A PHENOMENOLOGY OF POLYRHYTHMIC MUSIC [1]

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ABSTRACT

The thesis I will develop in this paper is the claim that polyrhythms have a property of 'emergence' that is distinct from the perception associated with atomic rhythms, as aided by the philosopher G. W. F. Hegel's theory of phenomenology. I will argue that the specific qualia sensations associated with apprehending polyrhythms are distinct from both the sensations of mono-rhythmic music and polyrhythmic music taken as just the sum of atomic rhythms. Using Hegel's text, *'The Phenomenology of Spirit'*, I will demonstrate how Hegel's concepts of 'Sense-Certainty' and 'Perception' play a crucial role in understanding the cognition of polyrhythms at the phenomenological level. Using Hegelian concepts such as: the indexicality of 'Here' and "Now' and the perception of 'Also' and 'One', I will demonstrate how polyrhythms are a specific phenomena that is greater than the sum of its parts, such as how a chair is not perceived as a bunch of wood arbitrarily constructed but as a unified whole. The key difference that I will make is that it is possible for a listener to apprehend a coherent soundscape that is perceived as a unified whole while at the same time retaining the multitude of differences contained within it; in this sense, polyrhythms have an 'emergent' property. In part 1 of this paper, I will discuss Hegel's phenomenology of music, as aided by the section on 'Consciousness' within the chapter on 'Perception' ; in Part 2, I will describe the Hegelian understanding of poly-rhythms as two terms of my own: 'notion-of-polyrhythm' and 'itself-of-polyrhythm'.

PART 1: PHENOMENOLOGICAL ANALYSIS OF MUSIC IN GENERAL

Hegel posits that when we are investigating any phenomenon we are altering it as we cognize it.[2] By this, Hegel does not mean that when we cognise a chair, that we are changing the chair as it is in-itself but only that we are changing the chair as it is for-consciousness. In other words, chairs exhibit a multitude of different phenomena that are inaccessible to human consciousness, of which consciousness selects certain phenomena that it can sense and makes it meaningful for itself. For example, a chair gives off infra-red radiation that would be directly accessible to various species of snakes, via their sensory organs, but infra-red is indirectly accessible to us human beings; this is because we lack the sensory organs that are able to cognise the chair within the realm of infra-red energy at the sensory level. While it may be said that the scientists who investigate electromagnetic energy, such as infra-red and ultra-violet, are experiencing both these phenomena, they are nonetheless not experiencing the phenomena as it is in-itself, that is, as it objectively is independent of a thinking mind.

1 My thanks to all those who participated in the seminar on Hegel's 'Phenomenology of Spirit', during the Winter 2011 semester at the University of British Columbia, for their insightful comments and criticisms; special thanks to my friend Kenji Hayakawa for organizing the seminar and for making it as productive as it was.

2 Hegel, p. 58

Even when the scientist observes infra-red, they must see it through another medium and thus are actually only seeing infra-red in human terms, namely – the wavelengths between around 380nm and 750nm, and thus actually sees only this particular range[3]. Because of the limitations of all sensory beings, we are always only cognising the Absolute (Hegel's term for what is basically the universe) as 'being-for-other', that is, as things appear to us; we are always making phenomena sensible and coherent for us, despite whatever its true nature in reality is. Similarly, as music is part of the Absolute, we only have a notion of music and are not understanding music as it acctually is. We should especially take this into account when analysing the phenomenon of polyrhythmic music, as will be explained later in the paper. Let us first discuss how music functions through Hegel's phenomenology before discussing polyrhythmic music.

Hegel posits that we must first take the sounds we hear as immediate and that we should refrain from trying to comprehend it: we should let the sounds be as they are. However, it is soon shown that we cannot let things be as they are and that we fail to treat the sounds of music as they are objectively because the way in which we apprehend sounds, in the context of music, is *as music* and not just as arbitrary sounds. However, Hegel warns us of trying to construct an objective criteria from which to judge phenomena. In my example, I have judged music to be distinct from 'arbitrary sounds', and I've taken music to be the being-for-other of sound and 'arbitrary sounds' to be the being-in-itself of sound. This distinction is problematic for Hegel because what I take to be the in-itself is merely a notion of the in-itself. While this may seem like an extreme form of scepticism, Hegel thinks that these moments of objectivity and subjectivity are crucial to understanding phenomena in a way that will be reconciled once a phenomena becomes in-and-for-itself – where notion of an object and the object itself correspond to one another; where the map and the territory fit each other. Despite Hegel's claim that we can never know anything as it is in-itself, we can still meaningfully investigate the experiences that we encounter throughout our lives in a systematic fashion. Therefore, musical-rhythms are something that our consciousnesses process in a way that is meaningful for us, despite the way they function independent of our minds. Hegel's process is famously regarded as dialectical; however, it should be noted that the famed Thesis-Antithesis-Synthesis triad is often explained in too simple terms than what Hegel means.

Hegel's phenomenological method posits that cognition is a sequence of systems, within themselves and within other systems, that are both separate and distinct as well as unified. While this may seem to be a contradiction, Hegel is not positing that both difference and unification are present at the exact same time, but that consciousness, having gone through Hegel's proposed process, will recognize that the process will, in the end, be realized as a system of difference and negation where both will be preserved under a unified whole. To begin with, we first see that we as conscious subjects are different from the Absolute – that there is an object and that there is a subject that differentiates itself from the object. Because of this difference, we as subjects realize that all phenomena must be for-us, and subjects are therefore not seeing things as they are in-themselves. Once this is realized, we also notice that the world of consciousness is always an immediate one where the truth of one instance/place is not necessarily true of the next instance/place: "'Here' is, e.g., a tree.

3 Curtis, p. 163.

If I turn round, this truth has vanished and is converted into its opposite: 'No tree is here, but a house instead'."[4] Despite these changes in the world around consciousness, consciousness remains the same in all these instances; the 'I' – the thinking subject – which cognises phenomena is always the same 'I' as the one who interpreted a previous truth as much as it is the same 'I' that interprets a present truth. Thus, consciousness realizes that 'Here' and 'Now' are all indexical concepts that function to organise phenomena in a manner that allows consciousness to categorise its experience in a meaningful manner; the only unchanging aspect is the position of the 'I' as it comprehends the world. In this manner, all music is in the 'Here' and 'Now' of consciousness, as all music is experienced *across* time and cannot be heard unless consciousness is within the vicinity of the music performed. Because music differs from other art forms, especially visual art, in terms of time, music and sounds in general are always ephemeral phenomena that are constantly changing and altering as the piece progresses; sound is not static like a painting is – it cannot be experienced in its entirety in a fixed moment of time. This is because all music must be completed in order to have experienced the entire music piece. Therefore, all musical experiences for consciousness are in the 'Here' and 'Now'.

After this is realized, Hegel claims that objects have difference and negation within them; Hegel uses the example of salt: "This salt is a simple 'Here' and 'Now', and at the same time manifold; it is white and *also* tart, *also* cubical in shape, of a specific gravity, etc."[5] Hegel describes objects as a "*simple togetherness of a plurality*; but the many are, in their determinateness, simple universal themselves."[6] Universals, in this context, are properties of objects that can apply to other objects as well, such as tartness, cubicality, and whiteness. When we perceive that things are a certain color or a certain sound, there *also* exist other things that are apprehended with the same properties; this means that no phenomena is ever purely individual and singular because there are universals that are attached to the particular phenomena that make it universal. As a consequence, when we listen to music, musical sounds have a certain pitch, timbre, rhythm, etc. of which each of these can be applied to other instances of music as well - as one song may be in the key of F major but many other songs may also be in the key of F major. In Hegel's salt example, while a particular cube of salt sitting on a table may be a particular thing, the properties that it possesses (tartness, cubicality, whiteness, etc.) are *not* particular objects but are instead *properties* that can be applied to many other objects as well (e.g. - certain candy is tart, cardboard boxes are cubical, and milk is white). Therefore what we initially experience to be a particular object in the world is soon shown to be merely an instance of a universal – namely, that there are many different objects/phenomena that possess the properties of other objects/phenomena. Universals are instantiated properties and 'particulars' possess these properties; salt is the 'particular' of the universals whiteness, cubicality, etc. The key point that Hegel makes when he says: "*simple togetherness of a plurality*" is that all these differences are retained into a particular thing – all objects are particulars with universals (a cube of salt on a table may be a particular salt, but it possesses properties that are equally applicable to other salt). All music is equally perceived through differentiation and by the instantiation of universals; all pieces of music are the particular pieces they are because they are possess properties that other

4 Hegel, p. 61
5 Hegel, p. 68
6 Hegel, p. 58

pieces of music do not possess. Musical-universals such as a time-signature of 4/4, an E flat key signature, and a Vivace tempo, are perceived by consciousness to be instantiated when a piece is performed that satisfies those properties. So while there might be a Beethoven piece in E flat major, with a time signature of 4/4 (four beats per quarter-note), and at an Allegro tempo, is a particular piece of music, its properties are not particular properties but are properties that can apply to many other pieces of music as well.

To explain this reconciliation of differences within an object, Hegel uses the term 'Also'; an object is an 'Also' when it possesses the properties that hold together all the universals of a particular.[7] In Hegel's salt example, salt is the 'Also' of the universals: cubical, tart, and white. These properties, according to Hegel, can only exist if there is a difference between one property and another property, for otherwise they would just be one property. So when a symphony is being performed, the pure universal of the music itself would be the physical air that retains all the universals of differentiating pitches, volumes, and timbres that a symphony creates from its musical-instruments. Another example is that the piano is a pure-universal for all piano sonatas to be performed as music; without the piano, there would be no unifying medium by which the 'Also' of a piano piece could exist, because musical-universals such as pitch, timbre, and volume need to be instantiated by a musical-instrument in order to be experienced by consciousness. This demonstrates that both the physical instruments that music are created, as well as the music itself, are subject to the properties of 'Also' as both can be divided up into smaller constituent parts that create a larger whole.

After this 'Also' becomes an object of perception that contains differences held together by "a pure universal itself, or the medium"[8] (salt, which is the pure universal of salt, holds together its universals), the object becomes a 'One' - a phenomena that consciousness experiences as negation. In other words, something can only be white if there is something non-white of which to distinguish it from; similarly, salt can only be salt if there are non-salt things, of which amongst the whole collection of objects in the universe we can determine to be salt or non-salt. This illustrates Hegel's emphasis on negation as well, because salt is not a duck, not a dinosaur, not a cup of water, etc. This process of difference from the 'Also', and negation from the 'One', allows objects to be determinate from one another – what makes a cup different than a bicycle. What is key about these negations is that they allow the 'One' to then become a unified whole; thus, all the differences contained within it are also unified as a whole. This means that if salt, as an 'Also', is sodium-chloride, salt qua salt would be at the perceptual level of the 'One' whereas salt as sodium-chloride would be an 'Also'; this demonstrates that perception at the level of the 'One' must negate a phenomena's own difference as well. Thus, salt *qua* salt is, if taken by consciousness to be a 'One', is simply just salt; salt qua sodium-chloride is salt as an 'Also'. When salt is perceived as a 'One', salt is known by consciousness to be sodium-chloride, however it ignores these atomic properties and instead just perceives salt as the mundane object it was prior to be realized as salt. For example, consciousness perceiving salt as a 'One' would be inclined to say at the dinner table: "please pass the salt, though I know that it is acctually sodium-chloride." A chemist on the otherhand would likely perceive

7 Hegel, p. 69
8 Hegel, p. 69

salt as an 'Also', as a particular object that has differences within it. So the chemist would be inclined to say: “please pass the sodium-chloride” instead of “please pass the salt.”

At this point, the phenomena becomes a 'Thing' - something Hegel describes as unifying the qualities of the 'Also' and 'One' properties of objects and phenomena in general. Perception at the level of the 'Thing' is the point where consciousness realizes that objects are unessential and that to understand an object is to understand its relation to other things; this is why an object is not itself on its own but is determined in relation to other things. This differs from the 'Also' because now the object, at the perceptual level of the 'Thing', is seen as a 'One' that is different from other 'One's. To re-iterate, consciousness perceives the 'Also' of an object as possessing different 'universals' that are different from one another; consciousness then unifies these differences into a 'One', where the differences are negated. Perception at the level of the 'Thing' now takes the object as a 'One' and compares it to other objects as a 'One' and realizes that there are now different objects qua 'One'; this is how an object as a 'Thing' differs from an object as an 'Also'.

Hegel points out that consciousness now realizes that the 'Thing' is not responsible for these differences (because the 'One' and 'Also' are retained by the pure universal of whatever object or phenomena it is retained by) and it is instead consciousness that alters objects from what they are. This is important to notice because consciousness learns that all 'Things' are divided up into other 'Things'; if all 'Things' are 'Ones' and 'Alsos', it is revealed that all of these are themselves divided into their subsequent 'Things', 'Ones' and 'Alsos'. For example, when the symphony performs, in order for them to be heard there must exist in the space-time vicinity around the orchestra a 'Thing' by which to vibrate through in order for their instruments to resonate and become sound. The 'Thing', which in the context of music, is commonly ground-level atmospheric-air, then reveals itself to be contained of 'Ones' and 'Alsos' (what the general populace describes as air is in fact a mix of many different gases such as nitrogen, carbon dioxide, and oxygen, etc.) and thus air is differentiated and negated by consciousness into other properties. While it may seem like this process suggests an infinite regression, Hegel posits that only what we can sense can be understood and comprehended: “the knowledge or knowing which is at the start or is immediately our object cannot be anything else but immediate knowledge itself, a knowledge of the immediate or of what simply *is*.”[9] To recapitulate:

- First, consciousness apprehends the 'Thing' of air, by which a symphony performs music
- Second, consciousness realizes that the 'Thing' of air is really a plurality of universals, differences, and negations (nitrogen, oxygen, etc.) and that they are composed of 'Ones' and 'Alsos'
- Third, consciousness finds that these 'Ones' and 'Alsos' are reduced to the level of the 'Thing' but at a different level of perception (i.e. - at the microscopic level, oxygen is not purely oxygen but instead differs depending on the chemical-isotopes it possesses, as dependent on how many electrons it has, which is in turn put into the 'Also' of quarks etc.)

9 Hegel, p. 58.

Thus, what was initially the 'Thing', which a symphony must possess in order to perform music, is instead a plurality of 'Ones' and 'Alsos', which are in turn reduced to the level of 'Things' and then the whole process begins again: 'Thing' > 'Also' > 'One' > 'Thing'. As a fifth step in this process, Hegel introduces the term of a 'Community'; this is the property of objects/phenomena where consciousness sees objects/phenomena as involved in this process of 'Thing' > 'Also' > 'One' > 'Thing'. This leads Hegel to make the claim that "Consciousness, therefore, necessarily runs through this cycle again, but this time not in the same way as it did the first time." [10] Consciousness goes through the phenomenological process and then realizes that the process is the result of the subject's epistemological position and not necessarily any change in the phenomena as it is in-itself. Realization of a process is crucial for Hegel as this alters the perception of objects in a significant manner; a chemist investigating the natures of salt would be better of perceiving perceiving salt as an 'Also', rather than just as a 'Thing', if it wanted to find out about its chemical properties. This is how Hegel's dialectical method functions at the level of Perception. Given Hegel's phenomenological method, music is equally involved in its own dialectic. Let us discuss how the average symphony sounds and functions across the length of time of the piece and how it functions within Hegel's phenomenology.

A symphony is a piece of music for an orchestra of musicians: cellos, violins, flute, trumpets, tubas, trombones, oboes, timpanis, drums, cymbals, etc.. All of these instruments function together to act as a 'Thing' that produces another 'Thing' (namely, music). These 'Things' are all constructed by 'Alsos', and 'Ones'; for example, a cello is made of wood, which is in turn made of certain molecules of cellulose fibers, which is turn made out of certain chemical elements, etc.; this is what constitutes the physical phenomena of music's creation which is the necessary pre-cursor to the phenomena of music itself.

Music itself contains also difference and negation because the way in which consciousness differentiates between one section of the piece and another section of the piece is all dependent on its relation to the previous section in the piece of music; for example, Shostakovich's Fifth Symphony, Fourth Movement is distinct in its extremely lively and quick emotional-tone from the sombre and slow Third Movement and this causes the Fourth movement to be much more powerful than if it were to have transitioned from an equally loud and exciting section. At the level of pitch, in order for a melody to be comprehended, all perception of music relies on the past judgments of consciousness as to the previous notes played. For example, in order for us to be able to cognise the popular children's folk-song 'Twinkle Twinkle Little Star', we as phenomenological subjects must take into account the order of the notes being played, in order to differentiate the song from just a simple scale exercise in any major key. This order of notes is simply the way in which the present notes of a piece are differentiated from the past notes of the same piece.

For example, if someone performed all the notes in 'Twinkle Twinkle Little Star' in the key of C major, all the different pitches of the song would be: A, C, D, E, F, G; if a person playing this piece were to play these notes from left to right, they would not be playing 'Twinkle Twinkle Little Star' but could just be practicing a scale on the piano or fooling around on the piano or any other arbitrary musical activity; they

10 Hegel, p. 71

would need to play the notes a certain number of times repetitively and with a certain syntax in order for the piece to be played coherently and to be recognized as 'Twinkle Twinkle Little Star'. In Hegelian terms, the person performing the music would have to be able to identify each particular universal contained within the 'Also' of a musical phrase; if a musical phrase were to be perceived as just a 'Thing', it would not be paying attention to the difference of 'universals' that are instantiated which make 'Twinkle Twinkle...' the piece that it is. In the beginning of 'Twinkle Twinkle...', the piece starts with a seven note phrase and then rests before the next phrase begins (C, C, G, G, A, A, G, and so on...); if one's consciousness is not focused on experiencing the piece as it unfolds throughout time, then the piece will be just a bunch of universals being performed arbitrarily with no 'Also' to hold them together, namely the pure-universal of the musical-phrase in this case. For example if a person were to walk into the room and were to hear these notes performed at a tempo of 400 beats per minute, they would not likely perceive the piece as 'Twinkle Twinkle...', as the average performance tempo is around 100 beast per minute. Therefore difference is important to understanding even such a simple piece as 'Twinkle Twinkle...', for consciousness would have to be able to differentiate the first pitch of notes from the next pitch of notes, throughout the piece, in order to even recognize the piece as 'Twinkle Twinkle'. As 'Twinkle Twinkle' is almost never performed as quickly as 400 beats per minute, one's consciousness would not be able to create 'difference' between the beginning of one phrase, in the piece, from another; the piece would be likely be a blur of sound if performed at 400 beats per minute. After the piece is completed, all these properties are brought together by the 'Also' of the piece and are unified by the pure-universal of the medium by which most musical-universals on earth must be experienced, in this case the vibrating medium of air (supposing the piece is performed at ground-level and on earth etc.) and so on through more 'Alsos' and 'Ones'. After going through this process of 'Thing' and 'Community', consciousness can now declare that 'Twinkle Twinkle...' is just 'Twinkle Twinkle' and despite its knowledge that there is difference contained within it, consciousness can take 'Twinkle Twinkle...' as a song that is simple unified whole. This process can be equally described of the difference and negation of timbre, volume, and tempo throughout a piece as well.

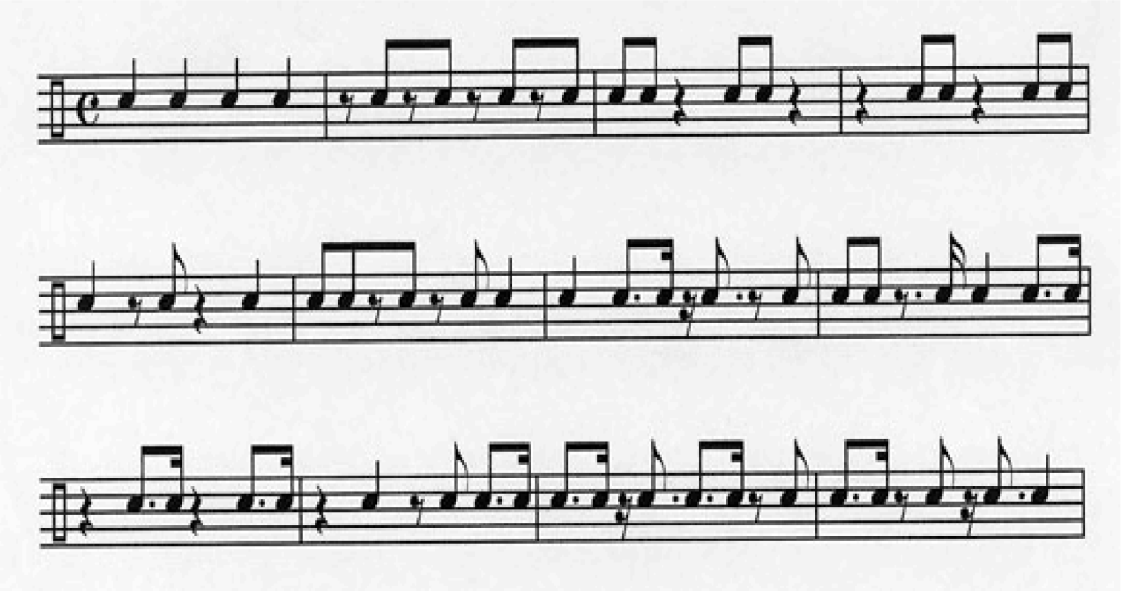
The 'One' of a piece is what consciousness takes to be the whole, unified piece of music with all the differences of the 'Also' negated and thus taken as a strictly pure whole. In the case of a symphony, it is what consciousness comprehends as being a symphony that makes it a symphony (as opposed to a sinfonietta or big-band arrangement). To reiterate, a symphony would be perceived as an 'Also' if consciousness cognised the symphony as the plurality of universals (musical-universals such as pitch, timbre, volume, etc.) and the piece would be perceived as a 'One' if consciousness negated all this difference and took a symphony to be simply a symphony, as opposed to the gestalt of numerous musical phrases, oboe squeaks, or whatever else consciousness might cognise under the category of the 'Also'. At the level of 'Thing', each movement of the symphony (movement as in section of the symphonic piece – not the movement of the players themselves) must be understood in relation to each constituent movement of the symphony; on the other hand, the symphony must be put into the context of each of its constituent movements and each constituent movement must in turn be related to the entire symphony as a whole in order for consciousness to understand the piece at the level of a 'Community'. Once consciousness takes into account the ways in which music can be perceived,

consciousness realizes that the way in which it perceives music changes what music is as being-for-other - what music is for the thinking consciousness. This crucial difference is important for the discussion of polyrhythmic music below.

PART 2: PERCEPTUAL ANALYSIS OF 'EMERGENT PROPERTIES' OF POLYRHYTHMIC MUSIC

Unlike paintings or visual art, whenever we listen to any piece of music, we are only presented with bits and pieces of the entire art-piece at a time; we are never shown the entirety of the piece because the nature of music is as an ephemeral art form that is contingent upon time more than anything else. Therefore, music operates in a similar to film and dance where a musical, or dance or film piece, unfolds throughout time. In this way, music is similar to a sculpture that can only ever be viewed from one angle and in one instance in time. Polyrhythmic music is directly intertwined with time, especially because it posits more than one time-line of rhythms, which ostensibly provides the illusion of two "musical-angles" (as if taking a piece of music as a sculpture) being perceived but will soon be revealed to still be just one rhythm that consciousness perceives.

Let's first begin by analysing atomic rhythms and their properties. Take for example the following rhythm:[11]



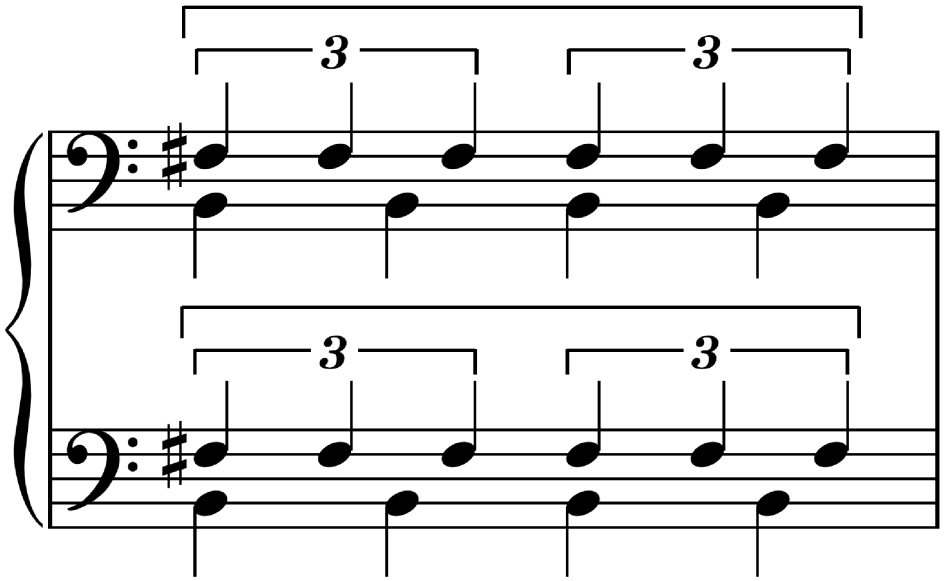
This is an example of a what I call an 'atomic-rhythm'. Despite the change in the rhythm itself (there are different types of note-duration ranging from: quarter-notes, eighth-notes, and dotted eight-notes), because there is only one time-line that the rhythm is played on, the rhythm is atomic. For example, imagine this rhythm is at the tempo of quarter-note = 120 beats per minute; that is, there will be 120 notes played, where a beat is defined as one quarter-note, per minute (this is the tempo of the

11 Leytham, *Left Foot Son Clave Grooves*

average classical piece and is the usual definition for the Allegro tempo-marking). This is the designated 'master time-line' for the piece as this rhythm's existence will be at the tempo of 120 bpm and will not deviate from it unless an accellerando/ritardando, or other tempo marking, is used to alter the tempo. Even if the rhythm does deviate from the regular tempo, this will still be taken to be a rhythm on a single time-line, as will be demonstrated in the case of polyrhythms later on.

Now to introduce some terminology to make this concept clearer:

- An 'atomic-timeline' follows one tempo; this particular tempo may include all the deviations in that particular tempo as well. In the diagram illustrated above, this rhythm is on a single-timeline because it follows a single tempo.
- A 'master-timeline' is a time-line that governs multiple atomic time-lines; for example, if a piece of music is designated at the tempo of quarter-note = 120 bpm, all non-tuple quarter notes will be played at that tempo in relation to one another (at the level of a 'One', because it is a unified whole and has not been negated by a polyrhythm occurring within its own piece). However, if there are tuples, each 'tuple quarter-note' will have to be taken in relation to the non-tuple quarter-notes and will thus be either at a faster or slower tempo than the non-tuple quarter-notes. These 'tuple quarter-notes' will be perceived as 'Alsos' because they require the differentiation of the master-timeline into atomic time-lines, of which these atomic time-lines must be related in reference to the master-timeline as a 'Thing'. Therefore, a music piece is a 'Thing' if consciousness does not perceive the difference of the 'One' and 'Also' within it; a piece of music is a 'Community' if consciousness realizes that there are these differences of the 'One' and 'Also' within a piece.
- A 'polyrhythm' is when two or more 'atomic-timelines' are experienced and are recognised by consciousness as simply existing, and at different tempos from one another
- A 'notion-of-polyrhythm' is the level of perception where a polyrhythm is experienced as having differentiation within itself and is experienced as an 'Also'
- An 'itself-of-polyrhythm' is the level of perception where consciousness reconciles the difference between two atomic rhythms and instead unifies them both under an 'emergent' polyrhythm. This property of emergence occurs when two atomic rhythms are perceived as a 'One' – perception of a single rhythm that contains no difference within it.

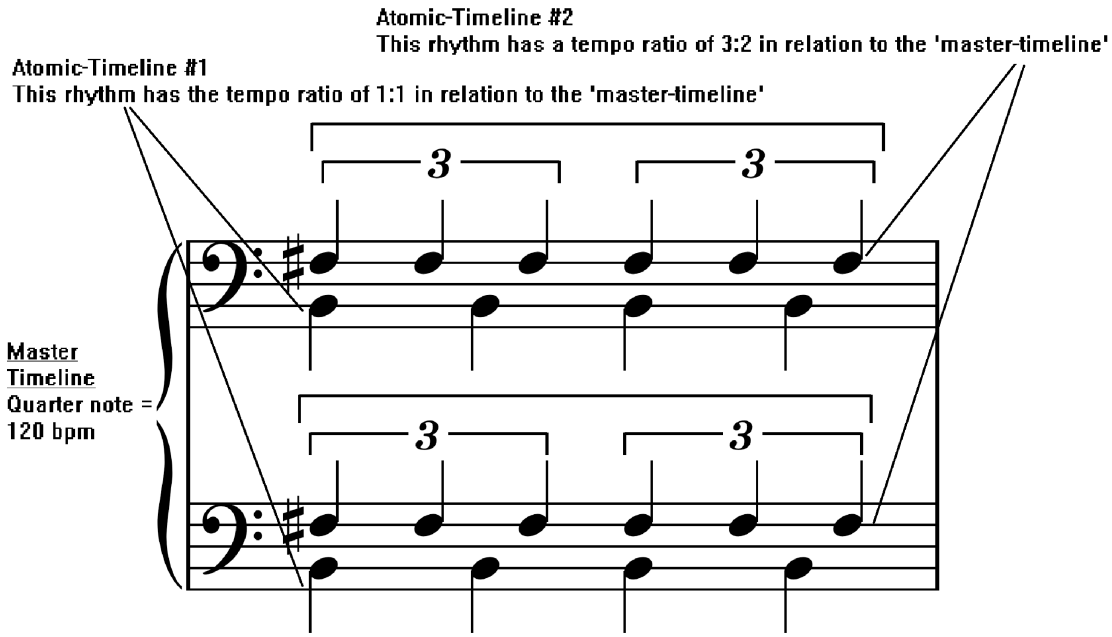


All of these terms I have introduced exhibit characteristics Hegel's phenomenological method and are crucial for understanding polyrhythmic music. To elucidate this process, let's have a look at the diagram of a polyrhythm above.

The quarter-notes grouped under the number 3 are to be played in the same amount of time as '2 quarter-notes at the tempo of the master-timeline'; this denotes a ratio of 3:2 in terms of tempo speeds. These segments of 3:2 are called triplets and are tuple-quarters with the ratio of 3:2 in relation to the non-tuple quarter notes illustrated. All tuple-notes are ones that have a tempo ratio different than 1:1 in relation to the master-timeline; all non-tuple notes have a tempo ratio of 1:1. In the illustration below, I have illustrated the above-diagram with the terminology above.

The poly-rhythm shown here consists of two atomic rhythms: 'Atomic Time-line #1' and ' Atomic Time-line #2'. Both of these rhythms are governed by a master-timeline of 'quarter-note = 120bpm'. In this diagram, the atomic-timeline of 'Atomic Time-line #1' is at the tempo of 120bpm; the atomic-timeline of 'Atomic Time-line #2' can thus be predicted as at the tempo of 180bpm. The reason for this conclusion is because given that triplets are to be played at a ratio of 3:2, in relation to the quarter-notes at the master-timeline tempo, the tempo of 'Atomic Time-line #2' will be performed at 1.5 times the speed of 'Atomic Time-line #1'. If consciousness recognizes these two rhythms as being different in tempo, then consciousness will posit these rhythms as a 'polyrhythm' – as cognisant that there are two rhythms that are at different tempos from one another. If consciousness realizes that both are in fact synchronized with one another, in relation to the master-timeline, then consciousness is at the level of 'notion-of-polyrhythm'. 'Difference' is cognised as well as these differences being unified as a whole; this is the 'Also' of polyrhythm, hence 'notion-of-polyrhythm'. The

key difference between 'polyrhythm' and 'notion-of-polyrhythm' is that the former has only the comprehension that, for example, in the above illustration, that there are two rhythms that are not at the same tempo; the latter has both the *recognition* that: the atomic-timelines are not at the same tempo, and consciousness reconciles the difference into an 'Also', *and* perceives it as a plurality of rhythms *unified as whole*. While this may seem like a difficult task, polyrhythms like the one illustrated above are easily perceived by human beings all the time; however, there exist many poly-rhythms that are extremely difficult to cognise unless careful attention is given. Given the immense popularity of the pop song 'Til the World Ends' by Britney Spears[12], whose chorus has a 5:4 polyrhythm, it is clear that polyrhythms as complex as the above-illustrated are not difficult for people world wide to cognise to the point where they can dance to the music and enjoy it without much cognitive strain.



However, if consciousness is able to attain recognition of a polyrhythm occurring, is able to comprehend the differences as a unified whole, and then is able to group all these differences into a pure and simple 'One', then consciousness will have attained the 'itself-of-polyrhythm' – the state where consciousness naturally is able to intuite the polyrhythm as easily as if it were an atomic-rhythm. If consciousness is able to satisfy these requirements, it will have apprehended the 'emergent' property of poly-rhythmic music, as the 'itself-of-polyrhythm' demands that consciousness comprehend the polyrhythm as a 'One' instead of as an 'Also'. Consequently, the perception of polyrhythmic music follows the similar dialectic as the discussion of salt: 'Thing' > 'Also' > 'One' > 'Thing' (see Part 1).

12 According to Billboard.com, Spears' single sold 117,000 copies after its first three days of sales in the United States.

To re-iterate, poly-rhythms are first experienced as a 'Thing', as just a piece of music; next consciousness apprehends more than one 'atomic-timeline' occurring and that they are both at a different tempo (difference). Next consciousness perceives these differences as a synchronized whole but is still aware of their difference as 'notion-of-polyrhythm' ('Also'). Finally, consciousness comprehends the polyrhythms as a unified pure 'One' where all difference is negated and the polyrhythm possesses an emergent quality, where the whole is greater than the sum of its parts, and thus comprehends as 'itself-of-polyrhythm'. All of this will naturally be grasped, by the consciousness at the level of 'itself-of-polyrhythm', as a 'Thing', where 'notion-of-polyrhythm' is negated and instead all its differences are taken as a pure unified simple phenomena. This emergent property is similar to the way a cube drawn on a two-dimensional surface is often not perceived as two sets of two-dimensional squares connected with lines but instead is perceived as a cube. Similarly, if atomic rhythms were to be understood at the level of 'notion-of-polyrhythm', consciousness would merely be realizing that all these meaningless atomic-timelines were in fact ordered but would have *no unified whole* of which to create meaning of this order. Therefore, consciousness at the level of 'itself-of-polyrhythm' would comprehend the truly emergent nature of polyrhythmic music that would not be the same for the consciousness that perceives polyrhythmic music at the level of 'notion-of-polyrhythm'.

Hegel writes that all knowledge seeks the same goal: “the point where knowledge no longer needs to go beyond itself, where knowledge finds itself, where Notion corresponds to object and object to Notion.”[13] Likewise, consciousness strives for 'notion-of-polyrhythm' to reach the level of 'itself-of-polyrhythm' in order to attain the emergent properties of polyrhythmic music so as to comprehend these kinds of rhythms as easily as consciousness would comprehending atomic rhythms. With the previously explained differences in conscious experience in mind, this level of perception allows people to appreciate polyrhythms as a meaningful experience rather than as a chaotic experience.

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13 Hegel, p. 51