

Scales of ability: autism, music, and the need for flexibility in doctoral research

Working towards a Ph.D. can be a very diverse experience. Not only do people differ greatly from one another in their individual research fields, but one's whole method of working changes at different stages for the same individual. Looking back as I end my time as a postgrad student, only one thing has remained constant: the future is always unpredictable. The Ph.D. process is like a military operation, and it is said that no military plan survives first contact with the enemy. This is just as true when applied to a research plan and its contact with scientific reality.

Threatened by all this uncertainty, one piece of advice that I found helpful was, to find an area in which you can start doing original work at an early stage. Ph.D. examiners are looking for work of publishable quality, and besides, it is very motivating to know that you are exploring a new piece of science. Finding such an area may appear daunting, but I have found that this impression can be mistaken. However, it is necessary to be prepared for the possibility that your first effort may be a false start, and to change direction if necessary. Science, like warfare, requires flexibility and the humility sometimes to admit defeat: a strategic withdrawal, or at least a change of direction, may be essential.

At the outset, my own research looked at mechanisms of empathy. I used music to induce mood changes in participants, who were then tasked with deciding on the mood shown by a series of morphed faces, varying from obviously happy to obviously sad, with ambivalent ones in the middle. The theory was that playing happy music to the participants would make them more likely to decide that a neutral face was happy, and sad music would have the opposite effect. I found a positive result, and concluded that this provided evidence for a particular theory of how empathy works.

The experiment was a reasonable success, but unfortunately several other researchers were working on this simultaneously. After progressing through the experimental process and writing it up as a paper, I was "scooped" by the prior publication of a similar result. Fortunately, I had had a subsidiary experiment planned, involving the same task with a group of high-functioning autistic adults, who were predicted to show no effect; they were a kind of control group. The reason for this prediction lay in an evolutionary theory of the origins of music: according to this, human liking for music is based on the selective advantage given by music in its role in social bonding; in summary the tribe that plays together, stays together. People with autism have reduced or absent social ability, so it was predicted that they would be unresponsive to music.

My original plan, as I subsequently discovered, contained two flaws, which, fortunately, cancelled each other out. The first flaw, mentioned above, was the assumption that my hypothesis and research plan were original. The second flaw was to assume that the received wisdom on autism and music was correct. But that second flaw was precisely what was needed to give me an escape route from the problems created by the first one. After the disappointment of being scooped, I decided to look again at the subsidiary experiment, and the autism hypothesis. I found that the assumption of insensitivity to music in autism was supported by almost no empirical evidence. Three respected writers on music psychology had made fairly brief

references to this alleged insensitivity, either in published papers or book chapters, but when I explored further, the only evidence that they cited was an account by Oliver Sacks of a single case, that of a woman with autism who has no liking for music. Everyone seemed to have read this book, and to have cited the same example. Somehow, a few conversations with one individual had been transmuted into a widely accepted assumption applying to everybody with autism.

I still question why this assumption was made and why it had not been tested further. It could be that the evolutionary theory of music apparently *required* people with autism to be insensitive to musical emotion. Therefore anyone wedded to the evolutionary theory *had* to believe in musical insensitivity in autism, and would not consider it worth testing this article of faith. And secondly, the majority of music psychologists are focused on pure music psychology and do not investigate autism, which requires access to clinical populations.

So by this stage, I had found a research area, and a sort of research hypothesis, embodying the received wisdom, that people with autism “would not ‘get’ music” (in the words of one of the writers on the topic). I say “sort of” hypothesis, because it was clear that one way to achieve an interesting result early on, would be to show that this hypothesis was *not* true. We are all trained to assume that we need to have a clear hypothesis before starting research, but I would argue that it is just as good to have a plausible assumption that you can use as an anti-hypothesis – an Aunt Sally – and to attempt to prove it wrong. In my case, there would be a clear interest in taking the common assumption on music and autism, unsupported as it was by any real empirical evidence, and proving it mistaken. This may involve what appears to be an attempt to prove a null hypothesis, which again, we are all conditioned to avoid. However, proving that an effect, if it exists, lies within certain small limits (an assertion known as a “nil hypothesis”) is a perfectly valid aim.

The lack of previous work on music and emotion in adults with autism was a handicap in one way, in that there was little to base my own research on. This required a further change of plan, but it turned out to be a fortunate one. Instead of doing a quantitative study on empathy in autism, as per my first experiment, I decided to investigate how adults with autism experience music within a qualitative framework, using semi-structured interviews and an analysis method known as Grounded Theory.

In an area where little is known, qualitative analysis can be a very useful. I think of it like making a rough sketch map of a newly discovered country: once you have marked in the main mountains, rivers and so on, it is then possible to add to this basic sketch by measuring the distances between the main features and adding further details. But it certainly helps to have the sketch map first. In the same way, qualitative work can be invaluable in guiding later, more precise quantitative studies. The open-ended research question in the qualitative study (roughly translated as “what on earth is going on here?”) can then be refined into the sort of research hypothesis that we are all familiar with, in the quantitative follow-up. To take a simple example, you might, at the qualitative stage, identify X and Y as being the most important variables, and then, at the quantitative stage, test whether or not X correlates with Y.

To cut a long story short I found with my sample, twelve adults with normal intelligence on the autism spectrum, that most of them showed a highly-developed

interest in music. In some instances, music played an essential part in their lives, especially in mood-regulation. So much for the received wisdom: it was clearly in error. On the other hand – and this would never have come out of a quantitative study – the words they used in the interviews to describe the emotional reactions that they sought to induce in themselves when listening to music, had one marked characteristic. They all seemed to be variants on two basic states: excitement and calmness. There was little or no mention of the wider range of emotion words used by typical populations, as documented in numerous broad studies of musical emotion induction outside the autism context.

This provided the seed corn for the subsequent, quantitative part of my research, which involved looking at whether this apparent language difference was real, by using a set of standard musical items and comparing the autism group descriptions with a control group. It turned out that the difference *was* real, and was explainable in terms of a construct named alexithymia, or a reduced ability to find words for one's internal emotions. Alexithymia was already known to be common in autism. I also measured their physiological reactions to music using galvanic skin responses, and found no difference between the autism and control groups. My conclusion was that people with autism have the same ability as controls to respond emotionally to music, but that when asked to verbalise their responses, they are limited in their ability to do so, precisely in the same way as they are limited in describing any other emotion that they may experience. This result was publishable.

What conclusions do I draw from my own experience? Apart from expecting the unexpected, I would recommend that PhD researchers should never treat assumptions with reverence just because they originate from someone senior. All researchers probably need to have a rebellious streak in their makeup: science often advances, after all, by proving the cherished theories of distinguished scientists to be incomplete, or simply wrong. Another conclusion, when looking for a less crowded research area in which to attempt original research, is that one should look at the *boundaries* between established disciplines. Ten to one there are questions involving a crossing-over between different territories which nobody has looked at. If fusion cooking is the new nouvelle cuisine, fusion psychology could be one way forward for your psychology research. It worked for me to look at the crossover between music and adults with autism, because most music psychologists look only at music, and most autism researchers focus on non-musical topics in autism.

If all else fails, one can always try to narrow the research area by just adding more qualifiers to the definition of the population of interest and the phenomena you are considering. One can envisage a research area as a kind of Venn diagram, with the area you are working on defined as the intersection of a number of circles. The more circles you include, the smaller will be the area of intersection, and therefore the more chance there is that you will have defined something that is so precise, that nobody else will be doing exactly the same as you are. In my case, my first decision to look at the intersection between the music and mood induction circles gave too large an area. By including an extra circle, that of high-functioning adults on the autism spectrum, and focusing on music and emotion induction in this group, I discovered an area almost free of heavyweight competition. And for most of us, unless we are gifted with an unusual degree of self-confidence, that is probably quite a good place to begin.