

CAN MUSICAL UNDERSTANDING BE GROUNDED IN THE PHENOMENOLOGY OF MUSICAL EXPERIENCE?

Abstract: Much attention has recently been paid in aesthetics to the question of how a listener understands music, or what constitutes comprehending listening. While this debate is quite interesting, I am more concerned with a more foundational question: What is it that a listener must attend to in order to understand music? One suggestion that has been proposed is that a listener must attend to the phenomenal quality of their auditory experience. This view is motivated by the thought that the phenomenology of musical experience should hold in common between both musically trained and musically untrained listeners. However, much empirical evidence on the perception of tonality has been made available through cognitive science suggesting that listeners with different levels of musical ability hear music differently.

In this paper, I will examine the empirical evidence for the perception of tonality and argue that the empirical findings are incompatible with the phenomenological claim. The perception of tonality, I will argue, is not something that is available to naïve perception. Rather it requires the listener's possession of a certain psychological capacity for the representation of musical pitch. This, in turn, must be learned through a process of enculturation. Insofar as two listeners could differ in their possession of this psychological capacity, then to that extent these listeners would differ as to the phenomenology of their musical experience. Thus the phenomenological claim is empirically unfounded.

I. *Introduction: The Problem of Musical Understanding*

It is arguable that appreciating music involves some degree of understanding the music. The thought is that it is not enough for one to appreciate some music to simply be passively responsive some perceptual stimulus. Rather appreciation requires some degree of understanding what is heard. So, how does a listener understand what they hear?

There have been many attempts to answer this question. Some argue that understanding requires the listener to grasp the formal structure of a piece of music.¹ Against this some argue that such demands on structural understanding are too strong, rather all that is required is to attend to the sounds passing in succession and understand their relation to sounds heard immediately before.² The problem of musical understanding is usually a question about what understanding consists in.

I am not here concerned with what conditions must hold in order for a listener to be attributed musical understanding. Rather my question is, what is it that a listener must attend to in order to understand music? Answering this question by saying that one must attend to the notes that one hears would be premature and unhelpful—it is the notes that one is trying to understand.

¹ See for instance Davies (1994) and DeBellis (1995).

² Levinson (1997).

When listening to music, a listener undergoes a certain sort of perceptual experience. While many factors may contribute to a listener's understanding—such as their possessing some familiarity with the musical genre or some cultural knowledge about the practise of music—at bottom, musical understanding is a certain sort of perceptual experience. I want to know what is it about the perceptual experience that is salient to a listener's understanding. So my question is, what is it about the listening experience that aids understanding?

One suggestion that has been offered is that what one pays attention to is the phenomenology of the perceptual experience. Musical experience feels a certain way, and it is argued that it is this 'feeling' that grounds understanding. One of the motivations for accepting this view is that the phenomenology of the perceptual experience is something that is thought to hold in common between listeners who have some musical training and listeners who do not. If this were true, then it would be the case that a listener who has had extensive musical training would have no advantage over an untrained listener. This is desirable as untrained listeners clearly take great interest and pleasure in music listening. Indeed they usually make up the bulk of the music listening audience.

In this paper, I will question this assumption. By examining the empirical evidence for the cognition of musical pitch, I will argue that the phenomenology of musical experience is dependent upon the listener's possessing certain cognitive capacities. Insofar as two listeners could possess different capacities, then to that extent their perceptual experiences would possess different phenomenal qualities. Therefore there would be no guarantee that phenomenology holds in common between any two listeners. I will first explain the motivations for the phenomenal view, then I will examine the empirical evidence for the cognition of musical pitch and explain why this threatens the phenomenal view. The conclusion of this paper will largely be negative—I will argue that if my observations are correct, then the phenomenal view faces a crisis.

One theoretical point that I should make clear: throughout this paper I will talk about perceptual states as being representational and therefore as having contents. However, this is a claim that I will not be arguing for, rather I will refer the interested

reader to Mark DeBellis' very compelling argument for a representational view of musical experience.³

II. *The Phenomenology of Music*

The problem of musical understanding is a question that I personally have long found deeply perplexing. I know what I do when I pay attention to some piece of music. I am a professionally trained musician—I was trained in a conservatory. When I listen to music, I analyse what I hear. I dissect the music into its rhythms, beats, melodies, and chords, down to the individual notes that make up the complex whole. Listening to music for me is like watching a game of chess, or examining a mathematical proof: it is a test of my ability to analyse what I hear into recognisable and predictable patterns so that I might better be able to anticipate what will come next.

But this isn't what most people do when they listen to music, nor should we think that this intellectual game is somehow necessary for understanding music. As Malcolm Budd says:

To experience music with musical understanding a listener must perceive various kinds of musical processes, structures and relationships. But to perceive phrasing, cadences and harmonic progressions, for example, does not require the listener to conceptualise them in musical terms. A listener can experience these phenomena whether or not he hears them under the description they are given in a correct analysis of the music. This description applies to the experience of a listener who experiences the music with understanding;⁴ but the listener does not need to recognise this fact in order to have the experience it describes.

Budd's claim here is that understanding a piece of music is just the having of an experience whereby one perceives certain musical qualities, but while these musical qualities can be described in music-theoretic terms, it is not necessary that a listener must *think* of the music in these theoretic terms. There is nothing more to understanding these musical qualities than just to hear them. On this view, what I as a trained musician am doing when I theoretically analyse a piece of music is conceptualising it in the music-theoretic terms that I have learned—that is, I am doing something in addition to perceiving and experiencing the music. And that is all well and good, but we should remember that this conceptualising is not equivalent with *experiencing* the music. On Budd's view, understanding musical experience precedes understanding music theory.

³ DeBellis (1991), but see also his (1995) and (2002).

⁴ Budd (1985): 247.

So to answer the question ‘What do listeners pay attention to in order to aid their understanding of music?’, the answer on Budd’s view must be that they pay attention to their perceptual experience. But what about the perceptual experience must one attend to? Taking up this position, DeBellis claims that it is the phenomenal feel of the perceptual experience that one must attend to. Musical experience is rich with phenomenal feel—there is a particular way it is to hear a particular melody or phrase—and the way that music feels phenomenally is independent of one’s music - theoretic understanding.

DeBellis offers one very compelling argument for the phenomenological claim. He offers the example of the intermediate ear-training student. In an ear-training course, an instructor typically starts off by playing pairs of notes on the piano and instructs the students on how to identify what intervals are being played. For a student to learn this, DeBellis argues, all the student has at her disposal is the way the music sounds. The student must learn to identify intervals by listening to and distinguishing between the different ways that intervals sound. According to the phenomenological claim, this sort of learning is only possible because musical experience does sound to be a certain way, and there is no prerequisite that a listener must meet in order for this to be the case.

This seems to be right, or at least on the right track. Whatever ‘musical understanding’ amounts to, it must be grounded in the phenomenology of music perception; the experience of listening to music feels a certain way; and it is this phenomenal feel that ultimately is all there is to musical understanding. It is argued that subjects are able to possess an understanding of music despite their lack of theoretical knowledge because the phenomenology of music is something we just get for free—that is, it is just part of the perceptual experience.

But I worry that this phenomenological claim is unfounded—the assumption that the experience of listening to music really is phenomenally much the same for me as it is for any other listener. Why should this be so? What is it that grounds the phenomenology of musical experience? What is it that guarantees that the way that musical experience is for me is phenomenally like the way that musical experience is for anyone else? To answer these questions, I propose we look more closely at just how it is that musical experience gets the phenomenology that it does.

III. *Tonality*

Providing a complete account of the phenomenology of musical experience would be a very complicated task indeed as we would need to take into account a seemingly vast number of perceived properties. Some of things that would need to be accounted for would be pitch, rhythm, tempo, dynamics, timbre, articulation, phrasing, formal structure and so on. That being said, what I want to focus on here is tonality. Tonality is the defining characteristic of musical pitch and music theorists claim is the most fundamental property of music. The difference between hearing a musical pitch and hearing a non-musical sound is that the non-musical sound does not possess tonality. I will explain.

The physical basis of auditory experience is our perceptual sensitivity to sound waves—to regular disturbances of air pressure. Sound waves can be physically described as a set of frequencies resonating at a certain degree of intensity for a certain temporal duration. All sounds can be described in terms of their physical frequency, intensity and duration, so consequently a minimum account of any auditory experience must account for these physical properties—if musical experience does have content, then the properties of frequency, intensity and duration must figure in that content somehow. But empirical psychologists have found that a description of this physical basis is not enough to capture one's experience of music. In listening to music, the listener does not simply hear tones of a certain frequency—some higher and some lower—additionally the listener hears notes that stand in certain relations to each other, and the relations that notes stand in to one another cannot be reduced simply to physical frequency.

For instance, consider the octave relation. If musical pitch could be reduced to physical frequency, then tones that are closer in physical frequency should sound to be more closely related than tones that are further away in physical frequency. The tone 440Hz is higher than the tone 220Hz; however, 440Hz is closer in physical frequency to 415Hz than it is to 220Hz; so, 440Hz should sound to be more closely related to 415Hz than to 220Hz as they are closer in physical frequency. However, much empirical evidence proves inconsistent with this claim. Typically, tones that are separated by a ratio of 2:1 are heard by musically sophisticated subjects as being more

closely related to each other than tones that are closer in physical frequency.⁵ This is what psychologists refer to as ‘octave equivalence’.

Tones that are an octave apart are heard as being harmonically equivalent—that is, they share the same harmonic function. The tendency to group tones across the entire physical frequency spectrum into octaves allows a subject to categorise what should be a wide array of auditory stimulus into twelve discreet ‘pitch classes’.⁶ And this is just what tonality is: the harmonic function of a certain pitch class within a particular harmonic context. That musical tones possess this property is just what distinguishes musical sounds from non-musical sounds—musical sounds are heard as having some harmonic function, while non-musical ones do not. Tonality is the property of a certain tone’s sounding to be related to other tones in an harmonic way. Octave equivalence is just one kind of tonal relation.

Just to avoid one possible confusion, this is what tonality is not: it is not the ability to hear a tone *as being* the note A—tonality is not the ability to identify tones by note-name. Being able to identify tones by note-name requires perfect pitch, and is the ability to remember two instances of a tone within a certain range.⁷ It is not necessary that a listener should possess perfect pitch in order for tonality to figure in their perceptual experience.

Now I should say something about the phenomenology of tonal hearing. Within a given musical context, some notes will sound ‘more stable’ than other notes. The ‘unstable’ notes will sound as if they are being pulled toward one of the more stable notes. To hear a tone as standing in a certain relation to another tone is to hear the tones as standing in these stability relations (what music theorists call ‘tonal relations’). These relations between musical notes form a hierarchy of more- to less-stable notes. The most stable notes are the tonic, the dominant and the mediant; the least stable diatonic notes are the subtonic, the sub-dominant and the supertonic. The note C sounds to be the tonic when it is heard as being the most stable tone; alternatively, C sounds to be the dominant when it sounds like it ought to resolve to G; and so on. And what is important for us is that hearing a note as being the tonic has a different phenomenal quality from hearing the same note as being the dominant.

⁵ It is important to notice that octave equivalence is heard more strongly in musically trained listeners. While untrained listeners

⁶ Assuming of course the twelve tones of the Western chromatic scale.

⁷ Perfect pitch is *not* an ability for fine tonal discrimination, rather it is an ability for remembering tones. See Sloboda (1985) Ch. 5.4.1.

Consider this case. In the context of the key of C-major, C (523Hz) sounds to be most stable. A natural melodic progression would be for C to follow B (493Hz), as in Figure 1. In the key of C, the C is the tonic (*do*) and B is the subtonic (*ti*).

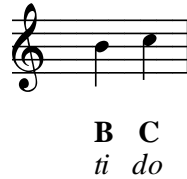


Figure 1

However, in other contexts this sequence would sound to be less stable, such as in a G-major tonal context where the more natural resolution is just the reverse. In G-major, the note C has a natural tendency to resolve to B, as in the IV-I resolution (Figure 2). Thus, C is now the sub-dominant of G-major (*fa*) and B is the mediant (*mi*).

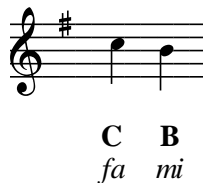


Figure 2

Two important points: first, this ‘sounding to be most stable’ is not something that the frequency 523Hz has just by virtue of its being that frequency. If that were the case, then it should not matter what tonal context 523Hz appeared in, which it most clearly does. Second, the same notes—B and C—can sound to have different harmonic functions in different context, and this difference in harmonic function is evident in the phenomenology of the auditory experience. In the C-major context, B is a very unstable note, but in G-major it is highly stable—it sounds more resolved.

This ‘way’ that the experience sounds—its consonance and dissonance—is just what DeBellis is appealing to when he claims that it is the phenomenology of the perceptual experience that holds in common between trained and untrained listeners. A listener hears the C-B resolution in Figure 2 to sound consonant, and having that experience is just all there is to understanding that musical phrase.

IV. *Tonality: The Empirical Evidence*

So, how does auditory experience come to possess the property of tonality? What cognitive science tells us is that tonality is not an objective property of auditory experience—it is not a property that is available to ‘naïve perception’. By *naïve perception* I simply mean perception that is unmediated by anything mental or cognitive, as would be the case with perceiving shapes or colours. Think of it this way: colour experience is something that we seem to get for free—that is, the qualitative character of our colour experience results from our having a visual system that is physiologically constituted in a certain way that is responsive to certain properties of the external world. The phenomenology of colour experience is just part of the workings of any naïve perceptual system that is constituted in the right physiological way. The perception of musical pitch, on the other hand, is not so naïve.

Empirical psychologists have long puzzled over how it is that musical pitch enters into our perceptual experience. If we look at auditory experience as the simple naïve perceptual sensitivity to certain physical auditory stimulus, then all that auditory experience should present us with are tones arranged along the one-dimensional spectrum of physical frequency. It should *not* present us with the sort of phenomenological differences between hearing the same notes in different keys as demonstrated in Figures 1 and 2. There is no physical difference between hearing C as being the stable *do* in Figure 1 and hearing C as being the unstable *fa* in Figure 2. Nor is there any physiological difference—the way that the auditory information is encoded in the inner ear does not differ between the two cases. In either case, all the ear is presented with is a tone resonating at 523Hz. Whether C is represented as being *do* (Figure 1) or as being *fa* (Figure 2), in either case exactly the same objective mind-independent properties are represented by either perceptual content. And yet there is a phenomenological difference. The C in Figure 1 sounds resolved, whereas the C in Figure 2 sounds less so.

Empirical psychologists hypothesize that the phenomenal properties of musical pitch is a psychological property. Psychologists hypothesize that in order to hear a tone resonating at the frequency 523Hz as *do* requires the listener to cognise the tone under a *do*-representation. To remind, tonality is the property of a tone’s sounding to be more- or less-stable within a tonal hierarchy. As argued previously, these tonal relations are not properties that the note C has just by virtue of its being

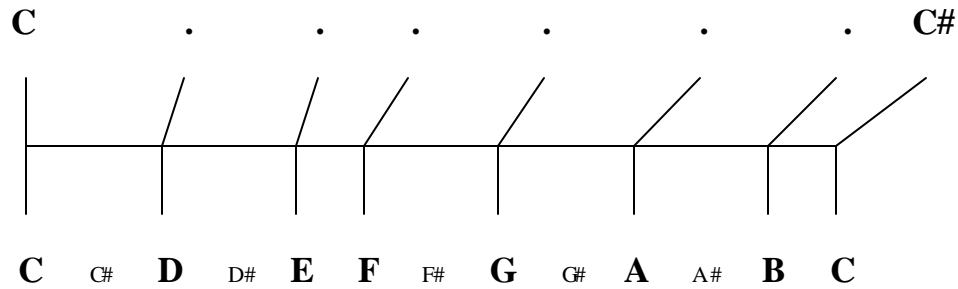
the frequency 523Hz. Rather it was thought that tonality is something that the mind must supply to auditory experience. Krumhansl and Shepard describe this as a process whereby a listener must 'interpret' sound in a musical way in order to hear a tone as being some musical pitch or other.⁸ On this hypothesis, the perception of musical pitch is not something that a listener gets for free in naïve perceptual experience, rather it is something that the listener must do some (subpersonal) cognitive work for.

This is the way that some psychologists describe the situation: listeners must possess a psychological ordering mechanism—an internalised schema for tonal relations—that acts as a template for the incoming auditory stimulus. This schema would consist of an internalised recognitional capacity to judge the distance in physical frequency between two tones (an interval) and to assign the tones heard to some position along the tonal hierarchy that would make sense in a musically relevant way of the incoming stimuli. This psychological schema is like an internalised scale. It is an implicit understanding of the tonal intervals that make up a particular scale. The idea is that a listener identifies tones as particular musical notes not by frequency but rather by identifying the interval. A subject hears two tones being a certain interval apart and from that is able to place them somewhere within the tonal schema. It is thought that this process of schematisation is required in order for tones to sound to be standing in the particular tonal relations that they stand in to each other.

An experiment that is meant to show that this is indeed the case that I will briefly review is Shepard and Jordan's 'stretched scale experiment'.⁹ It was hypothesised that if such an internal schema is responsible for endowing auditory experience with tonality, then it may be possible to test this by subjecting a listener to subtle but perceptually noticeable errors. In Shepard and Jordan's experiment, they presented subjects with a series of tones that preserved the uneven spacing of a natural major scale but where the intervals had been systematically stretched along the entire sequence so as to end on a tone that is noticeably more than an octave above the starting tone. The tones of each interval were stretched by a ratio of 13:12 so that if the starting note had been a C, then the finishing note of a complete scale would be C# (see Figure 1).

⁸ Krumhansl and Shepard (1979). Also Krumhansl (1990) is very instructive.

⁹ Shepard and Jordan (1984).



The Stretched Scale Experiment

Figure 3

Stretching an interval by this amount is perceptually noticeable to a subject (as nuances for instance)¹⁰, though these ‘wide’ intervals are still within the range of correctness for these particular intervals.

In Shepard and Jordan’s experiment, subjects were played the stretched scale with at starting note of C in ascending order and from C# in descending order four times each. After the scale was played for times the subject would then be presented with the original starting tone—the C—and were asked to judge whether this tone was higher than, lower than or exactly the same as the starting tone of the scale that they had heard. Of course this actually was the same as the starting tone. The purpose of the experiment was to test whether the subjects could notice the discrepancy of the scale. If musical tones are identified simply by physical frequency, then subjects should judge correctly when they hear the original starting tone played again.

Interestingly, when the scale was played in ascending order, 86% of subjects judged that the C was lower than the original starting tone, while only 9% judged correctly. When the scale was played in descending order, 68% judged that the C was higher than the original starting tone, while only 25% judged correctly. (Shepard and Jordan hypothesize that, while the results of both experiments are statistically significant, subjects were slightly less fooled by the descending scale because scales are more commonly played or sung in ascending order.)

The interpretation offered for these results is that musical pitch is not identical with physical frequency, rather one judges a tone to be a certain musical pitch relative to their relatedness to other tones presented in the auditory experience. A listener hears two tones being a certain interval apart; they make a judgment of which interval this

¹⁰ See Raffman (1993) for more on nuance hearing.

may be based on how it would fit within the internalised schema; by identifying which interval this is in the schema, a subject is then able to narrow down what the tonal context is.¹¹ If this is indeed how tones are identified as musical pitches, then it would be requisite that subjects possess this internalised schema. It is then hypothesised that possession of this internalised schema is what allows us to hear certain tones as being more- or less-stable than others.

V. *The Origins of Tonality: Stability and Expectation*

How does a subject come to possess such a psychological capacity? Is it innate—that is, does our possession of this capacity have a biological origin? Or are its origins based in culture? There have been many attempts to account for this in biological terms. While many of these often seem quite plausible when restricted to certain musical cases, they often fail to encompass the wide range of musical phenomena. For instance, they often work quite well when restricted to examples of major key tonality, but will fail to account for minor key tonality.

While some perceptual capacities do appear to be innate—such as the recognition of octave equivalence or memory for sequences of tones—many cognitive scientists argue that cultural factors play the strongest role in the acquisition of musical sensitivity. The supposition is that there must be a period of enculturation during which a subject becomes habituated to the musically salient commonalities of a particular culture. The subject must move from simply hearing sounds as having certain physical characteristics (frequency, intensity and duration) to hearing sequences of sounds as having certain normative (musical) characteristics. It is this move to normativity—to a listener’s having expectations about what the music ought to do—that is thought to endow auditory experience with that quality of tonality. Again, tonality is just that property whereby certain tones sound to be more- or less-stable within a certain context. The hypothesis that empirical psychologists offer is that this feeling of stability is due to the listener’s having built up a set of expectations of what the music of a certain culture commonly does.

If this were so, then the effects of this period of learning must be demonstrable—it must be possible to show that a listener’s perceptual capacities do indeed change and

¹¹ This also squares with what is known about musical experience: certain musical phrases can sound ambiguous because of the way they avoid identifying the tonal context. Think of twelve tone or serial music.

improve over time. For illustration, I will review the results of one such experiment. In an experiment by John Sloboda,¹² five groups of subjects were played four different types of musical examples in order to test the subjects' sensitivity to harmonic correctness and incorrectness. The subjects were grouped by age, the five age-groups being 5-, 7-, 9-, and 11-year old children and one adult control group. Each were played short examples that grew increasingly more difficult, each requiring greater listening skill from the subject. In each experiment, two short musical phrases were presented, one correct and the other—the test case—'incorrect'. The subject's task was to identify the incorrect one. The first example was of a short three-chord sequence in which the incorrect phrase contained highly dissonant chords.



Figure 4: Test 1

The second example presented a single chord where the incorrect one was erroneously constructed.

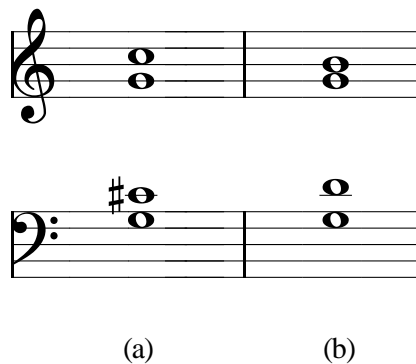


Figure 5: Test 2

¹² As reported in Sloboda (1985), pp. 211-215.

The third example was again a short three-chord sequence, the correct one being a perfect cadence and the incorrect one being constituted of the same chords but played in reverse.

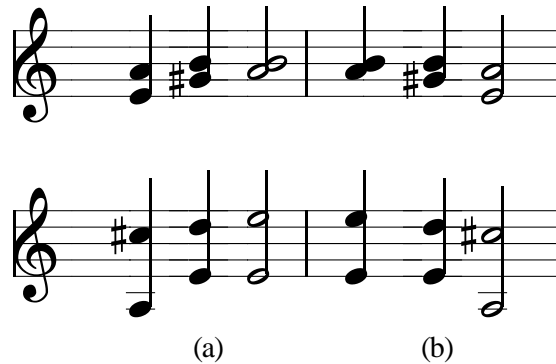


Figure 6 : Test 3

The final example was of a single unaccompanied melody line in which the tonality of the incorrect line was obscure.

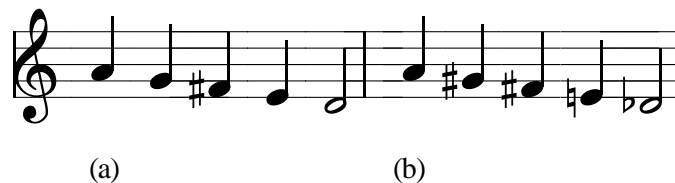


Figure 7 : Test 4

The results reveal that children at five-years-old performed only marginally better than chance on the first test and performed poorly on the other three tests. Children do not perform well on the second and third test until the age of seven, and do not perform well on the fourth test until nine. However, by the age of nine children perform as well as adults on the first and second tests, and they perform as well as adults on the third test by the age of eleven. While children perform well on the fourth test by the age of nine, they do not improve until much later.

As previously mentioned, other empirical evidence suggests that children as young as one month can exhibit perceptual sensitivity to differences in pitch, and can even detect changes in a sequence of tones. Unfortunately this evidence cannot be extended into the claim that infants are responding or attending to the perceptual stimulus *as* music. As argued above, the perception of musical pitch cannot be reduced to physical frequency, and nor can we assume that an infant's responsiveness

to differences in frequency show anything about their responsivity to tonality. What is lacking in infants is the ability to show any preference for or detect ‘mistakes’ in phrases that demonstrates a concern for the musicality of the sound. What Sloboda’s experiment suggests is that a subject’s response to auditory stimuli *as* music must be gradually developed over an enculturation period.

Of course I am not suggesting that the results of one experiment should be taken as conclusive evidence. These results should be compared with other research in this area, and the interpretation of these results should be carefully examined. However, if these results were accepted, then for my purposes the suggestion would be that the subject’s phenomenal experience of music develops over time too.

VI. *The Problem for Musical Understanding*

The final point that I would like to push is how these empirical findings impinge upon my earlier claims about musical understanding. The claim was that understanding music does not require a listener to form conceptualised judgments based on a knowledge of music theory. Rather understanding music is simply an experience of a certain appropriate kind that is based on the phenomenology of the perceptual experience. In this paper I have offered the view that a large part of the phenomenology of musical experience is bound up in the tonal properties of musical pitch. The empirical evidence I presented suggests that tonality is a property that auditory experience gets from a subject’s possession of a certain psychological capacity, and I suggested that the period of enculturation during which a subject develops this psychological ability could have gone otherwise such that the subject might have developed a different ability for the cognition of musical pitch. The final point I would like to raise is that if two subjects do possess different psychological capacities for the cognition of musical pitch, then there is no guarantee that the phenomenology of these two listeners perceptual experiences would hold in common. If this is true, then sadly there is also no guarantee that the two listeners could be said to understand some music in the same way.

Enculturation is a process whereby subject becomes habituated to a certain tonal system. During the enculturation period, the subject comes to form certain expectations about tonality. These expectations may be partly due to the particular way that, for instance, the Western chromatic system is constructed, or it may be partly due to the way that the system is used. What is important for us, however, is

that if a subject is enculturated into a tonal system that is different from the Western chromatic system, or Western usage of this system, then they would presumably build up different expectations. The way that we hear tones as being more- or less-stable is based on our harmonic expectations. So the point I would like to suggest is that if a listener does have a different set of expectations, then this will effect the ‘stable-sounding’ quality of tones. As this is what the phenomenology of musical experience is based on, then such a subject may not have the same sort of phenomenal experience as we.

Of course people often do form the same judgments of music, and presumably this is because it does sound the same to them. This may be accommodated within the view that I am suggesting—there can be wide convergence in the phenomenal states of subjects who are endowed with the same physiological capacities and are enculturated within the same musical tradition. In order for a subject to acquire the sort of musical sensitivity that we enjoy, two things would be required. First, they must be physiologically endowed with the right sort of auditory system, and the right sort of innate primitive psychological capacities that this system requires. These innate psychological abilities would include the ability to identify tones by octave and the capacity to remember auditory qualities of tones. Second, the subject must be enculturated into the same tradition as us—a tradition that is based on the Western chromatic system. Given these two conditions, we should expect that the phenomenal states of two listeners would be remarkably and significantly similar.

The moral of my discussion has been to remark that there is no guarantee of this phenomenal similarity. In addition, while there would be great convergence between subject's who are similarly constituted physiologically and enculturated into the same musical system, this would also mean that differences in the physiological constitution of a subject's auditory system or differences in the musical system that a subject is enculturated into should result in differences in the phenomenal states of their perceptual experiences. There is no reason to think that a subject enculturated into the Western chromatic system would phenomenally experience a piece of music in the same way that a subject enculturated in a tonal system that is radically different from the Western system.

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