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The Cognitive and Appreciative Import of Musical Universals

KATHLEEN MARIE HIGGINS

It is difficult enough for an ear trained in the nineteenth century to reconcile itself to the various modes used in the fifteenth and sixteenth centuries. But to reconcile itself to another system seems impossible. Happily it is not in the least necessary. The European system, though the exigencies of practice prevent its being absolutely true, is nearer the truth than any other…  – John Pyke Hullah

Much has changed since such views were commonplace in the Western world. Recording technology has made us aware of the fascinating diversity of the world’s music. But this awareness has led many to be as skeptical as was Hullah that that music could forge a connection between members of different musical cultures.3 Despite the popularity of what is marketed as “world music,” many Westerners have found themselves at a loss during encounters with non-Western music. Is there hope for more than superficial enjoyment of other people’s music?

This question is too big to answer in a single paper. Though I am convinced that music can provide an experiential basis for feeling one’s common humanity with people across the globe, I will here restrict myself to suggesting one ground for optimism. I will argue that characteristics of music perception encourage the association of the behavior of music with our own activity. Music is

meaningful to us because we can relate it to our lives. One reason we are able to do this is that we commonly interpret it as sharing the dynamic character of the activity in which our lives consist, a correlation that is available even to listeners without much familiarity with the kind of music being heard. Accordingly, our common mode of perceiving music takes us a considerable way toward a shared sense of its meaning for us as human beings. Although relating to the “active” character of foreign music is far from sufficient for acquiring full understanding of it, it is an entrée, and one that facilitates a sense of common humanity with others, whose activity is structured in the same way as our own.

**Processing Universals**

Several universals relating to the perceptual processing of what Lerdahl and Jackendoff call “the musical surface” have been proposed. Dane Harwood terms these “processing universals.” These include basic distinctions made by our auditory system and basic elements of musical structure that appear to be geared to what we are able to perceive. I will list a number of these processing universals, briefly explaining where appropriate, and then comment on the extent to which they might ground a sense of common human experience.

1) **We distinguish signals from noise.** Albert S. Bregman points out that perceptually, “tones (sounds whose waveforms repeat cyclically) will often segregate from noises.” Cultures generally distinguish between music and non-musical noises, although they may locate this distinction at different points.

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4. I use the expression “meaning for us” in the sense proposed in Constantijn Koopman and Stephen Davies, “Musical Meaning in a Broader Perspective,” *Journal of Aesthetics and Art Criticism* 59 (Summer 2001) : 261-274. Meaning for us is music’s significance as understood by a group of people.
2) Sounds that are candidates for being incorporated into human music must be within the range of human pitch perception, which is most accurate in the vibration range between 100-1,000 Hz.10

3) We perceive musical information in “chunks.” In other words, when we perceive an unfolding musical stream, our minds grasp it as a sequence of units or events.11

4) We perceive a tone an octave away from a given tone as effectively the same tone. This phenomenon is called octave equivalence. In other words, a tone and its counterpart an octave away (tones vibrating in a frequency ratio of 2:1) are treated as “functionally equivalent.”12 Even three-month-old babies accept the substitution of one tone by its octave counterpart without showing signs of being startled.13 One consequence of octave equivalence is that men and women singing an octave apart, in most societies, are taken to be singing together.14

5) We stretch octaves. This means that intervals somewhat larger than an acoustic octave are perceived as octaves in certain ranges (specifically, in high-frequency ranges). (In lower-frequency ranges the ratio of tones accepted as an octave is slightly smaller than 2:1.)15

11. Ibid.
14. Dowling and Harwood do note certain exceptions to this generalization. See Dowling and Harwood, Music Cognition, 93. But see also 238. In general, scales are developed on the basis of octave equivalence, with the size of differences in pitch being correlated with differences in frequency of vibrations.
6) **We organize musical signals in terms of melodic contour.** In other words, we grasp and remember a musical sequence as having a certain shape. Harwood describes contour as a “potent perceptual ‘chunking’ mechanism in memory for melodies.” Awareness of contour appears to begin early in life. Chang and Trehub (1977a) experimented with 5-month-old infants, finding that the babies’ heart rates, which decelerate when startled, decelerated when melodies to which they had become adapted changed contour.

7) **Melodic fission occurs.** This means that a single line of sequential pitches is often heard as two lines, a high line and a low line, when the pitches alternate across a relatively wide intervallic distance.

8) **We accept an acoustically deviant tone as the nearest pitch in the scale, so long as it is sufficiently close.** This can be referred to as the phenomenon of *pitch proximity*. Another way of putting this point is that we perceive pitches categorically, that is, we hear pitches as conforming to notes of the scale even if they are somewhat sharp or flat (although past a certain point, we notice that they are not on target).

9) **We more easily remember intervals and sequences of tones with frequencies in small-integer ratios with one another** (relative consonances) than those in frequency relationships of larger-integer ratios (rela-

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Intervals with frequencies in small-integer ratios, accordingly, tend to predominate in music. Experimental studies confirm that, cross-culturally, listeners consider the fourth and fifth as more consonant than the tritone, which has a frequency ratio of 45:32.

10) Temporal patterns are more important for processing and remembering musical sequences than are specific timing cues. In other words, we pay more attention to overall timing patterns than to the timing of individual musical events.

11) We utilize frameworks of discrete scale pitches, typically with uneven step size. This “universal” must be qualified, in that some societies utilize chants that focus on only one note, employing only one other note of varying pitch; some cultures utilize glissandos and portamentos to a great extent, or employ unpitched instruments. Usually, however, these patterns occur only in certain types of a culture’s music. The vast majority of the world’s music is based on scales having stable, discrete steps. Psychologist Isabelle Peretz considers “the encoding of pitch along musical scales”

23. Sandra Trehub, “Human Processing Predispositions and Musical Universals,” 431. It is important to recognize, however, that what is considered dissonant in the sense of requiring movement to a more consonant interval is culturally and historically relative. Octaves and fifths may well be universally considered consonances, but beyond that, there is considerable disagreement.
25. Burns and Dixon observe that scales of discrete pitches are “essentially universal,” the only exceptions being a few primitive styles that lack discrete pitch relationships. Edward M. Burns and W. Dixon Ward, “Intervals, Scales and Tuning,” 243. See also Dowling and Harwood, Music Cognition, 90-91, 98, and 238.
26. Dowling and Harwood cite Hawaiian oli chant, although often the second tone stands in a discrete relation to the first. See Dowling and Harwood, 90-91 ; and Curt Sachs, The Wellsprings of Music (The Hague : Martinus Nijhoff, 1962), 59-72. Nicholas Cook also cites counterexamples music such as Japanese shakuhachi music and the sanjo music of Korea, “which fluctuates around” the notional pitches in terms of which the music is organized,” as well as music that does not feature discrete pitches, such as “African percussion music.” Nicholas Cook, Music, Imagination, and Culture (Oxford : Oxford University Press, 1990), 10. Other examples include types of music that move in a glissando fashion rather than stepping between pitches. The Samaritans near Tel Aviv and Nablus, according to Bruno Nettl, have a form of group singing that “has indistinct pitches and only very vaguely defined relationships among the voices.” Bruno Nettl, “An Ethnomusicologist Contemplates Musical Universals,” in The Origins of Music, ed. Wallin, et. al.), 471. Stephen Davies also points out that in certain music of the Australian aborigines “glissandos and portamentos are so prominent that it is misleading to regard the sound structure as involving discrete notes or intervals.” Stephen Davies, Musical Works and Performances : A Philosophical Exploration (New York : Oxford University Press, 2001), 49.
to be one of two anchoring points used by the brain to process music. The use of scales with definite steps seems to be at least quasi-universal. We should note, however, that this universal by no means entails that we will automatically feel comfortable with the scales used in foreign music. As we gain experience with music, we develop templates for how music is supposed to sound, including templates for how scales should be structured and how they should be tuned. Music based on sufficiently unfamiliar scales or unfamiliar tuning is likely to be very disorienting.

Three other universals further characterize the scale frameworks that are used in music.

12) **Scales tend to be restricted to five to seven tones.**

This is consistent with George A. Miller’s principle that our short-term memory can manage “7 plus or minus 2” items of information. Some psychologists have suggested that the number of items in the scale is as restricted as it is precisely because of this limitation of memory. John McDermott and Marc Hauser, however, point out that this could also be the consequence of “a sensory or computational bias to have intervals that approximate simple integer ratios.”


28. See, for example, Stephen Davies Musical Meaning and Expression (Ithaca: Cornell University Press, 1994), 245. Alternatively, we may distort what we are hearing so that it conforms to our template for pitch. Y. R. Chao, who was both a linguist and a musician, described such a case in his own experience.

29. See Dowling and Harwood, Music Cognition, 93 and 238.


31. See Dowling and Harwood, Music Cognition, 91. Burns and Ward, “Intervals, Scales and Tuning,” 246, argue that this claim about memory is exaggerated, in that competent musicians can usually identify the twelve intervals of the chromatic scale, a number that exceeds the magic number identified by Miller. Nevertheless, Burns and Ward do think there is a practical limit for items in a musical scale, and they suggest that the twelve items of the chromatic scale may be the upper limit.

13) **Pitches are organized hierarchically within the scale.** In other words, scales include both a pitch that is most stable, called “the tonic” in Western music, and others that are less stable, each to a different degree.

14) **The temporal lengths of tones are typically uneven.** Much of the rhythmic interest of music derives from the fact that the basic pulse is maintained or subdivided by tones of varying duration.

15) **Rhythm is more basic than pitch for making judgments of similarity of musical pattern.** We tend to normalize rhythm. Musicologist Fred Lerdahl and linguist Ray Jackendoff point out, for example, that the listener “normally… treats… local deviations from the metrical pattern as if they did not exist ; a certain amount of metrical inexactness is tolerated in the service of emphasizing grouping or gestural patterns.” Thus, we tend to hear intervals that are less than regular as regular, up to a point, and we seek a regular pulse. We also tend to hear temporal intervals as half or twice as long as previous intervals. According to psychologist John A. Sloboda, this is because we categorize rhythms and have “a limited set of categories for describing durations of notes,” and that given a specific duration for a particular note, “all the other symbols acquire a defined duration which is exactly double, or half of that standard.” Thus our propor-

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34. In some cases, however, this hierarchical weighting is relative. Monique Brandily points out that the Teda people of Chad, “the status of each degree within the hierarchy is not constant throughout each piece… On the contrary, the status of a scale degree varies according to its position in one or another of the segments constituting the whole.” Monique Brandily, “Songs to Birds among the Teda of Chad,” *Ethnomusicology* 26/3 (September 1982), 383. McDermott and Hauser point out this hierarchical organization of pitches depends on the unequal sizes of steps within the scale. See McDermott and Hauser, “The Origins of Music,” 33.


ional musical notation and terminology reflect our categorical perception of duration.39

16) **Tempo-keeping seems to be proportional, on the basis of low integer ratios.**40 This means that sections within musical performances display tempos that relate to one another in simple proportions (e.g. 1:1, 2:1, and 3:1). This is the case even when performance is interrupted by rest periods. David Epstein, a musicologist and conductor, found that these results hold cross-culturally for Western and non-Western music. He proposes that proportional tempo-keeping may provide an aesthetic constraint on musical performance, establishing one criterion for aesthetic success.41

In addition to these universals, most of which are specific to music, we can include others that are applicable to human cognition generally. Musicologist Leonard B. Meyer contends that principles of Gestalt psychology should be included in any roster of universals involved in processing music.

… The universals central for music theory are not those of physics or acoustics but those of human psychology – principles such as the following: proximity between stimuli tends to create connection, disjunction results in separation; orderly processes imply continuation to a point of relative stability; a return to patterns previously presented enhances closure; and, because of the requirements of memory, music tends to have considerably redundancy and is often hierarchically structured.42

By “hierarchically structured,” Meyer means that music is patterned in layers, with “higher,” more encompassing patterns that subsume those on lower layers. (For example, measures subsume individual notes; phrases subsume measures; sections subsume phrases; etc.)

The tendencies that Meyer mentions are all principles of Gestalt psychology, which concerns the ways that we group perceptions together into objects and coherent

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shapes. The first of Meyer’s principles (disjunction in stimuli results in separation) is evident in melodic fission. This musical generality is a specific application of the Gestalt “principle of proximity,” which holds that objects that are close together are perceived as grouped together. The second of Meyer’s principles is an application of the basic law of Gestalt psychology, the law of “good continuance,” or prägnanz, which he defines as follows: “A shape or pattern will, other things being equal, tend to be continued in its initial mode of operation.” Meyer’s third principle is an instance of the Gestalt “principle of closure,” which holds that objects that are physically incomplete will be perceptually completed. (For example, we will tend to see an incomplete circle as a fully closed circle.) I will return to the fourth condition below.

Psychologist E. Glenn Schellenberg provides experimental support for the claim that Gestalt principles are universal in a study by that compared melodic expectancy among American and Chinese listeners, using Chinese and British melodies. Two Gestalt principles that applied to all their subjects, regardless of national background, were the expectation that melodies would be composed of small intervals (“pitch proximity”) and the expectation that a leap in one direction would be followed by pitch movement in the opposite direction (“pitch reversal”).

43. See also Trehub “Human Processing Predispositions and Musical Universals,” 431 and 435; and Sloboda, The Musical Mind, 154-166. Lerdahl and Jackendoff’s generative theory of tonal music is also premised on Gestalt theory. See A Generative Theory of Tonal Music, 40-43 and 302-307.
45. See Leonard B. Meyer, Emotion and Meaning in Music, 92. Both Meyer and Lerdahl and Jackendoff cite Koffka’s original formulation of the Law of Prägnanz: “Psychological organization will always be as ‘good’ as the prevailing conditions allow. In this definition the term ‘good’ is undefined. It embraces such properties as regularity, similarity, simplicity, and others…” Kurt Koffka, Principles of Gestalt Psychology (New York: Harcourt, Brace, and World, 1935), 110. See Meyer, Emotion and Meaning in Music, 86, and Lerdahl and Jackendoff, 304. Meyer includes this law among the principles that structure our musical expectations, although he grants that deviations occur. Dowling and Harwood insist that good continuation can be overridden by other patterning principles, such as repeated notes, proximity, or similarity of timbre. See Dowling and Harwood, Music Cognition, 158-159.
Musical Perception and Hearing Activity in Music

Certain of the universal perceptual processes we have considered are particularly important for awareness of sharing a common world with other human beings. In the vast majority of instances, music mimics human activity and draws attention to unfolding temporality, both features of our experience that we have in common with other human beings. Both of these aspects of what we recognize in music – its resemblance to our activity and to our experience as temporal beings – depend on the way we perceive music. Here I will consider the ways that musical perception suggests a strong resemblance between music and human action.

No doubt, the fact that we move when making music would already incline us to associate music with human activity. But we also connect music with our non-musical activity as well, and what I will argue here is that some of the perceptual processes considered above are particularly relevant for this association. First, we easily associate the relative consonance and dissonance of intervals with tendencies toward rest and motion. Dissonance and consonance are often defined in terms of relative tendency to movement or repose, instability or stability.47 We expect more dissonant intervals to give way to more consonant ones.48

Moreover, we tend to experience patterns of dissonance and consonance not only as having different tendencies with respect to motion, but also as reflecting patterns of tension and relaxation. We feel tension and relaxation ourselves in response to the degrees of tension among the intervals, and we also tend to objectify tension and relaxation as features of the music.49 Accordingly, we easily sense a similarity between the behavior of music and our activity, for we notice recurrent tensions, followed by partial or complete resolutions of those tensions in music. These resemble our own patterns of exertion and relaxation. For example, we follow moments of exertion (lifting a heavy weight, for example) with moments of relaxation. These may be temporary (as when we lift a weight, set it down, lift it again, etc.) or they may be relatively enduring (as when we leave the gym entirely).

Second, besides sequences of consonances and dissonances, one of the most basic ways that human beings organize what they hear as music is melodic

47. See Francès, The Perception of Music, 78.
contour, and contour is also among the means by which music suggests relative tension and relaxation. We sense that melodic line reflects more or less effort, in accordance with changes in the relative height of pitches. The fact that higher pitches in one’s vocal range are more difficult to sing than lower pitches may be a factor in the correlation of higher pitches with greater effort. The fact that Western and a number of other cultures use the straightforwardly spatial metaphor of height in reference to pitch also supports the tendency to consider music as resembling our effortful activity; we speak of “reaching” for “high” notes, for example.

Third, in any music our sense of rhythm is importantly basic, as we noted, and we tend to interpret rhythm in kinetic terms. This, too, inclines us to consider the music as active in much the same way that we are. Tensions and resolutions, among the key dynamics considered above in connection with music’s suggestion of activity, are organized sequentially in time yet perceived as connected. This, too, ensures our sense of temporal continuity in perceiving music. Resolution tendencies, which Victor Zuckerkandl describes in terms of attractions among tones, result in our experiencing music as projecting into the future. The tensions occasioned typically resolve in ways that we find pleasing, and relatively more relaxing. Zuckerkandl observes, “… we could not hear the melody as motion if we did not hear it as continuous.”

Fourth, some of the features of musical perception that we have considered support the analogy that we observe between pitch space and the space of our activities. That we do suppose such an analogy is suggested by the very fact that we speak of pitches in spatial terms. Interestingly, some societies reverse the direction of the correlation, among them the Greeks, the Jews and the Arabs. See Curt Sachs, *The Rise of Music in the Ancient World, East and West*, 69-70. Both Sachs and Francès speculate that these correlations may have stemmed from the observation that long strings, i.e. strings that extended “higher,” produced the tones that we would call “lower.” See Francès, *The Perception of Music*, 279.

50. Victor Zuckerkandl, *Sound and Symbol: Music and the External World*, trans. Willard R. Trask, Bollingen Series 44 (Princeton: Princeton University Press, 1956), 118. Ethnomusicological accounts suggest that the tendency to attend to music’s on-going continuation in time is not restricted to Western listeners. The cyclical talas, the basic rhythmic patterns employed in classical Indian music, often become perceptually submerged in the complex texture of cross rhythms between instruments, often further subdivided. The practice of audience members maintaining the basic tala by means of hand gestures allows for a magic moment, when the tala again becomes pronounced, appearing exactly in accordance with the cycle maintained by the gestures. The gestures also make the continuation of the tala a pattern for on-going physical activity. Listeners are, in effect, sustaining the continuation of the fundamental rhythm through these gestural patterns.

51. Interestingly, some societies reverse the direction of the correlation, among them the Greeks, the Jews and the Arabs. See Curt Sachs, *The Rise of Music in the Ancient World, East and West*, 69-70. Both Sachs and Francès speculate that these correlations may have stemmed from the observation that long strings, i.e. strings that extended “higher,” produced the tones that we would call “lower.” See Francès, *The Perception of Music*, 279.
ning that music is filling space, the same space in which we operate.\textsuperscript{52} We tend to associate spatial position with sound as well, for we use acoustics to localize sound sources laterally in space. From the other end of the analogy between pitch space and the space of our activity, we consider music to “move,” and to move in definite directions.

The use of frameworks of discrete pitches facilitates a sense of location and movement within musical space. By dividing up the continuum of pitch possibilities into discrete intervals, a musical system ensures the recognition of movement along the continuum. The distinct pitches of a given scale provide signposts, as it were, for a melody’s shifting from one level of vibrational frequency to another.\textsuperscript{53} Because the continuum is divided into distinguishable “steps,” we are able to recognize the melody’s progressive “stepping” through a pattern of discrete frequencies.\textsuperscript{54}

The unevenness of both the steps within the vast majority of human scales and the temporal lengths of tones is valuable for our ability to locate ourselves within unfolding music, and they facilitate modeling music in special terms. We might compare the pitch and rhythmic spectrums to two axes of a grid extending indefinitely in both directions, just as the spatial continuum is often modeled as grids extending indefinitely in three dimensions. If pitch and rhythmic increments were absolutely even in their respective spheres, locations in music would be no more distinctive with respect to each other than are the spaces of a checkerboard. Sloboda compares the function of scales and rhythms in this respect: “… scale and rhythm perform the same essential function, that of dividing up the pitch and time continua into discrete and re-identifiable locations, on which backdrop all the essential dialectical activities (tension-resolution, motion-rest), can flourish.”\textsuperscript{55}

The uneven step size between intervals, as Leonard B. Meyer points out, is also a means for the creation of musical syntax, providing for an impression of structure in a piece of music. “Functional differentiation,” a necessity for syntactic ordering “is a universal that is operative in all realms of being,” he

\textsuperscript{52} See Victor Zuckerkandl, \textit{Sound and Symbol}, 275-276.
\textsuperscript{53} We should note that music without discernible melodic lines does exist. An example would be recent music in which musical change occurs not through melodic movement but through changing textures of random tones held for a considerable time, followed by another such texture. An instance of such music is Gyorgy Ligeti’s “TMA-1: Lux Aeterna (1966),” the fourth track on the MGM soundtrack of \textit{2001: A Space Odyssey}, released in 1990 by CBS Records, CD AK45439. There “Lux Aeterna” is recorded by the Stuttgart Schola Cantorum conducted by Clytus Gottwald.
\textsuperscript{54} This argument was given by H. L. F. von Helmholtz, \textit{On the Sensation of Tone}, trans. A. J. Ellis (New York: Dover, 1877/1954), 250ff.
\textsuperscript{55} Sloboda \textit{The Musical Mind}, 259.
contends, and he claims that it is “why in the music of almost all cultures the repertoires of pitches and durations are nonuniform.”

Fifth, the uneven step sizes that we have been discussing also enable us to coordinate activities within music and in connection with music. This is perhaps the most obvious basis for relating music to our behavior. Sloboda points out the value of both uneven steps and tone durations for the interpersonal activity that music involves.

… (T)hese fixed points provide cues for synchrony, so that musicians can organize their behaviour with respect to what others are doing… (W)ithout reference points, it would be impossible for people to make the necessary anticipatory and planned adjustments to bring their behaviour into co-ordination with others, and thus make musical behaviour the structured social phenomenon that it is the world over.

Uneven step size between intervals of both pitch and duration thus facilitates the coordination of activity that is part of musical behavior, both in performing and responding to music.

A related feature of music’s ability to suggest our activity is its ability to rhythmically entrain us. Entrainment is the synchronization of one’s actions with an externally produced rhythm, such as a metronome or another person. Human beings are able to deliberately join the rhythm of their own movements to the pulse of something outside themselves. People can march in formation or pool their strength in common tasks by means of entrainment. Because music can and often does entrain many listeners at once, it is a powerful means of synchronizing our activity. This is an additional reason why music is reminiscent of our activity: if we are engaged in some activity while listening to music, we often assume the rhythm of the music. Work songs and marching songs, two globally widespread phenomena, illustrate the impact of music for entraining and synchronizing the actions of many human beings. Music’s ability to entrain us depends on processing universals that we have been considering. Peretz points out, “Pitch intervals allow harmonious voice blending when sounding together, and temporal regularity facilitates motor synchronicity. These two musical features are highly effective in promoting simultaneous singing and dancing… The design is specific to music; it is certainly not shared with

57. Sloboda The Musical Mind, 259.
speech…” The primacy of rhythmic pattern in our perception of music facilitates our entrainment to music.

Such interpersonal synchronization effects a strong sense of connection with other participants. Phenomenologist Alfred Schutz describes the social bond established among performers and listeners through music’s synchronization of their multi-layered impression of time. He observes several dimensions of synchronization.

On the one hand, there is the inner time in which the flux of musical events unfolds, a dimension in which each performer re-creates in polythetic steps the musical thought of the (possibly anonymous) composer and by which he is also connected to the listener. On the other hand, making music together is an event in outer time, presupposing also a face-to-face relationship, that is, a community of space, and it is this dimension which unifies the fluxes of inner time and warrants their synchronization into a vivid present.

Making music and listening to it, by coordinating our subjective sense of time with what others are experiencing, not only creates a connection between music and our own activity of experiencing time; it also creates a sense of connection with the other people who are experiencing the same time with us.

The universal and quasi-universal features of our perceptual processing of music thus encourage comparison between the activity of music and our own behavior. This already establishes a cross-cultural basis for connecting music with meaning in human life. The specific ways that cultures articulate this meaning vary. Nevertheless, the fact that musical perception itself already leads listeners to compare music to their own modus operandi is important. It suggests one of the reasons that we, as human beings, identify with music. This identification is a ground for recognizing and even experiencing our common character as human beings.

Structural Quasi-Universals

In addition to processing universals of music perception, musical cultures seem to converge in some of their choices in structuring pieces of music. Lerdahl

and Jackendoff propose a direct relationship between the processing universals described above and the sorts of musical structures societies construct.

... musical idioms will tend to develop along lines that enable listeners to make use of their abilities to organize musical signals. Therefore, if there is some kind of organization that is especially ‘natural’ (that is, favored by musical cognitive capacity), we should expect this sort of organization to be widespread among musical idioms.

They add the important qualification, “On the other hand, we do not expect all idioms to exploit all aspects of musical cognition equally.”

The fourth of the principles that Meyer mentions in the passage cited above – considerable redundancy and frequent hierarchical organization – concerns the structure of pieces of music. Other regularities having to do with the structuring of individual pieces are so common that they can be considered quasi-universals, though many of them represent tendencies rather than rules. Other quasi-universals of this sort that have been identified by ethnomusicologists and psychologists include the following:

1) **Music is made in “pieces” or “utterances.”** Nettl observes, “One does not simply ‘sing,’ but one sings something. Music is composed of artifacts, although cultures differ greatly in their views of what constitutes such an artifact.” Stephen Davies observes, “I do not know of any culture lacking musical works for performance – that is repeatable pieces with titles or identifying descriptions…” By virtue of being made in “pieces,” music is rendered repeatable.

2) **Melodies in all cultures tend to be constructed on the basis of fairly small successive intervals.** The chief melodic interval in melodic progressions tends to be in the range of the major second (though the exact interval depends on the tuning system); in any event, it is “usually no greater than 3-4 semitones” according to Merriam. Meyer claims that “intervals smaller than a half step almost always serve to inflect structural tones” because of the limitations of human perception. Although microtonal scales are theoretically possible, Meyer observes, “to the best of my

65 See Harwood, “Universals in Music,” 526. Dowling and Harwood point out that this tendency reflects the Gestalt principle of proximity. They also observe that in experiments “violations of the proximity rule… led to patterns that were difficult to follow.” See Dowling and Harwood, *Music Cognition*, 155-157.
knowledge, no scales of this sort have ever become shared cultural constraints."66

3) Almost all musical cultures employ a centering tone or other sort of goal-defining device.67 Cultures usually devise music in such a way that the listener has a clear conception of the ultimate destination of a piece.68 Sloboda, Lerdahl and Jackendoff all note that in many cultures drones establish the primary reference pitch in a piece of music. Where drones are not used, certain pitches are nevertheless given prominence in that the music returns to them frequently or circles around them.69

4) Musical utterances tend to descend in pitch at the end.70

5) Internal repetition is typical within musical utterances.71

6) Music in every society has “a rhythmic structure which depends on distinction among note lengths and among dynamic stresses.”72 In particular, pulse or meter makes the rhythmic pattern asymmetrical, creating an impression of location within the beat.73

7) If near-universals are counted, one might include the nearly universal tendency to construct rhythms on the basis of patterns of twos and threes.74 Chernoff points out that this is true even of rhythmically complex African music. “In spite of what we think, most African music is in some common variety of duple or triple time (like 4/4 or 12/8) and not in the

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73. Sloboda, The Musical Mind, 258. See also Dowling and Harwood, Music Cognition, 239.
74. Steven Brown, et. al. “An Introduction to Evolutionary Musicology,” in The Origins of Music, ed. Wallin et. al., 14. See also Sloboda, The Musical Mind, 259. Exceptions to this generalization exist, however. Avant-garde composer Conlon Nancarrow, for example, has written music for player piano in non-standard meters, such as 9/17, 11/32, etcetera.
7/4 or 5/4 that many Westerners have thought they might have heard. Music in 7/4 time would be very difficult to dance to."

Some of these structural universals contribute to music’s capacity to reflect our activity. The very fact that music tends to issue in pieces of definite extent enables one to have a sense of completion, usually combined with a sense of at least relative relaxation. Melodies tend to be constructed in small steps, and this reinforces awareness of the precise tones available in the scale across a particular span of pitch space. Going to the adjacent scale tone or one just past it is the most typical melodic movement; thus we become particularly aware of where the specific steps of the scale are. Rhythmic structure, which indicates regularity in the passage of time, depends on the uneven durations of tones, which we relate to the articulate structure of rhythms in our activities. The device of a centering tone facilitates the impression of a sense of direction in music, as well as a sense of relative relaxation when this pitch occurs. Relaxation is also conveyed by the almost invariable descent in pitch at the end of a piece.

These structural quasi-universals for pieces of music suggest that there are at least some elements of very foreign music that will strike the listener as familiar. Like the processing universals on which they are based, they offer a way into alien music, encouraging further exploration.

Conclusion

I have suggested that the universals and quasi-universals involved in musical perception provide a significant common denominator among listeners from different musical cultures. They do not by themselves dissolve all barriers to understanding significantly foreign music, but they do indicate relative constants that music everywhere exhibits. The fact that musical structure within pieces is typically shaped in significant ways by these universals and quasi-universals of musical processing means that the foreign listener has some preliminary bases for becoming oriented in unfamiliar music. Moreover, the fact that these processing universals offer sufficient structuring constraints on music to make it reminiscent of human activity provides a ground for a sense of shared humanity through music. We thus have reason for optimism that music can enable us to feel our human connectedness across cultural boundaries.

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