Historical Shifts in the Metric Organization of R&B Music:
A Case Study of Motown Albums, 1961–2005

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Hello. I'm going to talk today about the history of meter in R&B Music, and I'll structure my discussion in four parts: [NEXT] Part One: Background, Part Two: Methodology, Part Three: Some Statistics, and Part Four: Discussion.

[NEXT] First, some background. [NEXT] I want to start by playing the song "Poison" by Bell Biv DeVoe, which is a good example of contemporary R&B. As you listen, think about how you would categorize the meter of this song. [NEXT]

So what was the meter? [NEXT] I hope you agree that it's best to think of this song as in four-four. The tempo here happens to be around 112 BPM, by the way. But that's not the whole story. In particular, there is swing here, but it's not on the eighth notes. It's the sixteenth notes that are swung, which is especially noticeable in that snare drum part (One ee and ah, Two ee and ah). [NEXT] There is no way to incorporate sixteenth-note swing into the time signature itself, but it's an important part of the overall metric structure nonetheless.

[NEXT] In my experience, it's very easy to find examples of sixteenth note swing in contemporary R&B, from about the mid-1980s to the present day. [NEXT] And I assumed, as a result, it would ALSO be easy to find examples of swing on the eighth notes in contemporary R&B. [NEXT] But after a lot of searching through my Apple Music library and song books, I had—much to my surprise—a lot of trouble finding many if any contemporary R&B song with swing on the eighth notes. [NEXT]

So, to quote Marvin Gaye, "What's Going On?" Is eighth note swing truly rare in contemporary R&B? If so, there must have been some historical shift in meter, since—as far as I know—eighth note swing is NOT rare in the early years of R&B. I thus wondered, "When and how did this shift happen?" These are the kind of questions best answered with a corpus study, so that's what I decided to do.

[NEXT] This brings me to my methodology. When I heard this conference would take place outside of Detroit, I thought "What better way to look at the history of meter in R&B than in Motown songs, since Motown has played such a big part in the history of R&B."

[NEXT] Motown also makes for a nice corpus since it has a clear beginning and end date, from 1961 to 2005. Here, for example, are some albums from the Motown

catalog, from the Marvelettes to the Jackson 5 to Stevie Wonder to Lionel Richie to Boyz II Men to Erykah Badu. [NEXT] Overall, the Motown catalog includes 205 studio albums, which is what I used to create my corpus. I did not include any soundtrack albums or greatest hits albums or any of the other non-standard format album shown here.

Now I didn't listen to every song on these 205 albums. Statistics teaches us that we don't have to look at every single data point to get an idea for large-scale trends. [NEXT] So, for this paper, I divided the Motown catalog into periods of five years, which I call "pentades." From each pentade, I took 50 songs, randomly sampled without replacement, from the Motown albums during that five-year period. [NEXT] Of course, various substyles of R&B cross over and overlap these five-year spans. But this method should be sufficient to give us a sense of the big picture. [NEXT] So choosing 50 songs randomly from each of nine pentades gives a corpus of 450 songs total.

[NEXT] The main question I faced was how to categorize the meter of each song. That's not necessarily as straight forward as it may seem. Let's, for example, take the song "Higher Ground" by Stevie Wonder. The song clearly has a tempo of 124 BPM. But how you would categorize its meter? Let's listen. [NEXT]

I would guess some of you would say that this song is in twelve-eight, a compound meter. [NEXT] Here, though, is professionally published sheet music for the song, which says that "Higher Ground" is in four-four—not a compound meter—with a moderate shuffle feel. So in my corpus, should I say the time signature for a song like this is twelve-eight or four-four?

[NEXT] Let's actually take a closer look at this song. Here, for example, is the waveform of the drum part to "Higher Ground." Each beat lasts about 488 milliseconds. If this song were truly a compound meter, where each beat is divided into three equal parts, we would expect the long-short pattern to be in a two-to-one ratio, or about 325-to-163 milliseconds given the beat length. [NEXT] But that's NOT the timing here. Instead, the ratio is about 353-to-135 milliseconds. In other words, the "long" part of the beat is a bit longer, and the "short" part a little shorter, than a true compound meter. Let's listen to JUST the drum part of the song. [NEXT] Admittedly, the drum fills may be true triplets, but the long-short division in the main beat is not.

[NEXT] In part because of this issue, it's fairly normal for commercial musicians to deprecate compound meter at certain tempos. For example, in this textbook, the

authors write that "In popular music, compound meter is generally used only at slower tempos; when the tempo picks up, the triplet feeling is better defined as *shuffle* or *swing*." But that raises another question: What are "slower" tempos, and how do we know when the tempo picks up enough for us to NOT consider it a compound meter? Not having a clear answer to questions like this can create a problem for encoding the songs in a consistent way.

The good news is that these distinctions are somewhat moot if we reframe the original motivating questions. [NEXT] Rather than trying to determine the best time signature for a song, let's simply look at the rate of the kick and snare, and then let's consider [NEXT] whether the beat given by the kick and snare is divided into two equal parts or not. When the beat given by the kick and snare is NOT divided into two equal parts, we might call it compound meter or we might call it swing eighths. Either way, the working hypothesis here is that at some point in the history of R&B, the pathway on the right, shown in red, becomes much less common, especially given moderate or faster kick and snare rates.

[NEXT] Using this approach, swing sixteenth notes in a four-four meter would be categorized as NOT dividing the next level down in the metric hierarchy into two equal parts.

[NEXT] OK, let's now take a look at some results.

[NEXT] Here is a table of average kick-snare rates across all 50 songs in each pentade. For the sake of this corpus study, I'm going to take the rate of the kick and snare to be the quote-unquote "tempo" of the song, even though I've argued elsewhere that songs may be in half-time or double-time feels. I'll talk more about that later. I'm showing here both the median and mean tempo, mostly just to show you that the median and mean are about the same. The main thing to notice here is that songs in the 1960s seem to generally have faster tempos—and again, by "tempo" I mean the rate of the kick and snare—as compared to songs from later eras, like the late 1990s.

[NEXT] Here's one way to visualize this trend. In this chart, each pentade has its own boxplot showing the interquartile ranges of tempo. The black line in the middle of each box is the median tempo. The median moves around a bit, but it seems the generally go downward over time.

[NEXT] Indeed, if we do a linear regression on tempo versus year, we get a statistically significant negative slope, as indicated by the low P value, for those who

care about that sort of thing. But what I think we should care about more here is the fairly low R squared value, which is only point Zero-65. That means that the X-variable—the year—only explains about six and half percent of the variation in the Y-variable—tempo. That's a relatively small effect. In other words, despite the low P value, I wouldn't say with this data that the year of the song has much of a predictive effect on the rate of the kick and snare.

But of course, all songs and thus all meters are lumped together here, and that's potentially problematic. I wouldn't necessarily expect the kick and snare rate for a song in six-eight to be the same as the kick and snare rate for a song in four-four. So let's tease apart this data.

[NEXT] Here, for example, is a table of average tempos for songs where the kick and snare beat is NOT divided into two equal parts. In other words, it's either a compound meter or a meter with swung eighth notes. The interesting thing here is not actually the average tempo but rather the number of songs that fall into this category. In the early 1960s, almost half the songs—23 out of 50—have a kick and snare beat that is NOT divided into two equal parts. By the mid-1970s, though, that number starts to noticeably drop off.

[NEXT] Here's a line plot of that same data, which implies that my initial hypothesis may be true. We see lots of compound meter and swing eighths in the early 1960s, but then much less in later decades. That said, it's still problematic that I have lumped together both swing eighths and compound meter here, but I can tease apart this data even further.

[NEXT] Here, for example, is a linear regression of this same subset of songs—in other words, all the songs that do NOT divide the kick and snare beat into two equal parts—showing the year as a predictor of tempo. Notice that the regression line is flat, the p value is large, and the R squared value is very low. So with this subset of songs, the year offers no predictive value as to tempo. But that's probably because compound meter and swung eighths are lumped together here. In fact, we can see some clustering of the data here, showing evidence of how the use of compound meter and eighth-note swing changes over time. Remember, as discussed earlier, commercial musicians typically associate slower kick-snare rates, somewhere around 60 BPM, with compound meters like 6/8—which would be those points below that black regression line—whereas commercial musician typically associate faster kick-snare rates, like 120 BPM, with swung eighths—which would be those points above that black regression line.

[NEXT] So in the 1960s, circled here in orange, we seem to have a lot of songs in 6/8 AND a lot of songs with swing eighths. [NEXT] But in the 1970s, circled here in purple, we mostly get slow tempos, implying mostly 6/8. By the 1970s, therefore, eight note swing seems to disappear. [NEXT] Then in the 1980s, circled here in blue, 6/8 disappears, with the faster tempos implying swing eights. [NEXT] And then in the 1990s, circled here in green, we see a return of 6/8 and another dormancy for swing eighths. I admit that there are not a lot of data points after the 1960s, so it would be nice to have a different or bigger corpus to confirm these decade-by-decade trends. Nonetheless, it appears that while the use of swings 8ths doesn't entirely disappear after the 1960s, there may be certain eras—like the 1970s and 1990s—where swing 8ths were much less commonly used. Now what about swing sixteenths?

[NEXT] Well, here is a line plot of the percent of songs where the kick and snare beat IS divided into two equal parts, but the next level down, the sixteenth note if you take the kick and snare to be a quarter note, is NOT divided into two equal parts. In other words, these are the songs with swing sixteenths. It's pretty clear that swing sixteenths really started to become popular in the late 1980s and became especially common in the 1990s, with almost half of the songs in the early 1990s having swing sixteenths.

[NEXT] It's actually interesting to compare this line plot—now shown in red—with the line plot we saw earlier with the percent of songs that did NOT divide the kick and snare beat into two equal parts—now shown in blue. So compound meter and swing eighths were common in the 1960s and then decline, which is mirrored by a rise in swing sixteenths during in the 1990s. But in between, there is a valley during the late 1970s and 1980s, where compound meter and swing at any level generally disappear. You might associate these trends with the influence of certain styles, like disco, for example.

[NEXT] Now that we've taken a look at the history of compound meters, swing 8ths, and swing 16ths, let's revisit our linear regression of tempo versus year. Here is the same model as earlier, but now I have filtered out all the songs that could be considered to be in a compound meter or having swing at any level. In other words, this regression includes only those songs in straight four-four, where the the kick and snare is divided into two equal parts, and each of those divisions is then divided into two equal parts. The result is still statistically significant, as indicated by the low P value. But more important, the R squared value—which is almost point one eight here, shows—now indicates we have something between a moderate and a large effect size, conventionally speaking. In other words, if we just look at the

straight four-four songs, there seems to be a real trend of songs getting slower over time. [NEXT] I should admit that I'm not the first researcher to see a trend like this; Schellenberg and von Scheve, for example, found that popular music more broadly has gotten slower since the 1960s.

I think we can do better than trying to model tempo changes over time with a straight line, though. [NEXT] For example, here is a local polynomial regression on these same songs—the straight four-four songs. You can see that this model predicts a kick and snare rate of about 120 BPM for the early 1960s, which then flattens out from the 1970s through the 1980s at around 100 BPM. Again, we can probably associate this general tempo shift with different styles, like funk and disco. And then in the 1990s, it drops down to about 80 BPM.

[NEXT] OK, now for some discussion. I'd like to being by listening to one more song, again thinking about how we might categorize its meter.

[NEXT] The song is "Touch" by Johnny Gill, a good example of contemporary R&B from the 1990s. I think we can hear this song in two possible ways. [NEXT] One option is that the song is in four-four at tempo of about 61 BPM with swung sixteenths. That's what you'd get if you took the kick-snare rate to be the quarter note. [NEXT] But it's also possible to feel the quarter note at 122 BPM. In other words, we could hear the song as in a "half-time feel," with the kick-snare rate as the half note. Thinking about the song in this way would mean the swing would be on the eighth notes. In fact, that's basically the same tempo we saw earlier in "Higher Ground" by Stevie Wonder, where we had swing on the eighth notes. So we COULD call the swing here swing sixteenths at a slow tempo, but it's actually the same AMOUNT of swing in terms of absolute time as eighth note swing at a faster tempo. In other words, the "speed" of the swing is the same in this Johnny Gill song as it was in the Stevie Wonder song, even though the rate of the kick and the snare are very different. Let's listen. [NEXT]

[NEXT] With this song in mind—and this is my last slide—let's return to these two diagrams. In summary, this study does confirm my original hypothesis, that compound meter and eighth-note swing were common in the 1960s but then became less common as swing on the sixteenths increased in popularity during the 1990s. How might we explain this shift, though? Well perhaps the decrease in kick-snare rates over time is part of the answer. If there is some general preference for the speed of swing to stay within some window of absolute time, then it makes sense that when kick and snare rates slow down, there would be a corresponding shift in the level of swing within the metric hierarchy. In other words, swing sixteenths were perhaps

rare in the 1960s simply because at those tempos, the sixteenth notes are too fast to be swung, whereas in the 1990s, when the average kick-snare rate dropped to about 80 BPM, eighth note swing was just too slow to be viable. Of course, it's possible that the casual arrow points in the other direction. Perhaps the desire for sixteenth note swing is what caused the decrease in average tempo. But I find that causal direction less convincing, since the trend of decreasing tempo is strongest for songs without any swing. So as the kick-snare rate dropped for straight four-four songs, this shift impacted at what corresponding metric level R&B musicians felt comfortable using swing.

[NEXT] That's about all the time I have for my presentation. There's certainly more to think about and talk about, so I'd be happy to take questions or talk to you afterwards. Thanks for listening!