

# Born to Swing!

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## 1. Heartbeat

“The heart swings!” jazz trombone great, Wycliffe Gordon told me recently.

“It does?” I responded. I had no idea. He then proceeded to sing the beat of our hearts.

Could this be real?

“Our hearts *swing*?” I wondered.

“Yes, we *all* swing! We all have it!” he said.

This was all in response to my question, “Why can’t some people swing, Wycliffe?”<sup>i</sup>

And, there it was right there. The key to it all just hit me over the head. It was then that it all started to make perfect sense. I began to listen to different recordings of the human heartbeat and found them all to swing. This is in us. Take a listen!<sup>ii</sup>

Upon hearing this, I just had to call my dear mentor and teacher, pianist and composer, Jim McNeely to tell him. He said, “Ah ha! We are born to swing!”

Let’s go back to the beginning.

Imagine swinging from tree to tree through a dense rainforest just like our closest living relative, the chimpanzee, continues to do today. We share 98.8 percent of their DNA.<sup>iii</sup> That’s quite a lot to have in common! Imagine the thrill, the excitement, the timing, the endurance, the rhythmic patterns you must flow through, the push and pull, the unexpected, and the many calculations involved in executing this task

of swinging. Chimps are the masters of improvisation. They are completely in the moment navigating through challenging situations with twists and turns. <sup>iv</sup>

What a beautiful image, swinging through the trees! Swinging for amusement, for expression, for survival. Remember how much fun it was to swing on a swing set? Remember how free it made you feel?

This all started with a conversation I had with my father, J. Bruce Gatchell. He was so frustrated because the wind symphony he conducts up in New Hampshire wasn't swinging the way they should. They were rushing and playing the "swung" eighth notes without the right feel. He was at his wits' end. For years this has been a problem he's been trying to tackle head on. He's made some progress, but it's still not quite right. He has tried everything to get them to lay back and unevenly split those eighth notes in just the right spot. Where is that sweet spot, by the way? My dad feels it is more in the dotted eighth and sixteenth note division. More of a Count Basie feel. Is that the only place it's felt? What about Miles, Coltrane, and the one who started it all, Louis Armstrong? Do they all swing in the same place?

Do you know where the word "swing" comes from?" jazz trumpeter, big band leader and composer Gerald Wilson asks David Schroeder in an interview in 2011. "Benny Moten came up with it. He had a great band in Kansas City and when Count Basie came through with the Pantages Show from New York City, he got stranded there, so Moten hired him to play piano. On their first record, they recorded a song called "Moten Swing," and that's where swing music got its start. Both Benny Moten and his brother Buster played piano, but they made Count Basie their star pianist and featured him on "Moten Swing," and the rest is history.<sup>v</sup>

And, then there's Duke, as noted by Christopher Washburne of Columbia University.

Swing became a necessary and vital element in the jazz style, as Duke wrote in 1932, "It Don't Mean a Thing..." It later referred to an era of jazz originating in the 1930-40's. Although originally associated with jazz styles, the term swing is commonly used among salsa musicians. Throughout the 20<sup>th</sup> century in NYC musicians have performed competently in both jazz and Latin styles.<sup>vi</sup>

There are, of course, many kinds of swing music within the idiom of jazz. These include ragtime, cakewalks, New Orleans, Kansas City, Chicago, NY Stride, and syncopated music. All of these forms have their own particular history and origins, but all are derived from the enslaved Africans brought over to the Americas.

I would be remiss if I didn't honor the art form of dance and how intrinsic it is to jazz! Swing dance and swing music go hand in hand. If it grooves, you want to move. I find listening to jazz in a concert setting, where I have to be rigid and just sit and listen, very uncomfortable. It goes against the essence of jazz. The heart swings, the music swings, the body swings. As tap great Jimmy Slyde said, "And still you must swing!"

This beautiful, complex, and rich art form, jazz, has eluded many fine musicians since the beginning. Musicians, even at the top of their field in classical music, often rush and misinterpret this music with great regularity. The articulation is off. The feel just isn't right. The emPHAsis is on the wrong syLLAble. Is it cultural? Is it learned? Is it innate?

“If you have to ask what jazz is, you’ll never know.” Louis Armstrong<sup>vii</sup>

I often have long conversations with my dad about rhythm, swing, the harmonic series, tuning systems, the complexities of tuning a piano and the equal temperament system we all conform to. This conundrum of swing my dad was dealing with prompted me to ask Wycliffe if this inability to swing was because we are binary beings, with two arms and two legs? One, two, one, two. Walking is so natural to us and walking in two’s makes the most sense, of course. We march in two’s. Is this triplet feel foreign? Is the idea of adding another beat or step, add another level of complexity, creating a feeling of something extra, something unnatural? And, if we do add that “extra” beat, why does it often elude some of us as to where it lies. To quote a Count Basie tune, why are so many of us “A square at the round table?”

And, yet, the heart swings. It’s the most basic and primal force within us. It is our engine. We all have it! Our ticker is not in a triplet feel as in a Viennese waltz<sup>viii</sup>, an Irish jig<sup>ix</sup>, or Flamenco 12/8<sup>x</sup>. It swings, as in jazz! Like Louis Armstrong’s “Dinah.”<sup>xi</sup>

Although, Wycliffe says everyone is capable of swinging, many simply don’t. Somewhere along the line, many of us lose this connection to the heart, to ourselves, to our spirit, and to our community. Does our militaristic world beat it out of us? What armies march in three, after all? Have we been indoctrinated to

conform, and thus ignore our hearts? Have many of us been brainwashed to follow orders, not ask questions, and not think for ourselves, not use our instincts?

Conformity is the antithesis of community, of soul, of freedom, of connection with the spirit. Splitting the beat in imperfect ways is so personal and unique. This experience goes against playing exactly what's written or someone else's way. Community is diversity. Culture is divinity. A community's diversity is its strength.

Once I could play what I heard inside me, that's when I was born." Charlie Parker<sup>xii</sup>

Music is your own experience, your own thoughts, your wisdom. If you don't live it, it won't come out of your horn. They teach you there's a boundary line to music. But, man, there's no boundary line to art. Charlie Parker<sup>xiii</sup>

As the extraordinary jazz pianist and composer, Alan Broadbent told me, "Jazz is healing." Why is this? Perhaps this is because it takes us to our ancestral home? Bill Evans said "It's not an intellectual theorem. It's feeling." Could this be why we feel so connected to ourselves and to the divine when we listen to it? Or why it simply makes us feel so good? Why does this intrinsic, uneven metronome in all of us get ignited when we hear various forms of swing. This music derived from Africa has held the world captivated, in the form of spirituals, gospel, blues, jazz, rock and roll, R&B, reggae, salsa, Afro-Cuban, bossa nova, samba, soul, funk, hip hop, neo soul, and more. This music that evolved from overcoming great suffering and adversity feels the most at home for so many.

In this thesis, we will look at our origins in Africa, the magical number of three, the golden ratio, and swing ratio measurements. We will also read thoughts and interviews I had with some extraordinarily insightful musicians.

## **2. Africa – The Beginning**

The beginning of swing. The beginning of us.

What is swing? When does music swing? Where does it originate? Is it learned, cultural, or innate? Did it start in the American plantation fields by enslaved Africans? Did it start in the black churches of the South, with spirituals and gospel? Did it start with Louis Armstrong? Or was it earlier? Much earlier.

Jazz piano great, Randy Weston, who has spent years living in different parts of Africa and studying with the elders of many tribes and regions says, “The ancient people say music is the voice of the creator and we’re just the messengers. And when that music goes out every one of you takes a different trip. And we have nothing to do with it. It’s a higher power... It’s spiritual music.”<sup>xiv</sup>

I have spent some time in east Africa, specifically in Ethiopia. Working with children making music and developing a music curriculum for their school and orphanage. While there I learned much about their culture and history. Ethiopia is the place on our planet where we, human beings, began. It is the cradle of humanity. Our earliest ancestors, the first bipedal beings are found in Ethiopia. This is where all of us originate. I visited the skeleton of our oldest ancestor, Lucy, from more than 3.2

million years ago. I learned that the earliest civilizations in Ethiopia inspired and influenced the great Egyptian empires dating back to 3100 B.C. These civilizations created the great pyramids, developed art, metal work, an independent writing system, mathematics, medicine, and agriculture. I heard some of the traditional music of the land and saw their dances. Much of it is in a shuffle feel and in three. It also has swing!

It's interesting to learn that many of the enslaved Africans kidnapped and forced to the Americas came from different regions and went to different regions, thus changing the rhythmic landscape and traditions accordingly. According to Ned Sublette's fascinating and thorough book, *Cuba and Its Music from the First Drums to the Mambo*, the majority of slaves brought to the United States came from Sub-Saharan Africa, where much of the music is in 12/8, a form of 3. Most slaves brought to Cuba, the Caribbean, and to New Orleans (commonly thought of as the northernmost Caribbean city) came from the Congo, where the rhythms are in duple. This shows why the music of these American regions has varying grooves.

Afro-Cuban and African American has much in common, but they're also very different from each other. The two musics came from different parts of Africa, entering the New World by different routes, at different times, into differently structured societies.

Two of the most essential characteristics of African American music do not appear in Cuban music: swing (by which I mean the 12/8-like feel of uneven eighth notes) and the blue scale (with those bent, inflected pitches). Cuban music has something

else: clave (a rhythmic key) and those undulating, repeating melodic-rhythmic loops of fixed pitches called guajeo, montuno, or tumbao.”

In these differences, African American and Afro-Cuban music reflect the grand contrast between the two great musical styles of Africa.<sup>xv</sup>

Even though the eighth notes are straight in Latin music, they still swing. It's the bounce and the lift that's there that gets people up and dancing. We find this swing in Reggae music, as well. This is a music that has captured the world! Reggae feels so good. It seems to warm the heart and put us at ease. It puts us in harmony with each other and ourselves, for instance, Bob Marley's "One Love."<sup>xvi</sup>

We also feel swing in music styles of calypso, bossa nova, samba, and traditional folk music of South America and the Caribbean. I remember playing Argentinian folk music with great flutist Gerardo Levy, of Argentina. The music notation wasn't anywhere near expressing the way we were to play it. It had to be learned aurally, which is the natural way. We need to listen and feel.

### **3. Three**

In the teachings of Greek philosopher, Pythagoras, music and arithmetic were not separate, as the understanding of numbers was thought to be the key to the understanding of the whole spiritual and physical universe, so the system of musical sounds and rhythms, being ordered by numbers, was conceived as exemplifying the harmony of the cosmos and corresponding to it. Plato's principle was that beautiful

things exist to remind us of divine and perfect beauty. Aristotle wrote that music imitates and represents the passions of the soul. <sup>xvii</sup>

Many other cultures have music in three beat feel as a subdivision or as a whole all over the world. Folk music is often in three. Much of the music in the early Christian church was in three to represent the Holy Trinity. Children all around the world skip. Skipping is in three! Pythagoras said of the triangle, “the most perfect geometrical figure, inasmuch as it was the first form complete in itself.”

“Ars antiqua” music or “old art” music in the 13<sup>th</sup> century in Europe, there were specific rules of composing.

All the modes adhere to a ternary principle of meter, meaning that each mode would have a number of beat subdivisions divisible by the number 3. Some medieval writers explained this as veneration for the perfection of the Holy Trinity, but it appears that this was an explanation made after the event, rather than a cause. <sup>xviii</sup>

In the 14<sup>th</sup> century, “ars nova” or “new art” broke the mold of triple meter and rhythmic modes. They went into duple rhythm and defied tradition.

The chief technical points at issue were 1. Acceptance in principle of the modern duple or imperfect division of the long, breve (and, eventually, semibreve) into two equal parts, as well as the traditional triple or perfect division into three equal (or two unequal) parts; and 2. The use of four or more semibreves as equivalent to a breve-already begun in the motets of Petrus de Cruce-and, eventually, of still smaller values. <sup>xix</sup>

Does this extra third beat represent the spiritual? Do we get away from that when we go into duple? Does three represent our connection to the divine? Does it encompass the meaning of soul? Does it connect us with each other? Why does so much folk music around the world live in three?

A considerable part of the traditional dance music of Sweden and Norway are in so-called *asymmetrical triple meter*—that is, the three beats in a measure are of uneven duration. In attempts to both interpret and notate this phenomenon, the intimate relationship between the music and the corresponding dancing is often emphasized. Also, in accordance with the view that musical rhythm is intrinsically related to body motion, it has been suggested that performers' body motion should be incorporated in investigations of rhythm structures in music featuring asymmetrical meter.<sup>xx</sup>

Irish Jigs are in 6/8 and have a lilt to them. Bulgarian folk music is unique in its complex harmonies and highly irregular rhythms. These kinds of rhythms, also called *uneven beats* or *asymmetric measures*, were introduced to musicologists only in 1886 when music teacher Anastas Stoyan published Bulgarian folk melodies for the first time. Examples of such beats are 5/8, 7/8, 8/8, 9/8 and 11/8, or composite ones like (5+7)/8, (15+14)/8 and (9+5)/16 – (9+5)/16. Native American music has a bounce and release.<sup>xxi</sup>

This idea of three in our universe is pervasive and endless:

Mother, father, child

Mind, body, spirit

Man, matter, mind

Heaven, Purgatory, Hell

Land, sky, water

Sun, moon, stars

Past, present, future

Solid, liquid, gaseous

Animal, vegetable, mineral

Length, breadth, thickness

Beginning, middle, end

Every truth has 3 aspects, (thesis, antithesis, and a resulting synthesis)

Philosopher Comte

U.S.'s 3 branches of government

Kant's "three principles of homogeneity"

The Great Pyramids

The Star of David – two triangles

Holy Trinity - Father, Son, Holy Spirit

The triad, built with stacked major thirds and/or minor thirds

The Golden Ratio 1.618

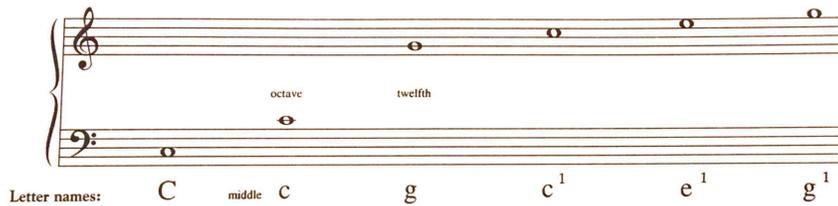
Fibonacci Series 1, 1, 2, 3, 5, 8, etc.

The dimensions of the Earth and Moon are in Golden Ratio relationship,  
forming a Triangle based on 1.618.<sup>xxii</sup>

Harmonic series:

The harmonic series is the basis for all of melody and harmony.

Common names:	Generating tone or fundamental	First overtone or first harmonic	Second overtone or second harmonic	Third overtone or third harmonic	Fourth overtone or fourth harmonic	Fifth overtone or fifth harmonic
Scientific name:	First partial	Second partial	Third partial	Fourth partial	Fifth partial	Sixth partial
If generating tone is x:	1x	2x	3x	4x	5x	6x
Ratio with C:	1:1	2:1	3:1	4:1	5:1	6:1
Cycles per second:	128	256	384	512	640	768



Example 1.1.  
The overtone series of C

Unlike the fundamental and its doubling, the fundamental and its tripling sound essentially different from one another – at least more different than the same. There is an energy in their combination that is not in a unison or an octave, some new feeling imparted by this waltzing in the tone world. This perception is worldwide: Cultures that name scale tones assign identical or similar names to octaves (tenor C and alto C) but different names to twelfths (tenor C and alto G). The two tones C and G clearly belong together: They are placidly eternally and utterly consonant. But they are different specifically in that we do not perceive the musical scale as beginning again at the twelfth tone. We have gone past “starting over” into something new.<sup>xxiii</sup>

The third partial is the beginning of harmony and bookends the almighty triad. It anchors harmony. The fundamental (or first partial) is the cornerstone, the twelfth (or third partial) is the keystone. There’s something about the number three. Three is exponentially more than one or two.

Gil Goldstein, jazz pianist, composer, and accordion great, has been instrumental in opening my eyes to the Fibonacci series and relating the ratios of the harmonic series to polyrhythmic patterns. 1:1, 2:1, 3:2, 5:3 and so on. These numbers relate to

the Golden Ratio and the partials in the harmonic series that make up the triad, the foundations of harmony. When asked where he felt the swung eighth notes were divided he said, "Just in the right spot!" Swing is elusive while at the same time, there is no mistaking it. It's felt!

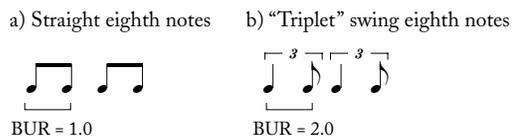
The Golden Ratio has been studied since the time of Euclid, a Greek mathematician considered to be the father of geometry, who grew up in Alexandria, Egypt. This magic number is 1.618. It occurs all over in nature and in great creations of beauty. You see it in the Egyptian pyramids, in the spiral of a seashell, in the climax of great literary and musical works, in the design of a leaf, in architecture, and with the third partial of the harmonic series, which is a fifth. This Golden Ratio is perhaps the definition of beauty and harmony. Leonardo of Pisa, also known as, Fibonacci, developed his mathematical theories after traveling through northern Africa. He then spread it throughout Europe. Again, we come back to Africa.

If we can calculate beauty, architecture, and art, can we calculate swing? Is there a mathematical way to explain it?

In my research, I have discovered there is a way of quantifying and examining swing on a technical level. These experiments were developed by Fernando Benadon. Dozens of musicians were studied and their swing ratio was determined from various recordings, making an average. I was astonished to learn that Louis Armstrong's swing ratio is precisely at the Golden Ratio! Yes, he swings at a Beat

Upbeat Ratio, BUR, of 1.61. No one else was calculated at this rate. The man who made swing an art swings at the Golden Ratio. Amazing!

Look at the charts below. His average swing is somewhere between the straight eighth note and the triplet eighth note. The Collier and Collier findings show Louis Armstrong's swing.



Soloist Swing Ratio BUR:

<p><b>Rose (1985)</b> <i>Solo breaks on fifteen jazz recordings from the 1940s–60s</i></p>	<p>Average BUR value: 1.43 Range of BUR values: 1.05 to 1.89</p>
<p><b>Ellis (1991)</b> <i>Common melodic patterns performed by three contemporary saxophone players</i></p>	<p>Average BUR value: 1.701 Range of BUR values: 1.474 to 1.871, declining slightly as tempo increases</p>
<p><b>Collier and Collier (2002)</b> <i>Stop-time solos by Louis Armstrong on "Potato Head Blues" and "Cornet Chop Suey"</i></p>	<p>Average BUR value: 1.61 Range of BUR values: not provided</p>
<p><b>Busse (2002)</b> <i>Swing ratio figures for 281 measures of eighth-note passages by three contemporary professional jazz pianists</i></p>	<p>Average BUR value: 1.74 Range of BUR values: not provided</p>
<p><b>Friberg and Sundström (2002)</b> <i>Swing ratio figures for three horn players and three pianists from six post-bop jazz recordings made between 1960 and 1990</i></p>	<p>Average BUR value: not provided Range of BUR values: 1.0–1.8, declining as tempo increases</p>
<p><b>Benadon (2006)</b> <i>Eighth-note passages in recordings of five bop and post-bop jazz musicians</i></p>	<p>Average BUR value: not provided Range of BUR values: 79%: 0.90–1.4; 19%: 1.5+</p>

Rhythm Section Swing Ratio BUR:

<p><b>Rose (1989)</b>  <i>Timing relationships among piano, bass, and drums on a Jamey Aebersold play-along record</i></p>	<p>Average BUR value: 2.38  Range of BUR values: not reported</p>
<p><b>Prögler (1995)</b>  <i>Swing ratio in Charles Keil's ridetap</i></p>	<p>Average BUR value: 3.4–3.7 at 120 bpm; 2.0 at 240 bpm</p>
<p><b>Friberg and Sundström (2002)</b>  <i>Swing ratio figures for four jazz drummers on six post-bop recordings made between 1960 and 1990</i></p>	<p>Average BUR value: not reported  Range of BUR values: 2.2–3.5 below 150 bpm; 1.0–2.8 above 150 bpm, declining as tempo increases</p>
<p><b>Collier and Collier (1996)</b>  <i>Ride rhythm performed by three drummers on a MIDI drum pad</i></p>	<p>Average BUR value: 2.36 (1.85, 2.23, 3.01)  Range of BUR values: ≈1.0–3.5 for tempos at or above 100 bpm, declining as tempo increases</p>
<p><b>Honing and Haas (2008)</b>  <i>Ride rhythm performed by three drummers on a MIDI drum kit</i></p>	<p>Average BUR value: not reported  Range of BUR values: stable at about 2.2 for tempos below 170 bpm; declining to about 1.2–1.7 as tempo increases above 170 bpm</p>

EXAMPLE 3. *A summary of empirical studies of BUR values within rhythm-section accompaniments*

The rhythm section swing ratio chart above has averages closer to the sixteenth note division, well past the triplet and past where most soloists place their swing. This creates a push and a pull. It's a propulsion, a progression, a forward moving drive that affects or is affected by the soloist. Alan Broadbent shared thoughts with me on swing as it relates to a band being in a sailboat trying to catch the lift of the wind while adjusting to each other. The sway, the swing, the compromise, the freedom.

There is another interesting study done on swing exclusively analyzing the drummer's ride cymbal. Anders Friberg and Andreas Sundström of the Royal Institute of Technology in Stockholm, Sweden took recordings of well-known drummers, Adam Nussbaum, Tony Williams, Jack DeJohnette, and Jeff "Tain" Watts, transferred them to a computer, and measured the ride cymbal strokes on spectrograms. The tempo of a given phrase was determined and they studied the time between two consecutive eighth notes. The article came out in the spring of 2002 and is called *Swing Ratios and Ensemble Timing in Jazz Performance: Evidence For a Common Rhythmic Pattern*. A swing ratio of 1 is equal to two even eighth notes. A swing ratio of 2 is equal to 3 eighth note triplets. A swing ratio of 3 is equal to a dotted eighth note and a sixteenth, just like the previous study. Here is the list of musicians and recordings used in this study.

TABLE 1  
Recordings Used in the Analysis

Recording	Year	Drums	Solo	Bass
John Coltrane <i>Aebersold Play-a-long</i> JA1244D	1983	Adam Nussbaum	NA	Ron Carter
Miles Davis <i>My Funny Valentine</i> CBS, CT9106	1964	Tony Williams	Miles Davis, trumpet George Coleman, tenor sax Herbie Hancock, piano	Ron Carter
Miles Davis <i>"Four" &amp; More</i> CBS, CT9253	1964	Tony Williams	As above	Ron Carter
Keith Jarrett, Gary Peacock, & Jack DeJohnette <i>The Cure</i> ECM 1440	1990	Jack DeJohnette	Keith Jarrett, piano	Gary Peacock
Keith Jarrett, Gary Peacock, & Jack DeJohnette <i>Standards in Norway</i> ECM 1542	1989	Jack DeJohnette	Keith Jarrett, piano	Gary Peacock
Wynton Marsalis Quartet <i>Live At Blues Alley</i> CBS 4611091	1986	Jeff Watts	Wynton Marsalis, trumpet Marcus Roberts, piano	Robert Leslie Hurst III

Only the soloists included in the selected excerpts are listed.

## RESULTS

The mean swing ratio for all excerpts is plotted in Figure 1. The general trend is an approximately linear decrease in swing ratio with increasing tempo. A few excerpts indicate an alternative approach at slow tempi with an approximately constant swing ratio of about 2. The largest swing ratios are between 3 and 3.5. This is a larger ratio than a dotted eighth note followed by a sixteenth note. The smallest ratios approach 1, that is, the eighth notes are played with equal duration. Note that this variation in swing ratio is not at all in agreement with the common idea that the swing ratio is close to 2, also referred to as "triple feel." This was the case for one particular tempo only, at about 200 bpm.

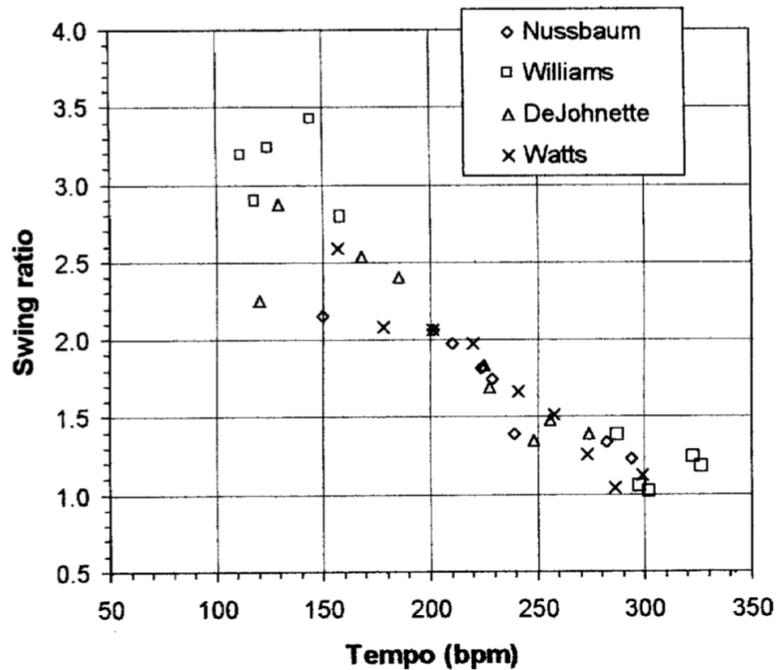


Fig. 1. Drummers' swing ratio as a function of tempo. All measurements are from the drummers' ride cymbal.

The swing ratios of each drummer are separated into four graphs in Figure 3. The drummers exhibit a surprisingly consistent swing ratio in view of the large differences in drumming style. Most of the differences between the drummers are found for tempi less than 200 bpm. Williams had the highest ratio values for the slow excerpts. Watts follows the same trend but there is only one sample that goes in that direction. Similarly, the ratios for Nussbaum flatten out for slower tempi, but there is only one sample there too. DeJohnette had one clear deviation from the general trend of a linear curve that suggests a deliberate change of swing ratio within the same tempo range. The difference between drummers was confirmed in a two-way analysis of covariance with drummer as one factor (4 levels), tempo as regression variable, and with swing ratio as the dependent variable. Not surprisingly, the influence of tempo was highly significant ( $F = 186, p < .0001$ ) but also the influence of drummer was significant ( $F = 4.4, p < .01$ ). The interaction of tempo and drummer was not significant ( $F = 2.6, p < .07$ ).

Included in Figure 3 are also the standard deviations for each excerpt. These intervals show that the variation within each excerpt differed between drummers. Williams had the largest variation in his slow tempi, and Nussbaum the smallest variation within each excerpt.

At tempos between 100-160 bpm, Tony Williams clearly was the most laid back in his swing, with DeJohnette next, followed by Watts, and then Nussbaum, who was the most like a triplet. At tempos 200 bpm and above, all four drummers were much closer in range, getting closer and closer to even eighths as it approaches 250 or 300bpm.

I find these findings to be fascinating. It's fun to listen to the recordings again with this in mind. Yeah, Tony is so laid back! He's playing with Ron Carter on bass, and Ron is so solid and laying it down. It's interesting to hear how they lock in together, when Ron catches the shorter part of the swung eighths with Tony and his resonance echos and bounces to our ears at just the right spot. Below are all the findings.

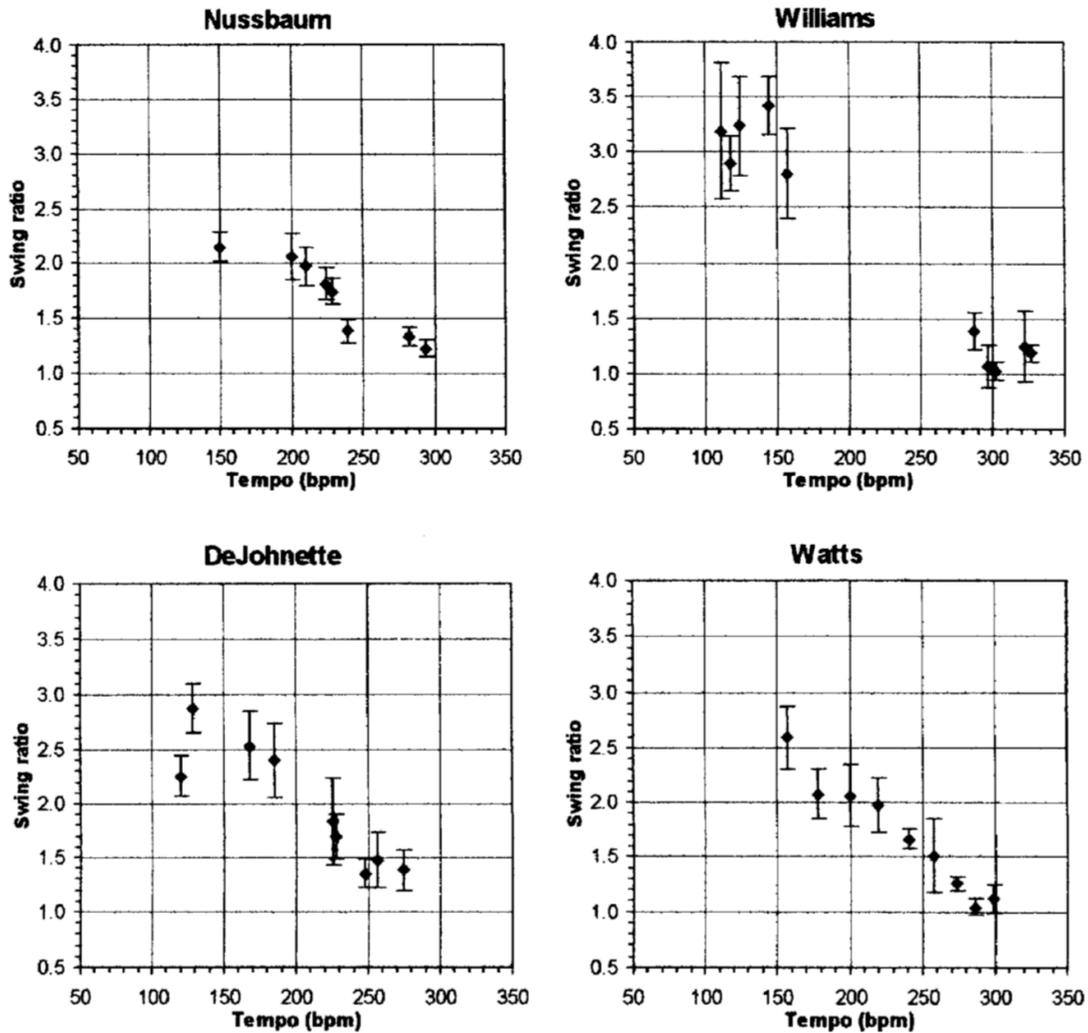


Fig. 3. Swing ratio for the four drummers as a function of tempo. Error bars show the standard deviation.

#### 4. Swing interviews

Here below are some interviews I've done with some very special people in my life. I wanted to hear their views on swing and find out what it means to them. Many of these people I've made music with on many occasions, whether it be on record dates, in a lesson, or playing together in my band. I cherish their thoughts, their musical expression, and their great musical prowess.

Gil Goldstein, legendary jazz pianist, accordion player, composer/arranger:

All of it comes from the overtone series, which begins with an octave that expresses the relationship of 2-1. But this doesn't yield much fruit as it just keeps spiraling upwards repeating the same note, ad infinitum. When we arrive at 2:3 or the fifth, the next interval formed. We have the basis of all harmonic music.

But related to this, that relationship is the expression also of the golden ratio; rhythmically as well as tonally. The fifth expresses this relationship in pitch and the 2:3 rhythm is the basis of African music, particularly, and has been adapted to jazz, and blues and rock....When you play the heartbeat rhythm you basically divide the 3 against 2 into time units of 2-1 as the first pulse is twice the length of the second....But as you showed me, the truly swinging placement makes the first pulsation a bit shorter so the division approaches the golden ratio....

And therein, comes the artistic expression of the triplet, heartbeat and feeling that gives the floating sensation known as swing.

Traveling up the overtone series, the next ratio is 4:3 which is essentially the same as 2:3 (4 just doubling it) and then the next important ration, in my opinion, is 5:3 which is the major sixth as both those numbers are from the Fibonacci series and even closer express the golden mean ratio....Continuing up 6:5 is an iteration of 5:3 and then the next important overtone/Fibonacci ratio is 5:8 which is another even further developed expression of the golden ratio and tonally is the minor sixth.

Jim McNeely, legendary jazz pianist and composer/arranger, Mel Lewis/Thad Jones

Big Band, Vanguard Orchestra, Stan Getz, Phil Woods, WDR and WHR Big Bands:

Louis Armstrong set the path for swing! Swing. If you were to shift Charlie Parker's eighth notes a full beat back, it would be more square. Swing is not just about rhythm. Swing is also the resolution of tension. Count Basie and Art Blakey bring tears to my eyes. Thad Jones shout choruses were so compelling because of their rhythmic and harmonic combination. Bob Brookmeyer would try to get his musicians to play even eighth notes in his later years. Oliver Nelson and West Coast Jazz was more legato with accents and more even eighth notes. Chet Baker had a smooth and even articulation and he swung so hard. Mambo swings. Bossa nova swings.

Art Blakey's shuffle made me cry. There's a special feeling to that shuffle. It swung like hell. "Pensativa" Clare Fisher as done by Art Blakey and the Jazz Messengers. <sup>xxiv</sup>

Mel Lewis had a lilt. Basie swung so hard. They way the band phrased together. They weren't tight but they were together. They would stretch the time in their phrasing. Blues in Hoss Flat chorus. Loose phrase. Loose and yet really together. The bass player is key. Quarter notes right down the middle of the road. The band phrases like a solo. <sup>xxv</sup>

1965/66 was my first time hearing Basie. Ellington played my freshman dance at Illinois. Basie had an effect on me unlike anyone else.

Stravinsky's 'Rite of Spring' contains seeds of every other kind of music in the 20<sup>th</sup> century to come, including heavy metal. The rhythm has a primitive quality to it, like a diesel engine throbbing away.

Stan Getz had an even feel like Lester Young. He played linear.

Joe Henderson would fly over the basic pulse hardly with any regard to it. Then he would grab on and lock in. Wynton Kelly. A lot of times his articulation was almost even, but my one word association with him is "swing!"

What makes a line swing? Articulation. Feeling of flexibility.

Victor Lewis sat back a bit and Marc Johnson pushed a little and that combination brought tension. It brought energy and excitement to the band. It creates tension that propels the band.

One night I was on tour with Mel Lewis in Europe. We went into a disco in the Alps of Austria on their night off. James Brown came on and Mel tapped his foot. Bernard Purdy, Clyde Stubblefield. Early R&B came out of jump and jive world. Soul, funk. Chuck Berry imitated Louis Jordan.

Thad's shout choruses are melodic. The third chorus makes the hair stand up on the back of my head on "A-that's freedom" by Hank Jones. After the third chorus, the audience always claps like it was a solo. Thad's shout choruses really made you tap your foot and shake your booty."

Alan Broadbent, legendary jazz pianist, arranger, composer:

Imagine the sailboat mast and sail to be jazz time and the wind to be the metronomic time. In order for us to get the boat to move, the sailors (our jazz musicians) shift their weight by leaning side to side for the sail to catch the wind. If one sailor leans to far, we all tip over; if we all sit in the middle, that

“life force” won’t go anywhere. But if we all find the right balance, the sail catches the wind and we begin to sail. Like a surfer finding the sweet spot in a wave that then carries him/her to shore. Carmen McCrae’s “Black Magic”<sup>xxvi</sup> or Billie Holiday’s “Life Begins When You’re In Love.”<sup>xxvii</sup>

All the great jazz players, lots of notes or less notes, have this relationship with the time. As Lennie Tristano said, ‘Jazz is not a style, it is a *feeling*.’”

Mike Richmond, renowned bass player for Miles Davis, Stan Getz, Toots Thielemans,

Kenny Wheeler, Jack DeJohnette, Richie Havens, Ravi Shankar, Mingus Big band

leader:

When I worked with the drummers, they would talk about the groove. They would play the grooves, different parts of the beat to play on. Which is really important. And, as a bass player, if you hook up with the drummer and you really hook up with the ride cymbal and your quarter notes are on the same beat, you’re gonna work with that person forever and they’ll recommend you for a million gigs. Billy Hart was one of the people that taught me to think about playing a little more behind the beat. So, you learn how to play behind the beat. All of sudden, you hook up with Mel Lewis. He played behind the beat. I’d play with Elvin Jones off and on. So Elvin was a real behind the beat kind of guy. Sometimes you have to play on top, sometimes you have to play in the middle, sometimes you play behind. The great horn players were like great drummers. Stan Getz played right down the middle of the beat. So you could get the time from his eighth notes. They were flawless. They were perfect. Miles had great time. Art Farmer had a great eighth note. Horace Silver, on the other hand played on top of the beat a little bit. So, you couldn’t go on top of the beat with him as a bass player ‘cause the tempo would rush. So you had to hold it down, ‘cause Horace was always on the edge of the beat. Knowing how to play on all parts of the beat. In each environment, you adjust your beat, according to the drummer and the gig. You have to know the rhythm section information. There’s a lot of material.

Etienne Stadwijk, keyboardist, producer of my record, *Camino Real*, played with

Richard Bona, Harry Belafonte, Kenny Garrett, Paul Simon, Marcus Miller:

What is swing? I just don’t know. It just feels right. Any style, any size ensemble, when it’s done right, it’s just badass. The difficulty with it is you

can't define it. It's not about being a great instrumentalist, but it does help. It's just swinging!

I don't think there's anything specific to explain. It can be obvious and easy to explain why it's not working. It's significantly harder to explain why something IS swinging. Often times when it shouldn't work and they're not locking in, it can still be swinging. Even if it's just one person. When you hear it, you just know it.

It has nothing to do with the facility of the instrument. If it was something teachable it would be a common occurrence. It's chemistry on multiple levels. It's there or it's not. Some people are just greasy. Others are trying to emulate the grease. Some aren't aware of the grease. It's an enigma. It's illusive.

I feel you can have a completely square beat and if it bounces properly, it swings. You know when you feel it. Can be any style, doesn't matter. Salsa, if it's swinging, you just can't get enough. It's not like they're better than the other band. Why are they swinging and the other band isn't? I definitely don't know. We're just happy when we experience it and we wait for it the rest of the time.

Leo Traversa, NYC Latin, Brazilian, world, jazz bassist, Michael Brecker, Don Byron, Astrid Gilberto, Milton Nascimento, Tania Maria, Janis Siegel, Bobby Sanabria, Chris Washburne SYOTOS, Anjelique Kidjo, David Krakauer, Aster Aweke, and Eileen

Ivers:

Swing to me is when music has a different kind of bounce or lilt. Swing makes music bouncier. You know lots of people use the word swing just when any kind of music has a great groove. It doesn't have to mean triplet feel. They use the word with Latin music even though it's straight eighths. I find it easy to mix Irish reels and jigs with Afro grooves because of the triplets.

Adam Jackson, jazz, gospel, funk, soul, R&B drummer:

Jazz, Funk, Soul, R&B, Hip Hop. It's all similar. It's all relative, in a way. You figure out how you want to interpret it and find your personal swing. You need to know how to lay way back and to be right on top of the beat. For that nice Basie swing, you gotta be molasses with your swing and be really relaxed. For Bebop, for Yardbird Suite tempos, you need to be on top of the beat more for more excitement on the edge. Bass should be relaxed and the drums more on top. For a Pocket/Funk band like The Meters, it sounds like

they ate a bucket of fried chicken and a bottle of whisky right before they played.

Now, a band like Tower of Power sounds like they're on cocaine or sober. It's intricate. They play on top of the beat but are also very funky. New Jack Swing is an extension of funk and has a happy church feel. They play on top of the beat. (from mid 80's to mid 90's, MJ, Janet, TLC, Bobby Brown)

Detroit Hip Hop J Dilla, Wavy, drunken laid back triplet. That 64-70% quantize swing feel. New York Hip Hop is swing right on top of the beat, in the pocket, driving things forward.

It's all relative. At the end of the day, it just comes down to feel. It seems so simple. It's something you have to spend a lot of time with. You have to approach Dilla, Ellington, Basie, Max Roach, Tony, and Elvin all the same way; listen and imitate over and over again.

The only way to get to know how to play on top, in the middle, or laid back is to listen, then put the metronome on at a  $\frac{1}{4}$  note (imitating the bass player.)

I, personally, am a visual learner and like to watch how musicians sit, relax, and move their body in a certain way. Gospel taught me to swing. Taught me to feel the music. There's a lot of amazing players out here that play the music, but can't feel it. There are drum clinics where drummers have incredible chops, but in a band setting they aren't musical. It all has so much to do with feeling. Growing up in the church, anytime I tried to play something fancy and choppy, my uncle or father would shoot me a dirty look. You are an accompanist. You have a congregation listening for a message inside the music. In order to deliver the message you have to feel the music. Listen to your teammates, your choir. There is a deeper purpose of what's going on.

I've learned to listen and feel before I learned to notate and transcribe. There should be a class in school about feel. You can play but you can't swing. Jazz is wavy, always fluctuating. It's not on the grid. When it comes to swing you want the person who can feel it over someone who can read it. Sit down with it and feel it first, then figure out everything else about it. A huge part of gospel music is feel. It's so deep and spiritual. You need to get into the space of feeling it, feeling where your brothers are coming from.

Mimi Jones, New York City jazz bassist, composer:

Swing to me, means the groove is in the pocket. Whether is 4/4, 3/4, 6/8... a traditional "swing feel", a funk groove, Afro Latin groove, gospel groove, etc. It's when the relationship between the up and down beats (syncopation) is

locked in and has found a cool place to settle. This pocket might include beats that are slightly in front, behind or dead center, or be of any tempo, (slow-uptempo.)

This alignment creates a synchronization that flows between us creating an undeniable urge to want to move, and lift our spirits.

Larry Lelli, New York City based drummer, Broadway & jazz:

Swing is attached to the heartbeat. It has a lilt. That's why we're so connected to swing. It's a rhythm we're so attuned to. It's so basic and primal. It's what connects us all. It's so powerful and why music is so powerful. It's all about connecting with other people.

Playing on Broadway you have to play more on top of the beat, without rushing, to energize things. The dancers need to feel that sizzle.

Fasil Wuhib, Ethiopian bassist:

I feel it and play it. I'm that kind of person and it comes naturally. That's a tough question. It's in us. Every kind of music has its own way of swinging, all of the cultures. Everyone has their own beauty."

Leon Lacey, r&b, pop and gospel producer, arranger, keyboardist for Janet Jackson,

Kim Burrell, Hezekiah Walker, Yolanda Adams, Wycliffe Jean:

Swing can be heard in both traditional and contemporary Gospel Music. In the traditional style, it's very easy to identify emotions that can also be felt in old African American spirituals such as, 'Swing Low, Sweet Chariot.' This feeling can usually be seen as the listener's body peacefully sways from side to side, as their face glows with hope, and their hands and feet tap usually in a cut time feel.

Vince Chericco, New York based Latin jazz drummer:

A lot of conga players from P.R. or Cuba play in duple rhythm. If you're playing with a jazz drummer it's like trying to put a square in a round hole. Ray Barretto knew how to swing on the congas. He grew up in NYC listening to jazz and Latin music. Drummer, Art Taylor was on a session with Ray and was worried ahead of time that the music wouldn't swing. But it did and Art was thrilled! They later went on to work together a lot.

Legendary conga player, Frankie Malabe, gave me the best lesson of his Latin career. We were doing a gig at Visiones. He told me to play the high hat on 1 and 3 and not 2 and 4, like they do in jazz. This changed my whole perception and I had to relearn everything. I couldn't do it well at first, but after a year or so of working on it, I got it. This feeling was brought home to me when I went to Cuba in 2010 and saw first hand how the Cuban feel is 1 and 3.

Hector Martignon, Colombian jazz, Latin, pianist, composer:

I don't narrow it down to the division of the eighth notes. For me, swing is a way to play that is not exact. It is an imperfection that makes music alive. In Spanish, they say, "That girl has swing!" "Esa chica tiene swing!" It doesn't refer to music. It means someone who makes things alive, someone who sways.

Evolution would be impossible without imperfection. This makes the stars possible, the universe possible. Perfection means sterile. It makes things die. Imperfection makes things evolve. Swing is the way you approach something that makes it better than it is. "It's your interpretation. Swing has to do with interpretation. A quantized computer plays perfectly and it's dead. Imperfection is beauty. That imperfection makes music alive in a conscious way. It makes it imperfect in a way that makes it beautiful.

It doesn't have to be a triplet. Straight 8<sup>th</sup>'s can swing. Jelly Roll Morton's version of Scott Joplin's The Maple Leaf Rag has a great swing to it.<sup>xxviii</sup> Morton called swinging 8<sup>th</sup>'s playing it with "the Spanish tinge" with the Spanish influence on the blues in New Orleans from the Spanish with a tango-like swing. He talks about it in the Complete Congress Recordings of Jelly Roll Morton.<sup>xxix</sup>

In swing you play around the beat in a different way. Not only rhythmically but in the harmonies and how you resolve them."

J. Bruce Gatchell, trombonist, music director, conductor:

You'll know when you hear it!

I think of it as a triangle with rounded points. When you look at big band conductors, they often conduct in a circular motion. This doesn't mean the ictus isn't precise. It leans towards the circle.

Basie had it all right. He exaggerated the triplet, meaning he made it a dotted eighth note and a sixteenth, making it real laid back. Duple is opposing. Triple is unity. It's connecting. When you put it in three, it connects.

Swing comes out of adversity, hope, and perseverance. Is the saying, "Good enough for jazz" derogatory? I take it to mean, you're taking a chance and making it work. Sometimes the outcome is stronger than it ever would have been if you hadn't taken a chance."

Elaine Gatchell, choir director, music theatre director, choreographer, producer:

"You feel it in your bones!"

I have to add Stevie Wonder's "Sir Duke" lyrics from his 1976 album *Songs in the Key of Life*.

Music is a world within itself with a language we all understand.  
With an equal opportunity for all to sing, dance and clap their hands.  
But, just because a record has a groove, don't make it in the groove.  
You can tell right away at letter A, when the people start to move.  
They can feel it all over. They can feel it all over, people.  
They can feel it all over. They can feel it all over, people.

Music knows it is and always will be one of the things that life just won't quit.  
But, here are some of music's pioneers that time will not allow us to forget.  
For there's Basie, Miller, Satchmo and the king of all, Sir Duke.  
And, with a voice like Ella's ringing out, there's no way the band can lose.

You can feel it all over. You can feel it all over, people  
You can feel it all over. You can feel it all over, people.

## Conclusion:

The one word everyone I've talked to about swing mentions is "feeling." This feeling of linking ideas and sharing your own individuality gives us a swing that's completely ours and completely unique. This internal metronome of life is our motor. It is our soul. It's our spirit. It's hard to even talk about it, because it's so personal and indescribable.

The beauty we, as a species, value over and over again stems from this uneven or imperfect division of the whole. We find perfection in the imperfection. Evenness lacks tension. Within the uneven division of the beat we find conflict and resolution, push and pull, tension and release, strife and rest, dissonance and consonance, and a sense of wanting to overcome adversity. The spice of life lies inside this flawed division. Swing has a way of connecting your imperfections and making sense of them. This leaning in, releasing, and bouncing off is our life force.

My hope in studying the origins of swing is to shed light upon the importance of jazz and other "swing" based music from Africa, and its vital connection to humanity and love. This divine, imperfect division of three, embodies our freedom of expression and our abilities to surmount challenges. I hope my findings will show that the connections we have to swing and to each other are all together physical (the heart), emotional, (the heart), and spiritual (the heart.)

i carry your heart with me (i carry it in my heart) e.e. cummings  
*Complete Poems: 1904-1962* (Liveright Publishing Corporation, 1991)

We all carry the hearts of our African ancestors in our own hearts. This heartbeat is something beautiful to listen to, to honor, to remember, and to experience in the present and to share with our children, lest they ever lose their innate ability to swing.

We are all born to swing!

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Wycliffe Gordon

Leo Traversa

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Gil Goldstein

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<sup>ii</sup> Human heartbeat <https://youtu.be/3do5nUV-hl8>

<sup>iii</sup> Human Evolution: Our Closest Living Relatives, the Chimps

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<sup>iv</sup> Chimpanzees swinging video <https://youtu.be/Nzle0SwKyb8>

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<sup>viii</sup> Viennese Waltz <https://youtu.be/NIFBWo-Cbz8>

<sup>ix</sup> Irish jig <https://youtu.be/gKGRqPXx6DQ>

<sup>x</sup> Flamenco 12/8 <https://youtu.be/d6ssiISV-CA>

<sup>xi</sup> Louis Armstrong's "Dinah" <https://www.youtube.com/watch?v=BhVdLd43bDI>

<sup>xii</sup> Charlie Parker, c. 1939 quoted in *Masters of Jazz*

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<sup>xix</sup> *A History of Western Music* by Donald Jay Grout Third Edition Norton & Co. 1960

<sup>xx</sup> (see, e.g., Blom 1981; Bengtsson 1987; Kvifte 2004)

<sup>xxi</sup> Native American music <https://youtu.be/cONbH0EnwDk>

<sup>xxii</sup> <https://www.goldennumber.net/solar-system/>

<sup>xxiii</sup> W.A. Mathieu from *Harmonic Experience Harmonic Experience: Tonal Harmony From it's Natural Origins to its Modern Expression* by W.A. Mathieu Copyright 1997 Published by Inner Traditions International, Rochester, VT

<sup>xxiv</sup> Art Blakey and the Jazz Messengers [https://youtu.be/cMtf2h\\_N7\\_k](https://youtu.be/cMtf2h_N7_k)

<sup>xxv</sup> Count Basie Orchestra – “Blues In Hoss Flat” <https://youtu.be/loT-xfYygQs>

<sup>xxvi</sup> Carmen McCrae’s “Black Magic” <https://youtu.be/z5rxpcZ6RrA>

<sup>xxvii</sup> Billie Holiday’s “Life Begins When You’re In Love”. [https://youtu.be/B4ZBv9b\\_mZY](https://youtu.be/B4ZBv9b_mZY)

<sup>xxviii</sup> Jelly Roll Morton playing The Maple Leaf Rag, <https://youtu.be/MEfW4sggZCk>

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