric bias in many of these earlier studies, but the issue of transcription's subjectivity has remained to the present day. Despite the availability of better technological resources and the cognitive perspectives that modern ethnomusicological fieldwork has given us, transcription in its very nature is still an imperfect art and science, both. Thus, it is always important to ask the question posed by *Jason Stanyek* in his 2014 *Forum on Transcription* [48.11, p. 104]: *how do the practices, products, and politics of transcription fit into an ever-changing landscape of ethnomusicology?*

Concluding Remarks on Early Music Ethnology

There are undeniably numerous intractable problems inherent in both transcription and standard analysis. Yet these methods can be invaluable assets to the ethnomusicologist; we must simply be aware of their limitations, as we must be of the limitations in *any* analytical tool, be it musical or cultural. Despite their shortcomings, the analytical methods used by these early music ethnologists – descriptive analysis, trait listing, and transcription – are still central features of an ethnomusicologist's analytical toolkit. They are an excellent starting point. However, as *Mervyn McLean* points out, we should always be searching for *improved ways of looking at each of the* [musical] *components and their relationships with each other* [48.3, p. 292].

48.1.2 European Comparative Musicology

The creation story told to most budding ethnomusicologists about the origins of our discipline generally does not begin with the transcription-for-preservation, descriptive analyses, and trait listing of the early American school that we have been discussing. It begins in Europe in the late 1800s with the emergence of Vergleichende Musikwissenschaft: comparative musicology (CM). As the name suggests, comparative musicologists saw as their task not just the collection and classification but also the comparison of all the world's musics. In this pursuit, they attempted to trace historical connections between traditions through the application of empirical and analytical methods, many seeking universals in music or positing other grand theories supported by their analyses.

Most of the important nineteenth- and early twentieth-century comparative musicologists hailed from German-speaking lands, and of these, many were associated with the Berlin Phonogramm-Archiv, a collection of thousands of phonograph cylinders founded in 1900 by philosopher, acoustician, and psychologist Carl

Stumpf (1848–1936) and developed by his students: chemist, philosopher, and musicologist Erich Moritz von Hornbostel (1877–1935) and physician, psychologist, and auditory perception specialist Otto Abraham (1872–1926). Initially assembled for Stumpf's *psychological interest in the sensual experience of tones and intervals and their ordering into tone systems* [48.12, p. 204], the Phonogramm-Archiv became, through Hornbostel, a repository of recordings for academic inquiry that went far beyond the confines of psychology.

In his 1905 lecture *The Problems of Comparative Musicology*, *Hornbostel* outlined the general goals of the field, beginning with the reasons for comparison [48.13, pp. 249–250]:

> *Comparison is the principal means by which the quest for knowledge is pursued. Comparison makes possible the analysis and the exact description of an individual phenomenon by comparing it with other phenomena and emphasizing its distinctive qualities. But comparison also characterizes individual phenomena as special cases in which the similarities are defined and formulated as* laws. *Systematization and theory depend on comparison.*

Hornbostel was particularly interested in methods for the comparative study of scales and tone systems, and these would remain a central concern of CM. But his 1905 lecture also presented ideas on the analysis of melodic construction and rhythm, encouraged explorations into the nature of the musically beautiful, and incorporated some quite forward-looking musings on the inherent problems of analyzing musical systems different from our own. Many of Hornbostel's early studies, and those of his contemporaries, grappled with these tasks. In 1906 for instance, *Hornbostel* published articles on the recorded musics of both the Thompson River Indians of British Columbia [48.14] and the people of Tunisia [48.15]. Like many early American studies, these articles contain Western-style transcriptions and analyses with heavy focus on melodic characteristics and tone systems. Both attempt a statistical understanding of scalar types and seek to ascertain the inherent tone hierarchy of the music's supposed *tonalities*. *Bruno Nettl* has noted that [48.16, p. 75]

> *what has sometimes been called the* Hornbostel paradigm *– focusing on scalar structures and pitch relations and giving attention to singing style and tone colour – seems to have been developed in part for establishing an approach to a description of music that might facilitate a comparative method.*

Yet, although European comparative musicologists would use many of the same standard analysis techniques as the early Americans – examining music componentially through trait listing and descriptive analysis – they had loftier goals too.

A Basis in the Sciences: Grand Theories of Origins and Evolution

Most early comparative musicologists approached the study of music as a science in the tradition of the great syntheses of *Helmholtz* [48.17] – not surprising, given the fact that many of them, like Stumpf, Hornbostel, and Abraham, were trained as acousticians, psychologists, and physicians first. And many would take their studies further than simple description, categorization, and comparison, turning to theories and discoveries in other academic fields as a scientific basis for their research. For instance, the then-current belief that there were universals in music was based in psychology. *Hornbostel*, for example, claimed that certain musical gestures, like a descending melody moving from tension to rest, were *natural, i. e., rooted in the psychophysical constitution of man, and* [could] *therefore be found all over the world* [48.10, p. 34]. And Darwin's theory of evolution was understood to support two of the more commonly espoused theoretical orientations of CM: cultural evolutionism and diffusionism.

Cultural Evolutionism. Cultural evolutionism stemmed from the belief that all cultures evolve from primitive to civilized – and their musics from simple to complex – but that each does so at a different rate. Supporting a theory of the polygenesis of musical attributes, cultural evolutionists posited that we could understand the music of our distant ancestors by studying the music of more *primitive* cultures: our so-called *contemporary ancestors*. Aesthetician *Richard Wallaschek* of the Vienna School of CM, in his 1893 *Primitive Music* [48.18], presents a musical world tour in 300 pages, describing and categorizing each so-called primitive music in terms of its evolutionary stage. At the core of Wallaschek's study is a belief in cultural evolutionism, held without question. He says [48.18, p. 145]:

> *I can take it for granted that there are still savage tribes, whose culture has remained stationary ever since the stone age. If this is so, it seems – to say the least – extremely improbable that such tribes (as Bushmen, Australians) should at the same time have made any progress in music alone.*

The book examines everything from instrument type to singing style to a people's understanding of harmony and harmonic progression, in order to place musical characteristics and (by extension) societies along a continuum of evolution, speculating on the origins of these attributes and connecting links between societies

along the way. An ambitious early example of CM, as *Mervyn McLean* notes, *it is also compiled substantially from unreliable secondary sources and is full of mistakes and misinterpretations* [48.3, p. 241].

Carl Stumpf, the father of the Berlin School of CM, was also very concerned with evolutionary theory in his work. He theorized [48.19, 20]:

> *that a tonal system with stable steps required an intellectual development* [...] *whose consecutive stages and inner properties no one ha*[d] *yet demonstrated for us in a psychologically credible way.*

In his 1911 *The Origins of Music* [48.21], *Stumpf* attempts to do just that: to discover and lay out the *main forms of primitive melodic formation and their gradual refinement* [48.21, p. 62]. In it, he discusses the ways in which melody-making developed from the use of *noisy sounds* (*Geräusche Töne*) through the use of fixed musical intervals, to the development of a sense of tonality and melodic centralization, and so on, all as a way of categorizing music on an evolutionary scale and thus speculating upon its origins.

Diffusionism. The closely related theoretical framework of diffusionism espoused a *mono*genetic theory of evolution: all cultural traits (including musical characteristics and forms) are invented in a single location and spread outward from that point. *Curt Sachs*, one of the more ardent supporters of diffusionism, justified it over the polygenetic theories explained above by appealing to a personal logic based on the relative complexity of musical instruments and characteristics [48.22, pp. 62–63]:

> *We may believe that a tool such as a hammer can be invented everywhere at a certain stage of human evolution; the progression from the use of the bare fist, through the use of a stone in the fist, to a stone on a wooden handle, is quite logical and natural. But a bull-roarer? Is it really acceptable that every human tribe must invent an oval board, held by a cord and whirled around the head, for certain magic purposes? Is it convincing that merely because of natural evolution such a bull-roarer should have been almost universally connected with the fish, and that Paleolithic hunters in France as well as modern Eskimos should both have the idea of dentating its rims?*

Convincing though his argument may sound, of course, it is still more conjecture than proof.

One of the more commonly adopted diffusionist theories among comparative musicologists was the theory of culture circles (*Kulturkreislehre*), where cultural traits were thought to spread in ever-expanding circles

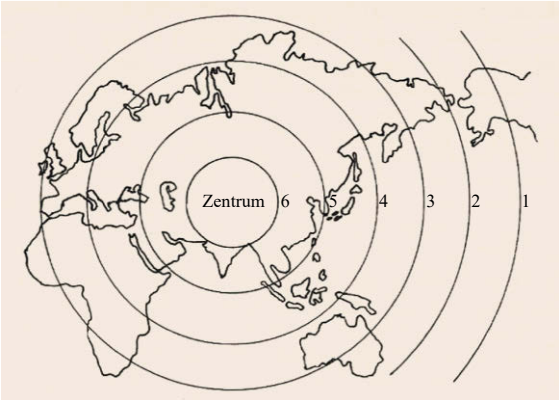


Fig. 48.3 The theory of culture circles (after [48.23, p. 29])

from their point of origin, and where those traits most distant from the center were considered to be the oldest (Fig. 48.3).

Diffusionist scholars theorized, among other things, that *the more widely an object is spread over the world, the more* primitive *it is* [48.22, p. 62]. *Sachs* claimed that the strung rattle, for instance, which is *used by modern primitives of a very low cultural standard as well as by Paleolithic hunters*, must be *among the earliest instruments* [48.22, p. 26]. In his 1929 *Geist und Werden der Musik Instrumente* [48.24], *Sachs* developed 23 historical strata for musical instruments based on distribution patterns, later adopted and adapted by *Hornbostel* for consideration of African musical instruments [48.25] and further refined by *Sachs* in 1940 [48.22]. Again, the most widely distributed instruments – like rattles – were considered to belong to the oldest strata.

Diffusionist theories not only allowed researchers to conceive of the age of certain musical or cultural traits; they also allowed them to hypothesize on the geographical route by which these traits traveled from one culture to another, and thus to build theories of cultural influence. In 1911, for instance, *Hornbostel* published a study on the tuning systems of xylophones in Southeast Asia and Africa [48.26]. Surprising similarities in the pitches, expressed in vibrations per second, led to a largely unsupported theory of monogenesis and cultural influence.

Concluding Remarks on Comparative Musicology

As *Savage* and *Brown* have noted [48.27, p. 158]:

> *One of the weaknesses of early comparative musicological work was a reliance on what we will call* remote comparison*, in which small numbers of songs from very distant regions were com-*

pared, often to support arguments of monogenesis *about long-distance similarity between regions. Such projects often involved the cherry-picking of particular songs that satisfied preconceptions of musical similarity.*

Moreover, the inherent racism in these evolutionary theories will probably be obvious to the twenty-first-century reader: it was not only allowed but encouraged to equate our Stone Age ancestors with our contemporaries in more so-called primitive cultures, in terms of their evolutionary stage. This supported a hierarchy of musics (and therefore cultures) ranging from primitive to advanced, thus justifying the goals of colonialism – and beliefs in Western superiority – through musical *science*.

For these reasons, the theoretical orientations of evolutionism and diffusionism, questions of origins, and concepts of universals were all eventually rejected by the academic community. And with that dismissal, the comparative approach to a large degree fell out of fashion also.

48.2 The Mid-Century Pendulum Swing: The Rise of Anthropology-Based Studies

While analysis of non-Western musics and the comparative approach did continue to have a few supporters and practitioners (discussed below) after the rejection of evolutionary theories, the second half of the twentieth century saw the development and eventual dominance of a very different form of ethnomusicological research. This was accompanied by a change in the name of the discipline from *comparative musicology* to *ethnomusicology* (a term coined by Jaap Kunst in 1950, later to lose the hyphen). As *Martin Stokes* has noted [48.28]:

Academic music theory and ethnomusicology parted company in the 1960s. Ethnomusicologists turned increasingly to Geertzian hermeneutics and ethnoaesthetics, viewing the application of western theoretical methodologies to non-western musics with concern and suspicion.

And given some of the emerging misgivings about what Western analytical techniques had wrought, this was an understandable reaction. Alongside the above-mentioned concerns of Eurocentric racism, scholars in the newly minted field of ethnomusicology feared that the kind of comparison undertaken in CM was a classic cart-before-horse blunder. *Mantle Hood* (1918–2005), who at mid-century promoted direct engagement with musics of the world through performance as a way to better understand music cultures and music systems (bimusicality), stated [48.20, p. 233]:

It seems a bit foolish in retrospection that the pioneers of our field became engrossed in the comparison of different musics before any real understanding of the musics being compared had been achieved.

He maintained that this approach had *led to some imaginative theories but provided very little accurate information* [48.29, p. 299].

Other objections to CM ran even deeper. As a new generation of American ethnomusicologists increasingly received training in anthropology, these scholars began questioning the very essence of the way we studied music. Suddenly anthropologists like Franz Boas (1858–1942), and his ideas of cultural relativism, began profoundly impacting the discipline as a whole. Scholars realized that music could not be studied in a vacuum; cultural factors *must* be taken into account so that *all people, in no matter what culture,* [would] *be able to place their music firmly in the context of the totality of their beliefs, experiences, and activities* [48.30, p. 3]. Enter *Alan P. Merriam*, an anthropologically trained ethnomusicologist, who developed a tripartite model for the study of music as culture, outlined in his influential 1964 book *The Anthropology of Music* [48.31]. According to Merriam's model, ethnomusicologists must begin by examining the culturally specific *concepts* about music as revealed to them by the practitioners themselves, use these concepts to inform observations about the *behaviors* of music-making, and only then tackle the music *sounds*, now from a deeper, more culturally sensitive place of understanding. This new approach would gain widespread appeal and support among many ethnomusicologists, particularly in the newly dominant North American branch of the field, calling into question the older practices of CM. As important English ethnomusicologist *John Blacking* (1928–1990) argued two years later [48.32, p. 218]:

A logical outcome of Merriam's approach to the study of music is surely the need for entirely new methods of analysis of music sound [. . .] If we accept the view that patterns of music sound in any culture are the product of concepts and behavior peculiar to that culture, we cannot compare them with similar patterns in another culture unless we

> *know that the latter are derived from similar concepts and behavior. Conversely, statistical analysis may show that the music of 2 cultures is very different, but an analysis of the cultural* origins *of the sound patterns may reveal that they have essentially the same meaning, which has been translated into the different* languages *of the 2 cultures.*

Scholars like *Charles Seeger* (1886–1979), alongside Blacking and Merriam, called for a discipline focused on *the advancement of knowledge of and about music* [and. . .] *the place and function of music in human culture* [48.33, p. 217]; as *Hood* put it, a study of music *not only in terms of itself but also in relation to its cultural context* [48.29, p. 298]. As mentioned, these new attitudes were especially strong in American ethnomusicology, where the teachings of Boas held considerable sway.

The putative goal of these mid-century scholars was to create a balanced, inclusive approach to the study of music – as the influential *Bruno Nettl* (b. 1930) [48.34, p. 26] described it:

> *a sort of borderline area between musicology (the study of all aspects of music in a scholarly fashion) and anthropology (the study of man, his culture, and especially the cultures outside the investigator's own background).*

A necessary shift in consciousness and understanding, this radical change in thinking among ethnomusicologists had a rather unfortunate, if inadvertent, side effect: a sudden and distinct disinclination among most ethnomusicologists to engage in deep musical analysis of any kind, and a subsequent paucity of analytical studies in the field. Ethnomusicology became a study of *music in culture* and *music as culture*, and its publications became overwhelmingly dominated by these anthropology-based studies. A survey by Timothy Rice of articles published in the journal *Ethnomusicology* from 1979 to 1986 showed that only 10% of these emphasized music analysis, while 34% focused on social processes and another 17% on individual processes [48.35, p. 476]. I performed a similar survey 16 years later with comparable results [48.36, pp. 108–109]:

> *In the annual list of dissertations and theses published by* Ethnomusicology *in the winter of 2001, only six of the over* 120 *papers had a distinct analytical bent. And, of the* 129 *articles published in that journal in the last ten years* [1993–2003], *only fourteen contained major music-theory analyses. Many articles did not contain a single musical example.*

The effects of Merriam's pendulum swing, then, have been deep and long lasting. As *Nattiez* has noted [48.37, pp. 241–242]:

> *Since the 1960s ethnomusicology ha*[s] *become increasingly an* anthropology of music *under the influence of Merriam (1964) and Blacking (1973).* [. . . And] *because of the widespread assumption that only a knowledge of the cultural environment would permit a true understanding of music from an oral tradition, all analytical activity, which, it was suspected, substituted the tools of the Western researcher for the values and concepts of the native musician, began to disappear gradually from ethnomusicological monographs.*

There were, however, a few pockets of the ethnomusicological community doing analysis – and encouraging analysis – in the second half of the twentieth century. In the next few sections, we will discuss some of the major trends and a handful of the most important scholars and methods in these decades.

48.2.1 Analysis in a Relativist World

The few scholars left attempting close musical analysis in the second half of the twentieth century now had to do so with a new relativist understanding of the world. One of the more engaging analytical experiments undertaken in the 1960s was a symposium on transcription and analysis published in a 1964 issue of *Ethnomusicology* [48.38]. This study, which began as a colloquium presented at the Society for Ethnomusicology conference in 1963, was an unabashed demonstration of the subjectivity of transcription and therefore of analysis. Four respected scholars, Robert Garfias, Mieczyslaw Kolinski, George List, and Willard Rhodes were invited to transcribe and analyze a recording of a Hukwe song performed with musical bow. The participants were given some background information on the Hukwe people and a small description of the bow's playing technique. They were invited to transcribe and analyze the recording any way they saw fit, with very little instruction, no communication among them, and a stated desire for individual approaches. There are certainly elements common to the resulting transcriptions, such as agreements regarding pitch content and the timbral quality and rhythmic material of the bow. But as we can see in the synoptic view of the four transcriptions in Fig. 48.4, they are also utterly different. Two of the scholars choose to transcribe the whole recording while the other two focus in on smaller sections; one uses a graphic-style notation for the vocal melody; each decides on a different level of detail for the bow's pitch

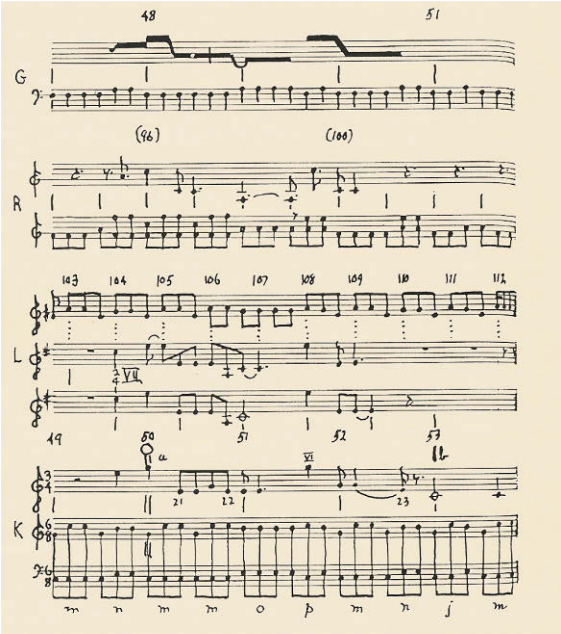


Fig. 48.4 Synoptic view of transcriptions from the 1964 symposium (after [48.38, p. 274])

content. Their accompanying analyses show even more breadth of perspective. While Garfias analyzes the piece from a culture-specific approach, both List and Kolinski apply the universalist sound-based theories still in vogue at the time, each focusing on his own particular areas of expertise: Kolinski alone, for instance, deals with tonal modality, which is of special interest to him.

The exciting thing about this symposium is that it addresses issues of subjectivity, recognizing *that in fact transcriptions bear within them the result of a transcriber's analytical understanding* of the music [48.39, p. 543], without then rejecting these methods out-of-hand. It is an experiment celebrating the relativism that turned many ethnomusicologists away from analysis in the later twentieth century, stating *one great strength of our Society lies in the varied individual approaches that are (and have been) made toward the data of our discipline* [48.38, p. 233]. It is with this attitude that the scholars discussed in the next sections moved forward with analysis in the latter half of the twentieth century, despite a virtual field-wide reaction against it.

48.2.2 Later Comparative Studies

Though comparative research largely passed out of vogue with evolutionary models, it did not entirely disappear in the second half of the twentieth century. In fact, as *Nettl* has noted, comparative study in the 1960s and 1970s actually *continu*[ed] *to occupy about the same proportion of research as it did before 1950; it* [simply] *received less attention and respect* [48.16, p. 67]. Two scholars forging new approaches to comparison in these decades were Mieczyslaw Kolinski (1901–1981) and Alan Lomax (1915–2002). Though studies of both men have been questioned and their approaches largely fallen into disuse, they were among the last to attempt to capture the full scope of the world's music in analytic terms. While Lomax was interested in cross-culturally examining singing style with enormous breadth of focus, Kolinski was concerned with deeply exploring the minutiae of very specific musical parameters across genres and cultures.

Alan Lomax's Cantometrics Project

Like many of the early comparative musicologists and music ethnologists, Alan Lomax was a prodigious collector of music, largely of the folk musics of Europe and North America. He was interested in comparing song styles and hypothesizing how differences among them might correlate with differences in the social structure of their respective cultures. *Lomax* is most well known for his multidecade project in what he called Cantometrics, or *measure of song* [48.40, 41]. An advanced form of trait listing analysis, Cantometrics measures 37 (later to be 36) distinct musical parameters of a song, from its various rhythmic and melodic features (e.g., regular versus irregular overall rhythm, melodic shape, type of polyphony, etc.) to ornamentation, level of group cohesiveness, and vocal qualities like nasality, vocal width, enunciation, and rasp. Lomax also designed a coding sheet on which each of these parameters could be judged. Figure 48.5 shows parameters 32–37 of the coding sheet – those dealing with vocal quality – including the various points on the rating scale for each parameter. The researcher would select the most appropriate point on each scale of the coding sheet and this would provide a *speedy characterization and classification* of the song's musical style [48.41, p. 8].

The same coding sheet could also be used to comparatively analyze two distinct music traditions, as we can see in Fig. 48.6. Here, the various vocal qualities of the so-called *African Gatherer* style are circled, and those of the *Urban East Asian* style are marked with rectangles. As *Lomax* asserts, these two profiles *define the extremes of the human stylistic range. There are, of course, other styles whose patterns fall along the middle of the profiling system* [48.40, p. 19].

Yet what really interested Lomax was determining how musical features might reflect social features. He sought to show, by comparing song measurements with preexisting ethnographic data, that [48.42, p. 97]

32) *Vocal Pitch* (Register)
(1) very high V-Hi (2) high Hi (3) mid Mid (4) low Low (5) very low V-Low
33) *Vocal Width*
(1) narrow NA (2) mid M (3) wide W (4) yodel Y
34) *Nasality*
(1) extreme or steady Ext (2) much Much (3) intermittent Int (4) some Some (5) little or no Ø
35) *Rasp*
(1) extreme Ext (2) great Gt (3) mid or intermittent Int (4) slight Sli (5) little or no Ø
36) *Accent*
(1) very forceful V-fo (2) forceful Fo (3) mid Mid (4) relaxed Re (5) very relaxed V-Re
37) *Enunciation*
(1) very precise V-Pre (2) precise Pre (3) moderate Mod (4) slurred Slur (5) very slurred V-Slur

Fig. 48.5 Lomax's Cantometrics coding sheet for vocal quality (after [48.40, p. 67])

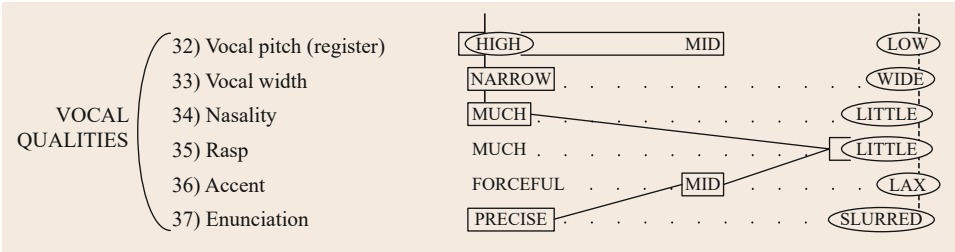


Fig. 48.6 Lomax's comparative analysis for vocal quality, *Urban East Asian* versus *African Gatherer* (after [48.40, p. 18])

> *song styles shift according to differences in productive range, political level, level of class stratification, severity of sexual mores* [...] *level of social cohesiveness,* [and so on].

Lomax's research team used a computer program to search for correlations between musical and societal features across the cultures they examined. Cultures were then organized into groups to create a geography of song style, and these larger profiles were analyzed in terms of their level of similarity in an attempt to show an evolution of style traditions. In the tree graph in Fig. 48.7, double lines represent the strongest cultural links, and the numbers on the bottom represent the proposed evolutionary stage of each culture group.

The Cantometrics system is flawed in a number of ways. It has been criticized for its evolutionist leanings and its unevenly distributed and often highly subjective parameters (how does one accurately judge a level of rasp, for instance?). Other critics have questioned its small sample sizes based on the mistaken assumption that most folk culture areas participate in a homogeneous style of music-making, and its use of *broad culture-areas as the basic units* of musical analysis [48.27, p. 155]. But, despite its not insignificant shortcomings [48.43, p. 101]

> *the Cantometrics system deserves credit for having moved vigorously in a direction previously uncharted: the description of singing style and of the nature of musical sound in general, things in the realm of what is usually called* performance practice.

Mieczyslaw Kolinski's Grand Schemes

While Alan Lomax was devising Cantometrics, Mieczyslaw Kolinski was developing a very different kind of grand scheme for comparative analysis. Yet, unlike Lomax, whose Cantometrics project is still cited in virtually all texts on ethnomusicology, Kolinski's methods are often only discussed *to recommend mostly against them* [48.3, p. 294]. Like earlier comparative musicologists, Kolinski was interested in discovering universals in music and comparing large bodies of data. He believed that all musics, no matter how diverse, could be [48.43, pp. 98–99]

> *subjected to comparison through a single classificatory system, a system reflecting and determined by the outer limits of and range of possibilities with the* [psychophysically rooted] *constraints* [of each musical style].

Kolinski published a series of articles through the 1950s, 1960s, and 1970s, each of which attempted a comprehensive examination of all possibilities for a given musical feature, from the 348 scalar and modal arrangements described in his *Classification of Tonal Structures* [48.44] to his detailed calculations of melodic movement [48.45, 46]. In these latter, Kolinski developed formulae and charts for comparatively analyzing melodic contours of diverse bodies of musical works.

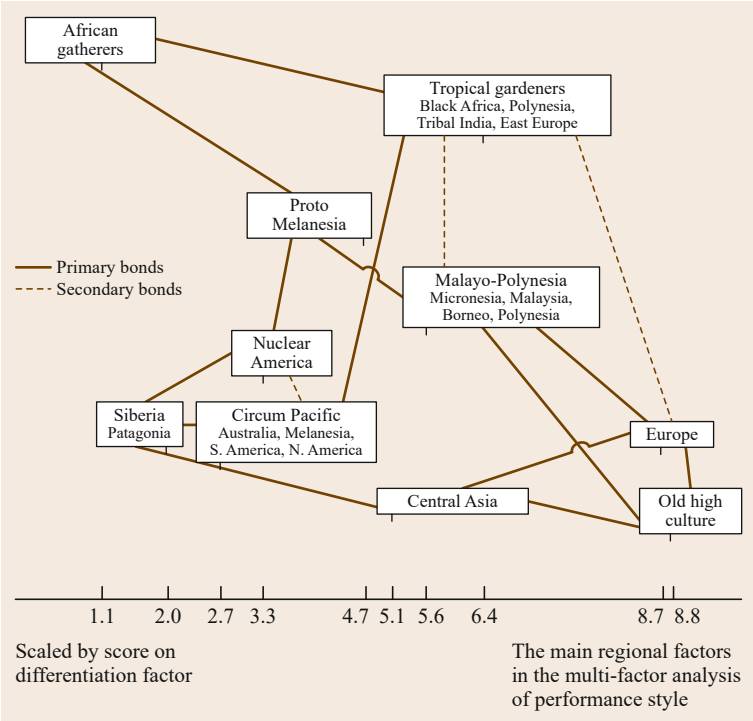


Fig. 48.7 Lomax's geography of song style (after [48.40, p. 35])

In *The General Direction of Melodic Movement* [48.45], for instance, *Kolinski* develops a method for comparatively analyzing different musics by charting the initial and final note of a melody in relation to its range. For a large body of works within a single tradition, Kolinski calculates what he calls *level formulae* – the average initial and final *melody level* expressed as a value from 0 to 100, where 0 is the lowest pitch and 100 the highest. For instance, among the songs of the Papago of Southern Arizona, Kolinski calculates the average initial pitch as being 64% of the piece's range higher than its lowest pitch, and the average final pitch as 32% higher. This gives the style a level formula of 64° : 32° and a level shift or pitch change of −32°, descending 32% of the full range over the course of the piece. By contrast, statistics of songs from the Menominee of Wisconsin exhibit a level formula of 89° : 4°, thus presenting a much sharper level shift of −85°.

Kolinski then expresses these level formulae in more detailed graphs showing the frequency distribution of songs with different initial and final levels across the repertoire, thus illustrating how the averages for level formulae were obtained. Figure 48.8 comparatively charts the distribution of initial pitch levels across the repertoire for Papago and Menominee songs. Kolinski divides the *x*-axis into 12 ranges – 0° (the lowest pitch in the range), 1–9°, 10–19°, 20–29°, and so on, up to 90–99°, and finally 100° (the highest pitch in the range). The *y*-axis shows the percentage of songs in the repertoires with an initial pitch in each of the given ranges. An average of all initial pitches in the graph gives the numbers from the level formulae above: 64° for the Papago songs and 89° for the Menominee songs. One can see that the Papago songs have a lower average initial level because a smaller percentage of songs begin on 100° than in the Menominee tradition and a larger percentage begin in the 20–29°, 30–39°, and 40–49° ranges.

The benefit of this sort of analysis is that it allows general melodic direction of different repertoires to be compared seemingly objectively regardless of the scale type or range of a given piece. Yet, for a number of reasons, Kolinski's methods have generally been rejected in the ethnomusicological community [48.47], [48.3, pp. 294–297]. This analysis of melodic direction, for example, takes no account of vastly different melodic contours presented with the same initial and final pitches and range. A melody beginning with a large leap up then proceeding with a slow descent back to the same pitch would generally be perceived as a descending melody where another differently contoured melody starting and ending on the same pitch could be perceived as wave-like or ascending. Yet these would be given the same level formula and thus erroneously analyzed as having the same melodic direction.

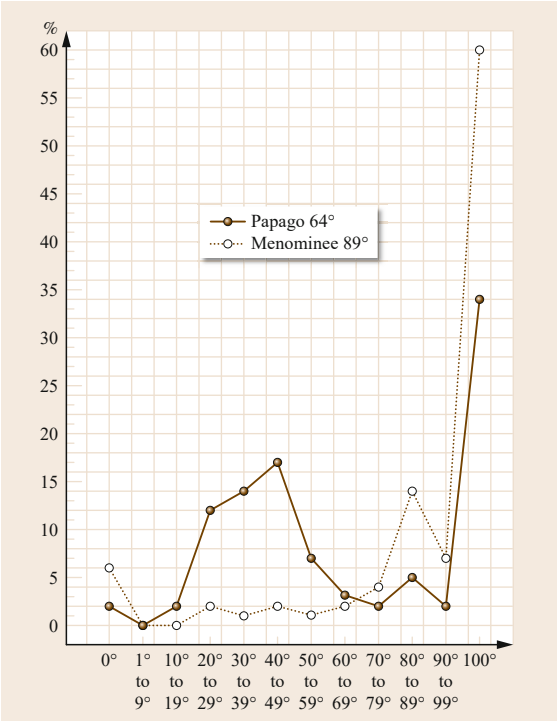


Fig. 48.8 Kolinski's comparative analysis of initial pitches; Papago versus Menominee songs (after [48.45, p. 241])

Kolinski's comparative study of tempo [48.48] has equally come under attack for its oversights and assumptions [48.47]. In this study, the author defines the tempo of a piece in terms of the number of notes per minute with no concern for the underlying beat of the music, as perceived by either cultural insider or outsider. Again, an attempt to provide a wide-spanning, seemingly objective comparative framework falls far short of its goal in terms of important perceptual details as well as *emic* (insider) considerations of the music.

Though much of the work of these mid-century comparativists has been largely rejected, we can appreciate the scope of their aspirations: using comparison, as *Kolinski* stated, as *an essential tool in* [our] *quest for a deeper insight into the infinite multifariousness of the universe of music* [48.49, p. 160].

48.2.3 Inspiration from Linguistics

Continuing the trend set by the late nineteenth-century comparative musicologists, many mid-twentieth-century analytical ethnomusicologists not predominantly interested in comparison turned to other disciplines for inspiration and guidance. The post-WWII era saw an academic atmosphere in which the study of symbols – and by extension the study of culture as a symbolic system – became increasingly popular across many disciplines, as Levi-Straussian structural anthropology [48.50] and semiotics [48.51] gained recognition. And for scholars attempting analysis in ethnomusicology, *an alternative to a behavioral approach to identifying symbols from a culture* [was] *to use language, the central symbolic code of humans, as a point of departure* [48.43, p. 305]. These scholars, then, turned to the work of structural linguists such as Ferdinand de Saussure, Roman Jakobson, and Noam Chomsky in the hopes of examining musical systems in the meticulous ways they had developed for examining linguistic systems. Scholars like George Herzog, the father of the American school of CM, were already asking questions about the overlap between musical and linguistic phenomena [48.52], but interest in applying linguistic *models* to musical analysis was something that developed through the 1960s and 1970s.

Saussurian structural linguistics is concerned, as the name suggests, with the underlying structures of language. Saussure made a distinction between the abstract linguistic system common to all speakers of a given language – what he called *langue* – and the discrete, unique utterances of individual speakers – *parole*. And for Saussure, the scientific study of language was a study of langue: a study of the rules behind the utterances. This he then divided into surface and deep structures. *Syntagmatic* analysis focused on the surface syntactical rules, such as the grammatically correct order of article, adjective, and noun in a given language: article-adjective-noun in English (the green house), article-noun-adjective in French (la maison verte), noun-adjective in Indonesian (rumah hijau). *Paradigmatic* analysis focused on the deeper paradigms, or preexisting sets of signifiers (letters, words, etc.), within the langue. This style of analysis could be applied to languages at several levels: the Roman alphabet is the paradigm from which English words are made; a full lexicon is a paradigm from which sentences are made, and this lexicon may be divided into paradigm sets according to things like word function (e.g., verbs). Paradigmatic analysis involves comparing the chosen signifiers (be they letters in a word, words in a sentence, etc.) with other signifiers that might have been chosen instead and to consider the significance of those choices. A common test in paradigmatic analysis is a commutation test, in which a signifier is selected and replaced with a different one to see whether or not the meaning – the signified – changes; this determines the distinctive signifiers within the language, defines the importance of those signifiers, and creates categories or paradigmatic classes of signifiers [48.53]. For instance, at the phonemic level, replacing *f* with *p* in an English word changes its mean-

ing; *fast* and *past* do not have the same meaning. But in Indonesian, *f* and *p* are very often interchangeable; *breath* can be spelled and pronounced either *nafas* or *napas*. This sort of commutation test becomes rather more subjective at higher levels of analysis, but its basic use is to discover the paradigms of the language: to determine at what level a change would affect the meaning; the signified.

The first musicologist to conceive of a paradigmatic analysis of music was *Nicolas Ruwet* [48.54]. He and his successors worked almost exclusively with notated music from the Western tradition. It was *Simha Arom*, in his studies of polyphonic traditions from the Central African Republic [48.55], who developed these techniques of classification and paradigmatic analysis most fully for ethnomusicological research. Arom used the natural commutation test of a cyclic music with repeated variation to discover culturally equivalent variations in diverse polyphonic musics, thus uncovering the paradigms of their musical languages. Through identifying common aspects between like patterns, Arom was able to decode a model for different rhythmic and melodic patterns and their possible variations. In Fig. 48.9, we see an example of what Arom calls a paradigmatic block: a group of rhythms that are deemed *culturally equivalent* among the Banda-Linda in the context of a specific ritual – rhythms that are freely interchangeable in their given position in the cycle.

A closely related form of linguistic analysis that also bled over into ethnomusicological research was *Chomsky*'s transformational-generative grammar [48.56], which aimed at [48.57, p. 163]

> *separat*[ing] *the grammatical sentences of a language from the ungrammatical ones and* [...] *provid*[ing] *a systematic account of the structure of grammatical sentences.*

An early example of the transformational model being applied to music is Edward Sapir's 1969 study of Diola-Fogny funeral songs [48.58]. Sapir incorporates insider (*emic*) names for different song structures while applying to those structures a transformational analysis that shows features shared by all the songs, and revealing each of the ways new variants can be derived. *Johan Sundberg* and *Björn Lindblom*'s 1976 article on generative theories [48.59] describes both Swedish nursery tunes and melodic variants of Swedish folksongs using generative rule systems. The authors then point to similarities between the two systems as potential guiding principles for composing simple melodies. They further hypothesize that connections between those musical rule systems and Chomsky and Halle's generative phonology of the English language reflect general characteristics of human cognitive capacities. *Vida Chenoweth* and *Darlene Bee*'s comparative-generative study of melodic structure in New Guinea [48.60] takes a different approach. The authors present three models of Awa song types (melodic structures) in the hopes of giving cultural outsiders simple visual tools with which to compose syntactically appropriate melodies in each structure. Figure 48.10 shows the authors' flow chart and associated formula for describing the simplest melody type. All syntactic units (notes) are described in terms of their interval relationship to the tonal center (TC), with *L* representing intervals below it (lower than) and *H* representing those above it (higher). As can be seen in the accompanying description, the flow chart and formula show all the possible choices that a composer can make, thus presenting a generative grammar:

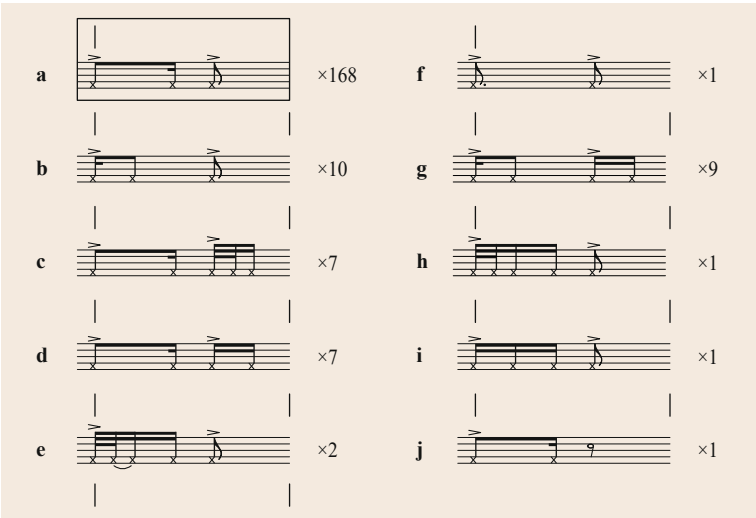
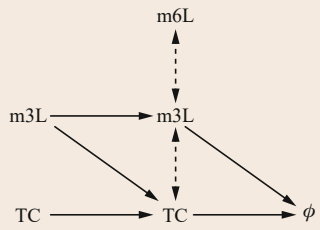


Fig. 48.9 Example of Arom's paradigmatic block (after [48.55, pp. 256–257])



{m3L; TC + TC} + {(TC) + m3L + (m6L + m3L); m3L + TC} $n + \phi$

An Awa melody composed on this pattern may begin on either a minor third lower than the tonal center or on the tonal center. If it begins on the tonal center there must be at least one repeat of the first note. The melody may end with either the tonal center or the minor third. The core of the melody consists of alternations between these two with an optional progression of a minor third plus a minor sixth and back to a minor third.

Fig. 48.10 Chenoweth and Bee's flow chart (*left*), formula (*top right*), and description (*bottom right*) for one Awa song type (after [48.60, p. 779])

a set of rules representing all the syntactically correct ways to generate new melodies in this melodic structure.

Concluding Remarks on Linguistic Approaches

Like all the methods discussed thus far, linguistic approaches to ethnomusicological analyses also have their critics. In an atmosphere of cultural relativism, one of the major points of contention is that these scholars, like many of their forebears in CM, were often unconcerned with how music related to culture. Further, ethnomusicologists like *Stephen Feld* [48.61] have questioned the practice of asserting equivalence between music and language without really demonstrating it, calling attention to studies that assume rather than explain the validity of using linguistic models for musical analysis. These detractors warn against what *Aniruddh Patel* calls the *distraction of superficial analogies between music and language* [48.62, p. 5], and promote the need for skepticism when considering studies that claim strict equivalence between them. As *Lerdahl* and *Jackendoff* argue [48.63, p. 5]:

> *Many previous applications of linguistic methodology to music have foundered because they attempt a literal translation of some aspect of linguistic theory into musical terms – for instance, by looking for musical* parts of speech*, deep structures, transformations, or semantics.* [. . .] *One should not approach music with any preconceptions that the substance of music theory will look at all like linguistic theory.*

Flawed though these approaches may have been, however, like the early comparative approaches, they helped to build a toolkit of methods that an ethnomusicologist could turn to – with a critical eye – to help with analysis.

48.3 Analysis in Modern Ethnomusicology

As we have seen in this chapter, analytical ethnomusicology is in its very nature subjective and imperfect. But, as *Judith Becker* has maintained (wisely if somewhat idealistically) of these many approaches attempted over the decades [48.64, p. 113]:

> *In each case, ethnomusicologists had the good sense to learn from these movements what was useful to us. In the process we became enriched theoretically and methodologically. Eventually, the realization sets in that this or that approach does not, as first assumed, solve all our problems or answer all our questions. But we move on with a richer arsenal of ways to think about music. We do not discard approaches that once seemed stunning in their ability to reveal insights into music and musical behavior, but subsequently were shown to be partial and vulnerable. Rather, we carry within ourselves, like a palimpsest, each theoretical methodological approach with which we have seriously engaged, and we are richer for it.*

This assertion, unfortunately, is the ideal, not yet the reality. Thus, in this final section, we will attempt to understand the still-uncertain status of analysis within the field – and perhaps look to the increased prominence that it *could* enjoy in the future – through a discussion of our field-defining rhetoric and an examination of a few of the new analytical methods evolving within the discipline.

48.3.1 The Still-Shaky Position of Analysis in Ethnomusicology

Despite the rocky history examined here, many ethnomusicologists do see the value of music theory and anal-

ysis, and a not insignificant number of us include them in our studies. As *Gabriel Solis* has argued [48.39, p. 533]:

> *Such music theory* [...] *should be – and, indeed, is – neither of limited value to questions about music as social practice, nor marginal to the discipline of ethnomusicology at large, but rather of central importance in practice and in principle to both.*

And *Michael Tenzer* contends [48.65, pp. 6–7]:

> *Once observed, sound patterns can be mobilized for many purposes: to demonstrate or inspire compositional depth or ingenuity, to discover an archetypical sound-structure model on which a music or repertoire is based, to symbolize or reflect a philosophy, social value or belief (of the analyst, the composer(s), performer(s), or their society), to reveal a historical process of change, to unearth suspected connections to music elsewhere, to embody a mathematical principle. Good analysis demystifies by cracking sound codes, better enabling the ear to collaborate with the mind in search of richer experience.*

That music theory and analysis are an integral part of ethnomusicological research thus seems an already accepted norm. Yet, since the so-called *great divide* of the discipline at mid-century, they have never regained equal footing with the more anthropology-based studies in the field. As *Jonathan Stock* observes [48.66, pp. 224–225]:

> *music analysis per se has been and continues to be questioned by the influential anthropological bloc within ethnomusicology* [...] *Whether the distrust by music anthropologists for what they see as the analysis of acontextual musical features is indeed academically well-founded may be contended with on a number of levels, but, in that it is analysis of the interplay between musical context, behaviour and sound that continues to dominate ethnomusicology* [...] *the anthropological view remains a powerful one in the shaping of ethnomusicological discourse.*

Mervyn McLean agrees, calling attention to the still-prevalent *notion that the earlier specifically musical approaches (especially those involving transcription and analysis) are no longer acceptable* [48.3, p. 330]. He argues fervently that a *complete* ethnomusicologist must be equally competent in both music and anthropology, and warns that [48.3, p. 333]

> *one of the most pernicious outcomes of the application (or more accurately misapplication) of Merriam's model* [of concept–behavior–sound] *is that it has led to the* sound *component of the model effectively becoming lopped off in favour of the remainder, because analysis of* mere sound *is supposed to obscure the reality of whatever it is that lies behind it.*

Indeed, many ethnomusicologists today still shy away from analysis or even warn against it. In his *Very Short Introduction to Ethnomusicology* [48.67], for instance, *Timothy Rice* expresses concern that the goals of music analysts like *Michael Tenzer* [48.65, 68], *reposition ethnomusicological study within a European, universalizing definition of what art is in contrast to the last thirty years of ethnomusicological work* [48.67, p. 62]. These analyses, in *Rice*'s estimation, are problematic because they elevate a Kantian view of music as art, which [48.67, p. 62]

> *has been used to valorize a limited, European view of art as always about beauty and to relegate non-European practices to a category of non-art or functional or applied art.*

These definitions of both music and analysis, however, seem narrow: Rice implies that analysts always consider music to be art, assumes that one would not wish to analyze something that was not high art, and by extension insinuates that analysis seeks to categorize and exclude, not to explore and discover.

Yet, though the role of music theory and analysis has been the subject of an ongoing negotiation since ethnomusicology's inception, to the credit of Tenzer, Stock, McLean, and other scholars passionately addressing the relative scarcity of analysis in our field, the tenor of this dialog has shifted in recent years. We have seen the establishment of the *Analytical Approaches to World Music* (AAWM) journal and conference, both of which rely heavily on the contributions of self-proclaimed ethnomusicologists. Further, *Tenzer*'s 2006 *Analytical Studies in World Music* [48.65] – a compendium of work from both ethnomusicologists and Western music theorists – was successful enough that Oxford University Press released a sister volume in 2011 [48.69]. And *Gabriel Solis* reports that in the *British Journal of Ethnomusicology* about 30% of recent articles have included significant music analysis [48.39, p. 535]. This is certainly an improvement over the aforementioned surveys of the North American *Ethnomusicology* journal by Rice and myself. Further, many recent published books and theses – like *Marc Perlman*'s *Unplayed Melodies* [48.70] and, in very different ways, *Thomas Turino*'s *Music as Social Life* [48.71] and *Michael Tenzer*'s *Gamelan Gong Kebyar* [48.68] – have also engaged in close musical analysis.

Yet there is still a significant imbalance of analytical versus anthropological studies; the pendulum has

yet to return to center after its mid-century swing. Solis attempts an explanation for this by shining a light on our own rhetoric surrounding analysis. He reproaches many ethnomusicologists for giving music theory and analysis short shrift in their field-defining metatheory, citing a recent article by *Timothy Rice* aimed at delineating the tasks and directions of the field [48.72]. While Rice, in his own research, does occasionally engage in what *Solis* (and I) would term a music theory and analysis of Bulgarian music, in his field-defining writing *he seldom metadiscursively acknowledges the ways that ethnomusicologists engage in theory about musical sound* [48.39, p. 531]. In fact, he even goes so far as to present an *off-hand dismissal of music theory as an exogenous and currently marginal practice to the discipline* [48.39, p. 532]. While Rice is perhaps extreme in his view of music theory's tangential role, *Solis* points to *the limited role of explicit language about music theory and analysis* [48.39, p. 546] and a general lack of deep engagement with these approaches in many of our major field-defining writings as a potentially dangerous precedent. He points to two seminal introductory texts on ethnomusicology as prime examples: *Helen Myers' Ethnomusicology* [48.73] and *Bruno Nettl*'s *The Study of Ethnomusicology* [48.43]. In these works, despite prefatory remarks embracing an integrated view of the field, *considerations of musical sounds become somewhat buried or separated from the main body of the work*. Myers, for instance [48.39, pp. 545–546],

> *includes major, very important articles* [... on transcription and analysis]*, but questions of music theory and analysis, and their role in answering anthropological questions are largely missing from other chapters in the volume.*

And ironically, though I have attempted here to present connections between anthropological and musicological concerns in ethnomusicology, the current chapter may simply be another in a long line of writings that separate analysis from the rest of the field.

Though many ethnomusicologists are now engaging in intensive music theory and analysis, then, the *metatheoretical ambivalence* [48.39, p. 541] facing those studies may perpetuate their second-class status. I am continually surprised at how many ethnomusicologists – when I talk to them at conferences – admit to being interested in music theory and analysis, because I do not hear about it in their papers. It seems almost a case of so-called pluralistic ignorance, where *virtually every member of a group or society privately rejects a belief, opinion, or practice, yet believes that virtually every other member quietly accepts it* [48.74, p. 161]. The end result of this metatheoretical silence on the topic, then, becomes a vicious cycle where each new generation learns from teachers who, themselves, were not trained to do analysis. Absent from our metatheory, music theory and analysis do not play a large role in most of our *Intro to Ethno* classes, requirements for graduate programs, or conference themes. As the graduate students of this generation become the next generation of teachers and writers, they will not necessarily think to include music theory and analysis approaches in their own writing or teaching; they have been acculturated into the thought-habits of the previous generation. Were music theory and analysis to enter our rhetoric, conferences, and grad programs in a more meaningful way, we would surely see more scholars engaging with music theory *as well as* social theory. And that deepening can only strengthen and enrich us. So how do we proceed from here?

48.3.2 A Panoply of Analytical Methods

Over the last half-century, ethnomusicologists interested in analysis have been grappling with the lessons of anthropological study and relativism, and we have learned that we cannot apply the same analytical approaches to every music culture. The paradigmatic analysis that Arom used to unravel underlying models and rules of variation for Central African polyphony, for instance, might quite aptly be applied to the Anlo-Ewe drumming examined by *Locke* [48.75]. Like those musics discussed by Arom, this tradition centers around short cyclic patterns varied by individual players, thus allowing the analyst to establish rhythmic models and equivalences. Or, as I have done for my analyses of Balinese improvised *arja* drumming [48.76], Arom's method could be emulated but then tweaked to suit the different style of cyclic variation in that tradition: one in which each set of paradigms does not trace to a single identifiable composition but rather a constellation of possible patterns then varied upon. For yet other styles, like the alap in a Hindustani rag performance, which does not have a steady rhythmic framework upon which equivalences may be found, paradigmatic analysis will probably be a much less fruitful approach. The analyst must choose from her/his toolkit of methods those that best suit the genre, so that, as *Marcia Herndon* puts it, *our conclusions about a particular piece* [can] *be checked by actual events within that piece, actual events within related pieces,* [or] *by informants* [48.77, p. 252].

Jonathan Stock has noted that detractors of analytical ethnomusicology *regularly censure music analysis as drawing on the values of the external scholar to the exclusion of those of the cultural insider*. He argues vehemently that *this criticism is intellectually unsatisfactory* and asserts that analysis lies [48.78, pp.189–190]

much closer to sensitive interpretation than dispassionate description when done well. Like ethnography, analysis is ultimately a means to develop and recontextualize understandings as we communicate them to our readers.

Most of the analytical studies published in the last few decades fly in the face of the so-called anthropology-musicology divide, and many scholars are attempting to amalgamate music theory with social theory in their writings. *Thomas Turino* in his *Music as Social Life* [48.71] examines the ways that music can be socially meaningful. But the book is also [48.71, pp.1–2]

an introduction to some basic conceptual models that might help to illuminate why and how music and dance are so important to [. . .] *fundamental aspects of social life,*

thus blending social theory with music theory. This more integrated approach has been at the center of many recent offerings in the field. In her article *Riffs, Repetition and Theories of Globalization*, for instance, *Ingrid Monson* presents a *detailed knowledge of musical practice* [as] *crucial in situating music within larger ideological and political contexts* [48.79, p. 33]. Marc Perlman agrees. In his work on Central Javanese *pathet* he has tried to show [48.80, p. 68]

how very close analyses of the music itself *need not be divorced from issues of status, gender, or colonial history. The more detailed our technical analyses,* [he asserts,] *the more opportunities we will have to show how sounds and context are subtly intertwined.*

In my own studies of diffusion and change in Balinese *arja* drumming [48.81], a musical analysis of patterns from seemingly unconnected drummers was what led me to dig deeper, thus finding musicogenealogical links between them. Music analysis and social analysis, then, can be mutually beneficial, reinforcing and informing one another.

Anthropological approaches have also informed analysis in other ways. Methods of fieldwork have allowed many analytical studies to draw on concepts from local music theory. In his 2004 *Unplayed Melodies* [48.70], for instance, *Marc Perlman* relies heavily on the insights and expertise of master musicians from Java in order to unravel the implicit *unplayed* melodies upon which Central Javanese gamelan music is based. In his study of Balinese *gamelan gong luang* [48.82], *Wayan Sudirana*'s analyses are very much informed by ideas and terminology from interviews and casual conversations with individual musicians. And *Andrew McGraw*'s *Musik Kontemporer* [48.83] and *Radical Traditions* [48.84] equally draw upon ethnographic perspectives from contemporary Balinese composers and musicians.

In this more well-rounded world of analysis, each scholar chooses her/his own approach. What we have seen over the last 20 years is an explosion of new methods as well as attempts to resurrect and improve upon older ones. There is no style of analysis that dominates the scene. Some scholars will choose to apply well-established techniques to their studies, but often in surprising ways. *Jonathan Stock* [48.66], for instance, has suggested that Schenkerian analysis may be appropriate for some ethnomusicological studies, applying it to such diverse musics as the Kalasha praise songs of north-western Pakistan and Beijing opera. Others look farther afield, exploring interdisciplinarity in ethnomusicological analysis. Many of these scholars are revisiting Carl Stumpf's early interest in the psychology of music, borrowing theory and method from cognitive science. An important book from the 1990s incorporating musical analysis with cognitive studies is *Benjamin Brinner*'s *Knowing Music, Making Music* [48.85]. This insightful work sheds light on ways of knowing and concepts of competence through the lens of Javanese gamelan practice and performance. More recently, an article on improvisation in Indian classical singing by *Richard Widdess* [48.86] uses the concept of schemas – or cognitive maps – to examine processes of variation (*laykārī*). *Widdess* explores the idea that [48.86, p. 198]

both the singer's improvisation, and the listener's comprehension of it, depend on the simultaneous combination of pre-existing schemas, which enable the singer to arouse, and the listener to feel, varying degrees of uncertainty, expectancy and resolution.

These are just two of many applications of cognitive science for analytical ethnomusicology.

In an environment where new approaches are encouraged and past approaches revisited and refined, there are far too many analytical methods in the modern toolkit to discuss them all here. In the following sections, then, we will briefly explore two quite different directions taken in recent years, both innovative, interdisciplinary approaches: the development of computational ethnomusicology and a return to comparative analysis.

48.3.3 Computational Ethnomusicology

The rise of new computer technologies has provided many opportunities for ethnomusicological analysis in recent decades. The use of computers and other machines by ethnomusicologists is by no means new – Charles Seeger developed the Melograph for graphic

transcription and the real-time analysis of pitch, dynamic, and timbre back in the 1950s – but a trend of using electronic tools for transcription and analysis did not follow for another 50 years. *Nicholas Cook* hypothesizes that much of this had to do with the strong reaction against comparative work in the mid-century [48.87, p. 103]:

> *Perversely* [...] *the possibility of computational approaches to the study of music arose just as the idea of comparing large bodies of musical data – the kind of work to which computers are ideally suited – became intellectually unfashionable.*

In the interim, some isolated studies have arisen, dispersed throughout various journals in many disciplines. Only in the last decade has there been a concerted effort to *gather relevant, high-quality research on computational methods and applications in ethnomusicology* into a unified, accessible forum for ethnomusicologists [48.88, p. 111]. Two important recent sources are *Tzanetakis* et al.'s introductory article in the *Journal of Interdisciplinary Music Studies* [48.89] and a special issue of the *Journal of New Music Research* (JNMR) from 2013 that presents several different studies on the topic (including [48.88, 90–92]).

Computational ethnomusicology, or CE, is understood to be *the design, development and usage of computer tools that have the potential to assist in ethnomusicological research* [48.89, p. 3], and beyond that, may have the capacity to develop [48.88, p. 111]

> theories *or* hypotheses *(not just* tools *as a spreadsheet or a statistical package can be) about processes and problems studied by traditional ethnomusicologists.*

Many recent CE studies are taking advantage of music information retrieval (MIR) techniques: tools that allow users to organize, search, and understand very large collections of data. Until recently, such techniques were largely used for popular applications, such as selecting music for personalized radio stations, query-by-humming [48.93], automatic genre classification, and tempo tracking. The potential benefits of such tools for the academic musical analysis of large data corpuses have only begun to be examined: analyzing pitch use or finding recurring rhythms or melodic patterns in collections far larger than a human could do by hand, transcribing for microtiming, analyzing minute physical performance gestures, searching for structural patterns in large collections, and so on. *Joren Six* et al.'s contribution to the JNMR special issue [48.92], for instance, introduces a modular software platform called Tarsos, which is designed to precisely extract pitch in recorded music of any tradition and, more importantly, to analyze pieces for their pitch distribution and organization. Figure 48.11 shows the various components of the Tarsos platform, which begins with a digital audio input, extracts pitch estimations, draws a histogram of pitch distribution, and finally creates an audio output of the result.

A tool such as this, if sensitively applied, could provide accurate cross-cultural pitch distribution analysis of a kind Ellis and Hornbostel could only dream.

Other applications of CE focus on the precise analysis of rhythm and timing, something for which computers are better suited than the human ear. In *Rhythm Analyzer* [48.94], *Kenneth Lindsay* uses computational analysis to measure *swing* in various recordings of Reggae, Afro-Brazilian music, and Western pop. *Cornelis* et al. [48.91] discuss the problems in using a computational approach to address tempo perception and levels of meter in Central African music. And even as early as 1993, *Jeffrey Bilmes* [48.95] was [48.89, p. 10]

> *work*[ing] *with multitrack audio recordings of Afro-Cuban percussion, extracting note timing, modelling note timing* [...] *and finally applying machine learning techniques to produce stylistically correct expressive timing for new phrases.*

Yet other applications of CE involve the classification of different pieces based on recurring rhythmic or melodic patterns. *Lin* et al. [48.96] have developed a method for determining the genre, or class, of a piece of music by identifying *significant repeating patterns* and then matching them to similar recurring patterns in other pieces of the same genre. Though their study shows varying levels of success depending on the genre being examined, its computational techniques provide interesting potential for more specific applications of pattern analysis. In his 2013 *Antipattern Discovery in Folktunes* [48.90], for instance, *Darrell Conklin* analyzes a large corpus of Basque folk tunes from different genres and identifies what he calls *antipatterns* – those patterns that are very common in most genres of folk tunes but rare or absent in one genre or set. In this way, he creates *negative association rules* for the identification of songs within certain sets of music, thus *predicting the absence of a genre based on the presence of a pattern* [48.90, p. 166].

Other studies using computational techniques attempt further levels of interdisciplinarity, interfacing with not only ethnomusicology but other fields of inquiry as well. In their *Computational Models of Symbolic Rhythm Similarity*, *Toussaint* et al. [48.97] test computational judgments of the relative similarities of different rhythms against human perception, thus touching not only on ethnomusicology, computer science, and mathematics, but also cognitive science.

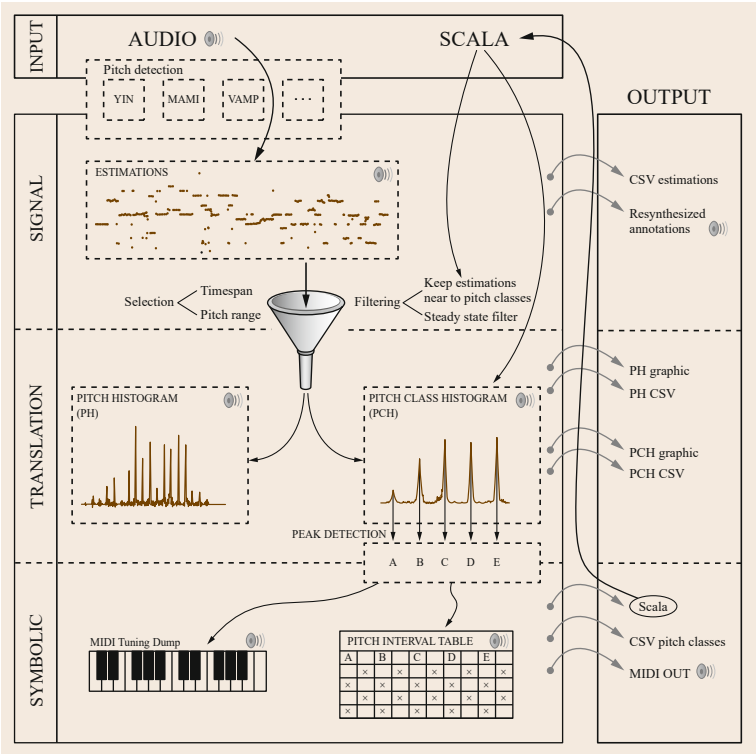


Fig. 48.11 The components of the Tarsos platform (after [48.92, p. 115])

It is hopefully clear from this limited examination that, though still a young field, computational ethnomusicology presents a number of new avenues for analysis and research. What will hopefully also be obvious, however, is that many computer-based tools are very useful for low-level analysis but, to be truly insightful, require refinement and, more importantly, interaction with music specialists. As *Tzanetakis* et al. state, we must [48.89, p. 12]:

> *actively seek interdisciplinary collaborations that include music scholars and technical researchers. Experimental results should generally be interpreted by music scholars with an understanding of the specific music(s) involved.*

Only in this way can domain-specific techniques and custom software be developed to tackle less general questions geared toward individual music traditions.

48.3.4 The New Comparative Musicology

The interest in interdisciplinary approaches currently fueling the growth of CE has also helped to reinvigorate comparative research. This renewed focus opposes the general perception in the field [48.3, p. 315]

> *that comparison is not only* old fashioned *but also in some sense unacceptable or even indefensible.* [. . . Of course] *most early comparative musicology was based on now long-discredited theories related to Kulturkreise and evolutionary ideas* [. . .] *No one wants to be tainted with such a brush, and there is irrational distaste for the whole idea of comparison as a result.*

Yet it seems premature to throw the baby out with the bath water. Comparative musicology was in many ways a groundbreaking, forward-looking, wonderfully experimental field. It brought together scholars of diverse specializations – both scientific and humanistic – and tried to grapple with some of the most basic questions of human existence: Why do we make music? What unites all musics and thus all peoples? Can we trace connections across the world through music? Perhaps these questions are impossible to answer in full, but without the latent Eurocentrism of Hornbostel's generation – or, more accurately, with a reconstructed, self-aware ethnocentrism cognizant of its own dangers – and with the benefit of a century's worth of insight and experience, old comparative methods and interests are leading to new analytical studies.

Comparative research in modern ethnomusicology takes many forms. In some cases, it involves the es-

tablishment of general theories that are cross-culturally relevant. *Michael Tenzer*, for instance, both in individual articles [48.98, 99] and edited works [48.65, 69] has established broadly applicable approaches for the classification and comparison of music according to its temporal organization. *Tenzer* asserts that *periodicity is really a universal, inseparable from a conception of music. This justifies choosing it as a framework* for analysis that may be applied across genres and across cultures [48.65, p. 23]. In his *Temporal Transformations in Cross-Cultural Perspective* [48.99], for instance, *Tenzer* examines concepts of time transformation cross-culturally by comparing instances of temporal augmentation in three distinct pieces of music – from Europe, South India, and Indonesia – and exploring how that temporal augmentation interacts both with the piece's musical structure and with the listener's orientation in musical time. He hypothesizes *that studying processes of* time transformation *cross-culturally can lead to musical and cultural insights* and, more broadly, *that cross-cultural research on musical temporality can lead to the discovery of some cognitive universals* [48.99, pp. 1–2]. In a very different way, *Judith Becker*'s *Deep Listeners* [48.100] sets up a theoretical basis for the cross-cultural analysis of high emotion and trance responses to music by drawing on new research from the fields of neuroscience and biology.

These sorts of universally applicable theories present their own unique set of problems. We know from earlier attempts at comparison that creating appropriate comparative categories can be daunting. At the first AAWM conference in 2010, Simha Arom raised this matter in a plenary session entitled *Ethnomusicology, Music Theory, and Music Analysis*. There, Arom made the contentious claim that if we wished to examine the concept of meter cross-culturally, we needed to provide the most neutral possible framework. Meter could not be defined as intrinsically multilevel and hierarchic as the growing consensus on the matter since the publication of *Lerdahl* and *Jackendoff*'s *A Generative Theory of Tonal Music* [48.63] asserted, because Arom did not see African music as having more than a bare skeleton of a hierarchy which, moreover, did not meet other accepted criteria for meter (typified by Lerdahl and Jackendoff's *preference rules*). Accounting for African meter in any encompassing definition meant abandoning what Arom suggested were biases favoring the structure of European musics, and therefore implied that asserting anything universal or cross-cultural meant only going for the minimal. At worst, this contention suggests that cross-cultural studies can only be shallow. Whether or not that is the case, the problem of defining meter nonetheless remains, and engaging in cross-cultural study demands reflection on these more difficult questions and the careful development of new solutions to old problems.

Two of the most avid proponents of reestablishing the comparative approach, *Patrick Savage* and *Steven Brown*, have proposed parameters and directions for a new comparative musicology [48.101], one that [48.27, p. 148]:

> *seeks to classify the musics of the world into stylistic families, describe the geographic distribution of these styles, elucidate universal trends in musics across cultures, and understand the causes and mechanisms shaping the biological and cultural evolution of music.*

This newer incarnation of the subdiscipline would avoid some of the pitfalls of earlier comparative studies by using larger sample sizes, focusing primarily on regional comparison, selecting appropriately sized units for analysis (e.g., individual songs, phrases, etc. as opposed to whole genres or cultures), creating culture-specific as well as more general and universal systems of classification, cross-culturally analyzing nonacoustic features of music – Merriam's *behaviors* and *concepts* – as well as music sounds, and so on [48.27].

The new comparative musicology demands mutually beneficial cross-disciplinary research, where anthropological, historical, biological, and linguistic studies, among others, help to inform discoveries in music research, but where the reverse is also true: where [48.27, p. 151]

> *knowledge of music's cultural evolution can be useful in illuminating* human history *more generally, including such phenomena as migration, colonialism, globalization, and other forms of cultural contact.*

In his provocative *Echoes of Our Forgotten Ancestors*, *Victor Grauer* [48.102] has attempted to do exactly that for the ancient populations of Africa. A collaborator on Lomax's Cantometrics project, Grauer uses song classification techniques to hypothesize that Pygmy and Bushmen groups, long isolated by geography, both maintain salient structural features of the same ancient musical practices. The striking similarities in their musics – interlocking polyphony made up of short phrases of continuous sound, repeated and varied, and sung in open-throated, blended voices with yodeling – he ascribes to a common ancestor. And he backs his theory with current research in genetic anthropology that has compared the DNA of Pygmy and Bushmen groups with that of other groups of black Africans and found

that the former two groups tend to have older mitochondrial and Y haplotypes [48.102, pp. 8–9]. Thus, the musical and the biological research support each other. And although Grauer's theories have not gone unquestioned [48.103], they provide a model for a very different kind of interdisciplinary analysis.

Much narrower in geographical scope but with the potential for large-scale insights is *Brown* et al.'s *Correlations in the Population Structure of Music, Genes and Language* [48.104]. This study examines the traditional group-level folksongs of nine indigenous populations in Taiwan using a modified Cantometrics system, called CantoCore [48.105]. The distance between each tradition in terms of its musical features is measured against existing information on mitochondrial DNA in the same populations to search for correlations. As we can see in Fig. 48.12, these measurements are most certainly connected.

In fact, this study shows stronger parallels between music and genes than between language and genes, and is thus [48.104, pp. 1,4]

> *the first quantitative evidence that music and genes may have coevolved* [and that music] *might serve as a useful marker to study human migrations and human origins more generally.*

Related to this sort of evolutionary study are the phylogenetic analyses undertaken by scholars like computer scientist Godfried Toussaint. Phylogenetics, which is a biological classification method that traces genetic links between organisms, is [48.107, p. 1115]

> *used to create a nested series of taxa based on homologous characters shared* [...] *by two or more taxa and their immediate common ancestor,* [and] *offers a means of reconstructing artifact lineages that reflect heritable continuity.*

For larger datasets in comparative study, computational methods are very useful, and *Toussaint* certainly uses these [48.97], but a smaller study will elucidate the method. *Toussaint*'s article on African ternary rhythm timelines [48.106] presents an analysis of ten 12-pulse, 7-stroke bell patterns from various African and African diaspora communities, shown in Fig. 48.13.

Toussaint measures the rhythmic similarity of these 12 patterns in terms of *swap-distance* – the minimum number of times one would have to move a note onset by one pulse in order to transform one pattern into another. These swap distances are then represented in a number of ways, including the swap distance matrix and phylogenetic SplitsTree shown in Fig. 48.14. Here the reader will notice a similarity between this style of distance tree and the one used by Savage et al. in Fig. 48.12. And, as *Toussaint* points out, with further research *these mechanisms may in turn shed light on the evolution of such rhythms* [48.106, p. 34].

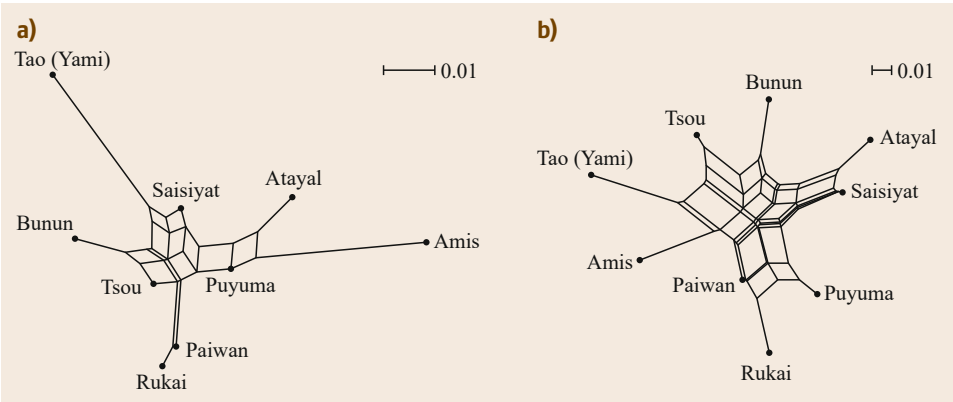


Fig. 48.12a,b Distance between musics **(a)** and genes **(b)** for nine indigenous Taiwanese populations (after [48.104, p. 3])

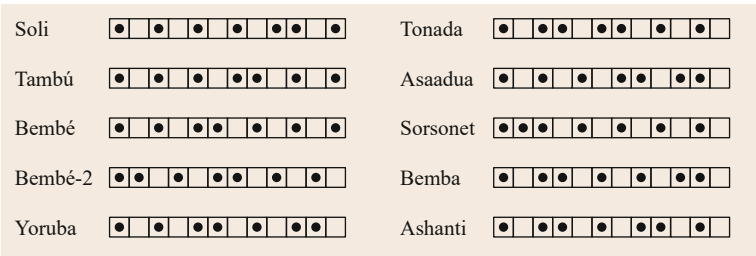
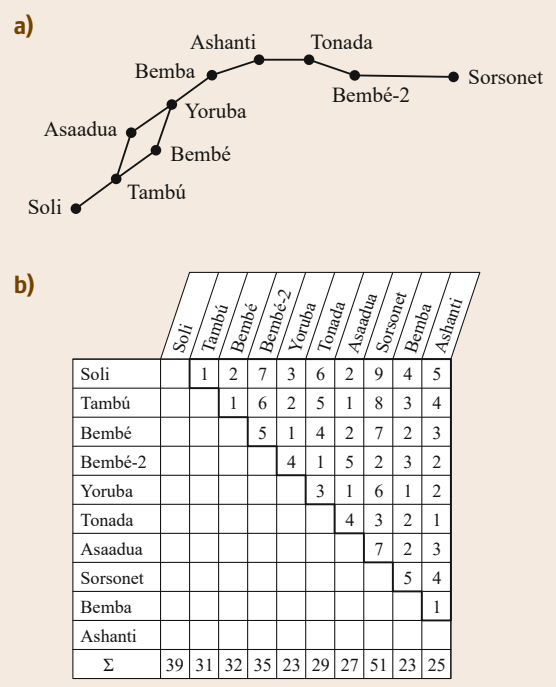


Fig. 48.13 Ten 12-pulse timeline rhythms to be analyzed by Toussaint (after [48.106])



	Soli	Tambú	Bembé	Bembé-2	Yoruba	Tonada	Asaadua	Sorsonet	Bemba	Ashanti
Soli		1	2	7	3	6	2	9	4	5
Tambú			1	6	2	5	1	8	3	4
Bembé				5	1	4	2	7	2	3
Bembé-2					4	1	5	2	3	2
Yoruba						3	1	6	1	2
Tonada							4	3	2	1
Asaadua								7	2	3
Sorsonet									5	4
Bemba										1
Ashanti										
Σ	39	31	32	35	23	29	27	51	23	25

Fig. 48.14a,b Toussaint's analysis of the patterns in Fig. 48.13 as a SplitsTree **(a)** and swap distance matrix **(b)** (after [48.106])

48.3.5 The Challenges of Interdisciplinarity

It seems, then, that many of the most innovative new directions in analytical ethnomusicology are interdisciplinary. So now the question becomes how to do work in a multidisciplinary project that speaks faithfully to each field involved. Whether or not we wish it were so, each field to some extent speaks its own language and has its own assumptions and priorities. And while scholars like *Victor Grauer* [48.102] synthesize ideas from quite divergent fields without the help of collaborators, Steven Brown, in his presentation at the 2012 AAWM conference, opined that most of us cannot hope to become experts in all of these branches; we must instead build working partnerships with specialists in other fields. Indeed, part of the reason that Savage et al.'s study of Taiwanese folksongs was so insightful was that, of the five authors contributing to the brief seven-page report, one worked in musicology, one in evolutionary genetics, one in psychology, neuroscience and behavior, and the final two in the medical profession in Taiwan. Specialists from divergent fields working toward a common analytical goal can lead to insights in all these different disciplines, and I believe that this open collaborative approach is the future of analytical ethnomusicology.

48.3.6 What Happens Now?

With all these opinions and methodologies at our disposal, the role of an ethnomusicologist now is to select, from an ever-expanding toolkit, those approaches best suited to the individual genre or piece under examination. Each may draw into focus (and conversely, obscure from view) certain aspects of the music, and thus the researcher may wish to attempt analysis of a given piece or genre through several approaches. Some of the earlier methods – general description or trait listing or classification – are perhaps more broadly applicable. Others, like Schenkerian, paradigmatic, or phylogenetic analysis will only be useful for the examination of certain genres or pieces or datasets. The researcher may even need to invent her/his own method, inspired by some of those explored here and always informed by the music theory (oral or otherwise) of her/his teachers and collaborators within the culture under examination. And, as we have learned from many of the more recent studies in analytical ethnomusicology, interdisciplinarity and an openness to collaboration with scholars in other fields – from anthropology to biology to computer science – will be what leads to some of our deepest analyses, our most exciting discoveries, and our most insightful new questions.

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