A Devil's Advocate Approach to
the Imposter Syndrome in Computational Music Research

Trevor de Clercq

I want to begin my brief talk by admitting that the imposter syndrome is something I have struggled with over the past decade, and I will give a personal anecdote about that in a moment. But my main goal today is not to try to mollify those feelings of insecurity by saying something like, "It's OK; we all feel that way sometimes; we're all smart, hard-working people; you can do it!" Instead, I intend to put forth a sort of devil's advocate argument. In particular, I would like to suggest that when we hear that little voice in our heads that says we are not good enough, maybe we should listen to it, at least in some cases. To be clear, I am not trying to sweep the issue of anxiety and its crippling effects under the rug. Rather, I am advocating for us to embrace that anxiety—to lean into it, if we can—in a way that makes us better scholars and deeper thinkers.

My own feelings of imposter syndrome began with the two papers I co-authored with David Temperley: the 2011 *Popular Music* article, entitled "A Corpus Analysis of Rock Harmony" and the 2013 *Journal of New Music Research* article, entitled "Statistical Analysis of Harmony and Melody in Rock Music." These were the first two full-length, peer-reviewed journal articles to appear in print with my name, and they were the only two major publications I had during the three years I was on the job market before landing my current gig. I can't say for sure whether it mattered to search committees that these publications were co-authored, but it was difficult not to feel somewhat insecure about that aspect of my CV. And frankly, I had good reason to feel insecure. Although I worked many hours encoding all the music for those corpus studies, and I had long discussions with Temperley about the structure of our work, at the end of the day, Temperley brought much greater knowledge about statistical methods to the table than I did. This was especially the case for our second article, in which there was mathematical language used that I did not fully understand at the time, such as the eigenvalues and eigenvectors of a principle components analysis. These feelings of imposter syndrome resurfaced once I got involved with peer review. As a co-author on two articles using statistics to analyze music, I was often asked to be a reviewer on papers employing fairly complex statistical methods that, to be honest, I often did not completely understand.

When reviewing these papers, I did my best to tailor my comments to the things I did understand, but it was nonetheless difficult to not feel somewhat underqualified.

Now perhaps what I am describing here is not technically imposter syndrome. Imposter syndrome, as I understand it, is the feeling of being a fraud despite the reality that you are not a fraud. But the reality here was that I was a fraud, at least to a certain extent, in that I did not fully understand some of the statistical tests in a paper with my name on it or in papers I was reviewing. From my own experience, I think it is in this gray area that a lot of us live when we use statistics in our published work—a gray area where we understand the tests on some level but have some underlying apprehension that we may not fully understand what is going on or what other methods might be more appropriate since we do not, most of us, have extensive formal training in quantitative methods or data analysis.

Instead of calling it imposter syndrome, therefore, let's simply refer to the feeling I am describing as insecurity about what you do not know, or simply "knowledge insecurity." I believe knowledge insecurity is actually a good thing for academics, generally speaking. It is the feeling of knowledge insecurity that perhaps spurred many of us to enroll in a PhD program. On some level, there may not be enough feeling of knowledge insecurity in our field, broadly speaking. My primary research area is popular music, and time after time I encounter assumptions that scholars bring to the study of popular music that turn out to be untrue or not appropriate. The danger of having a PhD in music theory—or any field, for that matter—is that it may lead you to think you know most of what there is to know. And maybe you do know most of what is currently known in your particular area of research. But the gap between what is currently known and what there is to know is gigantic, perhaps even infinite. That is to say, we should regularly remind ourselves that existing principles have limited applicability, and that other yet-to-be-discovered principles might better explain the musical phenomena we observe.

Getting back to music informatics, how should we address the particular feeling of knowledge insecurity as music theorists working with statistical methods? The answer is simple: We should learn as much as we can about these statistical methods if we are going to use them. The problem, of course, is that our time as researchers is limited. The more time I spend learning about various probability distributions, for example, the less time I have to spend studying the music itself. For some of us, there is a further complicating factor in that a fairly heavy background in math is needed before learning about statistics at an advanced level.

An introductory course in statistics for math majors requires three semesters of calculus—through multi-variable calculus, partial derivatives, and double integrals—as well as a course in linear algebra, which covers those eigenvalues and eigenvectors I mentioned earlier.

Now I don't mean to discourage anyone here. In fact, my goal is the opposite. The point of my devil's advocate argument is to encourage those of you who are feeling some latent knowledge insecurity about statistics or computer programming or whatever to do something about it, specifically through formal education. I realize this advice may come off as somewhat insensitive to people's work or family situations. If you are trying to finish your dissertation or are in the midst of your tenure-track hazing ritual, for example, there may be more effective uses of your time. But I think this general advice—that people should learn more about computer science and statistics—applies to everyone, not just music theorists in the music informatics interest group. It seems very problematic to me that in this day and age someone can graduate from high school and especially college without having taken a single course in computer programming or statistics. We live an information age, one in which computers and data surround us, and unfortunately high school and college curriculums have a long way to go to update what it means to be an educated citizen. We in this room have little to no power to fix these large-scale institutional problems, of course, but we can challenge ourselves individually to raise the bar on our own training and knowledge.

I'd like to conclude by talking briefly about my own solution to this feeling of knowledge insecurity. After years of trying to teach myself statistical methods by watching online videos or reading books—yet still feeling a lack of confidence about my statistical chops—I decided last year to take one statistics course a semester at my institution, MTSU, until I have finished the equivalent of an undergraduate minor or perhaps eventually an undergraduate major in statistics. I realize that not all of us have the luxury of taking a course a semester, especially since taking a course takes away from other things. I estimate that every three-credit class I take equals one journal article that I don't publish. But for me, that's worth it. In essence, I'm gambling that the investment now will pay off in the future. And even if it doesn't, the study of statistics is inherently interesting and frankly beautiful, as I hope you would agree if you are sitting in this room.

And even though I've only taken a few courses so far—I only started last Fall—I do feel like I have greatly improved my knowledge of statistical methods.

At our last music informatics interest group meeting, for example, I gave a short presentation about some research I have been doing on chord lengths in popular music. In that presentation, I mentioned that I was studying chord lengths in four different corpora of popular music, and I used a bunch of t-tests to examine whether chord lengths stayed the same, on average, across different tempos. I now realize, though, that an ANOVA might be more appropriate, and that I should at least be using some multiple comparisons procedures to compensate for the large number of tests.

So that's great: I learned a better way of providing evidence for or against my hypothesis. I must admit, though, that I still haven't written up that research for publication. Part of the reason is the feeling that maybe in another year or two, I'll have an even better way of analyzing the data. This is kind of a Catch-22 situation: The more you know, the more you may realize you don't know. I see this as related to what psychologists refer to as the Dunning-Kruger effect, where being incompetent at a task has been associated with strong confidence in performing well on that task because the person is so incompetent that they cannot even recognize how incompetent they are. In other words, you should be worried if you are *not* feeling insecure about your knowledge of statistics, because if you aren't, it may be a sign that you know so little that you do not realize how little you know.

So as we hopefully embrace and accept our feelings of knowledge insecurity, let's celebrate the good news that we know enough to at least realize that there are things we don't know. And that is something, ultimately, that we can address. So perhaps the goal of my talk here, after all, is to provide a "You can do it!" approach to imposter syndrome. But it's not the "you can do it" in the sense of, "Hey, you do know enough, just be more confident." Rather, the approach I am advocating is "Hey, this stuff is fairly complicated, but you can learn it; and if you do, I think you'll feel maybe not more confident but at least more knowledgeable." I don't think any of us here will ever feel completely confident with statistical methods, and perhaps no one ever should be. But I do hope we don't simply ignore that little devil on our shoulder telling us we don't know enough, because that little devil just might have a good point.

Thank you.