More Proof Music Is Growing Worse

Posted on 31 July 2012 by Briggs

New proof (which wasn’t really need) that popular music is, as has long been claimed, been growing worse has arrived thanks to the diligent work of Joan Serrà and his colleagues in the *Nature: Scientific Reports* paper, “Measuring the Evolution of Contemporary Western Popular Music.” From the abstract:

[W]e prove important changes or trends related to the restriction of pitch transitions, the homogenization of the timbral palette, and the growing loudness levels.

The central results could not have been summarized better than in the *Australian*, which correctly wrote:

OLD fogeys have long proclaimed it, parents have long suspected it, and ageing rockers have long feared that even thinking it would turn them into all they used to despise.

But it seems that believing today’s music is samey, boring and, well, just too loud does not necessarily make you a miserable reactionary. Rather, it is the scientific truth.

Before continuing, let’s snap our minds back to May of 2010, when Yours Truly posited a theory of Musical Badness.

Musical Badness (MB) quantified is this: the proportion of the time a length of music is devoted to repetitiveness.
Then in September of last year, Yours Truly and his Number Two Son computed one practical measure of Musical Badness, best summarized in this picture:

![Fraction Unique Words](image)

For the *Billboard* number one song of each year, we computed the number of unique words per song from which we formed the ratio of unique words to total number of words. The idea is that—on average—a song that is more repetitive is worse than a song which is more expansive in its use of lyric—or melody, harmony, or rhythm. As we then said,

Of the three songs with the lowest proportion of unique words, two are by the Beatles. 1964’s *I Want Hold Your Hand* (21%), and 1968’s *Hey Jude* (18%), which featured the lyric “na na na, na na na” sang 40 times. Simple to digest, no?

The other worst offender was a song called *Too Close by Next* in 1998 (18%), which featured the subtle refrain:

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Baby when we’re grinding
I get so excited
Ooh, how I like it
I try but I can’t fight it
Oh, you’re dancing real clos
Cuz it’s real, real slow
You’re making it hard for me
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(Incidentally, see also proof that it is global warming which causes musical badness.)

Return to the present, where I am delighted to report that the new work from Spain confirms one aspect of the Musical Badness measure, the growing simplicity, i.e. repetitiveness, of popular music. The *Australian* quotes study co-author Martin Haro, who said “The complexity of the pitch transition – chords and melodies – is simplified over the years...Right now, music is full of these simple transitions. In the Fifties, new chords were tried and we were more experimental... [music today] is less an artistic expression and more a commercial product. Old music was more expressive, more experimental.”

For their work, they used a dataset which included “the year annotations and audio descriptions of 464,411 distinct music recordings (from 1955 to 2010)” in genres “rock, pop, hip hop, metal, or electronic.” They looked at loudness, pitch, and timbre. The main findings are that:

> Yet, we find three important trends in the evolution of musical discourse: the restriction of pitch sequences (with metrics showing less variety in pitch progressions), the homogenization of the timbral palette (with frequent timbres becoming more frequent), and growing average loudness levels (threatening a dynamic richness that has been conserved until today).

The paper is clear and uses simple mathematical and statistical methods. The plots require some expertise understanding distributions, but all are crystalline and unambiguous: pop music has held the same structure over long periods of time, but individual songs are “one-note Johnnies” (with some hip hop offerings, this is literally true). These changes are not some subtle signal hidden where only advanced models can discover it. No. The decline of musical quality is plain.

And easy to place in time: the period of decline began in the later 1960s, which is no surprise to anybody.

Shown here is just one of their plots, proving popular music is
Popular music splitting more eardrums than ever

The authors say that the “evidence points towards an important degree of conventionalism, in the sense of blockage or no-evolution, in the creation and production of contemporary western popular music.” There is “less variety in pitch transitions, towards a consistent homogenization of the timbral palette, and towards louder and, in the end, potentially poorer volume dynamics.”

Yes, kids, you heard it right: get off my musical lawn!

This entry was posted in Culture, Statistics by Briggs. Bookmark the permalink.

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Comments

More Proof Music Is Growing Worse — 22 Comments

Big Mike on 31 July 2012 at 10:38 am said:

Commercialism drives this uniformity. Look at magazines at like

the supermarket checkout, which I think reflect the same phenomenon: There is little that distinguishes one from the other.

“Pop music” isn’t really music anymore, but a system of sounds analogous to a primitive drumbeat that signifies tribal identification.

If you want to hear modern music, try serious composers such as Arvo Pärt, Witold Lutoslawski, and Krzysztof Penderecki.

Briggs on 31 July 2012 at 11:08 am said:

Big Mike,

Thanks for the recommendations!

SteveBrooklineMA on 31 July 2012 at 11:25 am said:

I thought this article would appeal to you, Mr Briggs! What is real meaning of loudness though... if songs are louder now, can’t I just turn the volume knob down a notch?

Joey H on 31 July 2012 at 1:39 pm said:

SteveBrooklineMA,

You can turn the volume down, but at the same volume level, the signal is at a higher decibel. This increase in loudness (see compression) decreases dynamics, which decreases musicality by definition. It’s the same concept as television commercials blaring over the volume of the program you are watching.

If you are at a live show, however, you have no such control. I generally can’t go to live shows without holding my ears or wearing ear plugs; I don’t understand why people are not more protective of their hearing – once it’s gone it’s gone – unless we are collectively counting on advancements in hearing aids.

Ray on 31 July 2012 at 2:04 pm said:

One summer I worked at a radio station that played the top forty. They compressed the dynamic range to keep the radiated power up. The music didn’t have much in the way of dynamic range, but who cares if it’s the top forty. I worked in engineering and had to listen to that music 8 hours a day on the monitor. After that I loathed pop music.

Doug M on 31 July 2012 at 2:49 pm said:

The Hitch Hiker’s Guide to the Galaxy notes that Disaster Area, a plutonium rock band from the Gagrakacka Mind Zones, are generally held to be not only the loudest rock band in the Galaxy, but in fact the loudest noise of any kind at all. Regular
concert goers judge that the best sound balance is usually to be heard from within large concrete bunkers some thirty-seven miles from the stage, whilst the musicians themselves play their instruments by remote control from within a heavily insulated spaceship which stays in orbit around the planet – or more frequently around a completely different planet. Their songs are on the whole very simple and mostly follow the familiar theme of boy-being meets girl-being beneath a silvery moon, which then explodes for no adequately explored reason. Many worlds have now banned their act altogether, sometimes for artistic reasons, but most commonly because the band’s public address system contravenes local strategic arms limitations treaties. This has not, however, stopped their earnings from pushing back the boundaries of pure hypermathematics, and their chief research accountant has recently been appointed Professor of Neomathematics at the University of Maximegalon, in recognition of both his General and his Special Theories of Disaster Area Tax Returns, in which he proves that the whole fabric of the space-time continuum is not merely curved, it is in fact totally bent.

michael felong on 31 July 2012 at 3:55 pm said:

I’ll bet if someone studied film they’d find a similar correlation, not just in loud (obvious) but in frenzied cutting, less-sophisticated lighting, and simpler compositions: more noise, less information.

Speed on 1 August 2012 at 6:56 am said:

... get off my musical lawn!

And get a haircut.

It seems that one generation after another wants to go back to “the good old days” and believes that the next generation is going to hell in a handbasket. Yet ... civilization continues to get better.

Now, where’s my Walkman?

David on 1 August 2012 at 8:14 am said:

Despite Joey’s explanation, I still don’t see how loudness can define goodness, since ultimately, you can control the decibels that reach your ears (by setting the volume or refusing to go to a concert). I also wonder how Cold Play would rank with this approach...

Geckko on 1 August 2012 at 8:42 am said:
You really need to explain to me the concept of “music becoming louder”.

I for one have a volume control on every music playing device I own.

Geckko on 1 August 2012 at 8:45 am said:

And dare I say it... more extensive use of proxies to infer a true characteristic of interest.
Shall we file it with the tree rings?

Carmen D'oxide on 1 August 2012 at 9:32 am said:

But gangsta-rapper Snoop Dogg has turned to Reggae. Is reversion to the mean beginning?

DAV on 1 August 2012 at 10:33 am said:

So, what’s the issue? The increased loudness or lack of dynamic range? It isn’t hard to find classical music with limited dynamic range. Harpsichord pieces for example. Piano pieces despite the name, pianoforte, are also limited in dynamic range. If the complaint is merely loudness then that only matters when you can’t control the volume.

In your previous work, the number of unique words is used as a proxy for quality in which less variation means worse quality. By that criterion, pieces with zero words must really suck.

IIRC in another previous effort you equated quality to the number of chords. Using that system, be-bop with its rapid chord changes within a measure must be sublime while classical music pieces confined to only two chords are the pits. (Hmmm, if the pit under an outhouse is covered in lime the contents existing at the time of covering would also be sub-lime.)

Gregorian chants must really rate low as well with their limited dynamic range and limited variability in both word and pitch changes (the latter also implies limited chord structure).

I think a better proxy is time. It is most important when the music is filtered by nostalgia.

Face it, taste can only be measured subjectively.

Briggs on 1 August 2012 at 11:27 am said:

DAV,
“pieces with zero words must really suck.” It was the ratio of unique words to total words, which for no-word pieces is undefined.

Adam H on 1 August 2012 at 3:59 pm said:
When they say increased loudness, they mean more homogeneous dynamics. Fun fact: the technique producers use (called compression) is actually to LOWER the volume of the loudest sections of the music, then to increase the volume of the entire track. They’ll apply this to every individual track, then the entire mix. The end result is a wall of sound.

Oh, and then radio stations apply mega-over-compression AGAIN.

I think problem that drives this musical badness is that people don’t LISTEN to music anymore. They dance to it, they sing along with it, they use it as white noise, etc.

Stephen Dawson on 1 August 2012 at 8:33 pm said:

DAV, actually piano has an enormously wide dynamic range and can be difficult to record for that reason. It doesn’t sound like it does because as humans we judge loudness by short-term average, but the percussive pulse as the hammer strikes the string is immensely higher in power level than the actual tone.

Stephen Dawson on 1 August 2012 at 9:27 pm said:

Briggs, tsk, tsk. Many studies you report on here you properly shred for methodological errors. But not this one. Are we seeing just a little confirmation bias here?

The first place I’d start is with the source of the raw data used in the analysis. This is ‘The million song dataset’ referenced in Note 14 of the study.

But I have grave doubts about its validity simply from inspecting the loudness vs year graph you reproduce above.

The vertical scale on this is ‘dBFS’ which stands for decibels referenced to the full scale (thus the negative numbers on the scale, since full scale is 0). A decibel is a unit of measure for logarithmic ratios. When dB is used as a unit for actual loudness, it is properly called dBSP (Sound Pressure Level) and the reference for the ratio calculation is an extremely low power level, just barely audible.

With dBFS the FS is the 0 on the digital meter. Unlike analogue, this is a hard limit. In a 16 bit system, say, an audio level of greater than 32,767 cannot be recorded. It will simply be truncated to that.

Now, looking at the graph we can see that the database has songs going back into the 1950s. We know that commercial digital recording did not start until the early 1970s (probably using the Soundstream 16 bit, 50kHz system). We know that the first digital recording of popular music was made in 1979. We also know that digital recording of popular music did not become ubiquitous until at least the late 1980s, and probably into the
early 1990s.
So we know that all the songs in the first half the database were analogue recordings, later transferred to digital by unknown engineers using unknown criteria. Did they transfer at a low level to try to keep tape noise to a low level? Did they transfer at some semi-random level within the number space available on a 16 bit system? Did they transfer at a high level, dynamically compressing the music to fit, or even unknowingly clipping it?
What we do know is that CDs have been getting louder (is in, average level) over time … even for the same performances of the same songs! In general when a 'remastered' CD of older music is released, its average level is higher than the earlier version. This can actually involve the mastering engineer applying some dynamic range compression in order to get the average level up without breaching the hard 0dBFS limit.
But all these are engineering techniques, and have nothing whatsoever to do with the songs themselves, merely the way they are commercially presented.
In support of this explanation, inspect the graph. The curve shows a roughly linear rise from ~1955 to ~1975. It is then flat to ~1995 and then starts rising again.
In 1955 there were effectively no post-recording dynamic compression tools. Listen, for example, to ‘Swing Around Rosie’ (Rosemary Cloonie and the Buddy Cole Trio, 1958) or ‘Kind of Blue’ (Miles Davis, 1959) for recordings which are clearly technically challenged due to the equipment of the day, but are nonetheless lively because they are totally uncompressed.
But dynamic compression systems were developed and deployed from this time forward and throughout the sixties. The main consumer medium — vinyl — and the limited quality of mainstream playback equipment favoured the use of dynamic compression to allow clarity in the audio signal. A balance between purity and clarity would have been achieved by the early to mid-1970s, thus the plateau. By the mid-1990s, though, the 'jukebox effect' began to take hold as the CD became the predominant playback medium. This demanded that any random song should sound as loud (ie. short term average level) as the one preceding it in a jukebox. Or louder. Thus the escalating average levels.
An interesting study, perhaps, but one that must be taken with extreme care.

Incidentally, on the commercial dynamic compression of the music on vinyl, some enthusiasts actually used the dynamic range expansion facility of dbx companders (intended primarily for tape noise reduction) to attempt to restore something approaching the original sound. Generally the attempt was futile
for lack of any ability to properly calibrate the system.

Stephen Dawson on 1 August 2012 at 10:03 pm said:

I've republished my ridiculously long comment on my own Blog, here, with a link to the Million Song Dataset and the correct spelling of Clooney's name.

DAV on 2 August 2012 at 3:19 am said:

Stephan Dawson,
The pianoforte's name is a comparison to the harpsichord which has a more limited range.
The volume available is determined by the force applied to the keys which effectively translates to velocity. It is difficult to apply a heavy force in quick passages. Likewise (ignoring the soft pedal), in quick passages, it is difficult to drop to the minimum activation force (very soft). The full range is only practical during slow pieces with broad notes which can be quite boring when overdone. If you pay attention, the times when a piano plays over a full orchestra is when playing full chords which can be hammered unless the rest of the orchestra drops to pianissimo or mostly stops playing altogether. All in all, the dynamic range in the music is determined by the orchestra size and the orchestra must accommodate the instrument in focus. Even when solo, piano pieces rarely explore its full range. It's the net effect we should be interested in.

When the sustain pedal is pressed, previous notes will add to the volume.

"humans we judge loudness by short-term average"
It's the human perception that counts in this discussion.
"percussive pulse as the hammer strikes the string is immensely higher in power level than the actual tone"

2nd law of thermo predicts that but it's the tone that we hear.

"This demanded that any random song should sound as loud (ie. short term average level) as the one preceding it in a jukebox. Or louder. Thus the escalating average levels."

Not to mention that the milieu of a jukebox has a high noise level to start. The same places also contain people who want to be entirely numbed by the sound. Given, what's played on a jukebox is mostly popular, would alone account for the increasing levels of popular music.

DAV on 2 August 2012 at 3:30 am said:

Extra commas in the last sentence provided at no additional charge.
Stephen Dawson on 2 August 2012 at 7:05 am said:

DAV, sorry, I misread your remark. I see now that you wrote ‘piano pieces’. I was actually talking about something different: the technical difficulty of capturing piano notes. If recorded dynamically uncompressed, then the average level of the music sound is actually fairly low — a low value for loudness I expect on the metrics used in this study — in order to allow the percussive hit to fit under 0dB.

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