

## How Does Music Produce Emotional Reactions?

### Description

The movie Arlington Road has perhaps the most unsatisfying ending ever. I saw it in 1999, and it still annoys the crap out of me.

A close second? 12 Monkeys. All that buildup, and I'm not sure how to interpret the ending. Argh!

Maybe I'm peculiar this way, but when I invest 2 hours of time in a movie, I like to see an ending that feels rewarding in some way. It doesn't have to be a happy ending per se, and it's also not much fun if the ending is totally predictable. It just has to be a satisfying resolution to the buildup of the last 90-120 minutes.

Like The Usual Suspects. Best ending ever.

Umm...what do best/worst movie endings have to do with music?

Well, have you ever wondered why music can engender strong emotional reactions in us? Why we like some music and not others? Why some performances have an emotional impact, and others don't?

Researchers in cognitive science and music psychology have wondered the same thing, and there may be lessons to be learned from storytelling and filmmaking, that can help us elicit a stronger emotional reaction from our audiences as well.

### Babies and patterns

From the moment you were born, you began organizing your experiences into templates (or "schemas") about how the world works. You began identifying patterns, and using your growing understanding about these to predict the future.

As in, hmm...when I whimper, a soft cuddly creature who smells nice comes and pays attention to me. When I cry, things kick up a notch and I get pampered with food, clean diapers, and bouncy rides. And when I scream, it seems to be the same drill as crying, except I get faster service.

Over time, as we accumulate more experiences and conduct more tests of the world around us, we become increasingly sophisticated about what we can expect in the future. Our internal library of templates and probabilities thus helps us navigate the world more smoothly.

For instance, when you go to a restaurant, past history suggests that you wait to be seated, order, eat, and pay.

So when you encounter a restaurant which requires you to pay first, then find some food, and then find a seat, it can be a little confusing and anxiety provoking.

## Expectancies and emotions

Not only does our library of expectancies help guide our actions on a day to day basis, it also plays a role in our emotional experience of the world around us.

For example, when I order my favorite chicken/mushroom/jalapeno pizza from the restaurant down the street, I've come to learn that there are three possible outcomes I can expect.

One, the pizza arrives, and toppings, crust, size, temperature, etc. are just what I've come to expect from this place. No complaints. Expectations are met, I'm content, and that's not so bad.

Or, I get the pizza, and it's bursting out of the box because the pizza guy made it extra big. It's loaded with extra chicken, it looks especially yummy, and I'm like, YES! Awesome! I feel pleasantly surprised, delighted, and am psyched about my pizza.

Or, I get the pizza, the edges don't even touch the sides of the box, the crust is burnt, seems thinner, and there are gaping chicken-less spots on the pie. I feel a bit annoyed and disappointed. I mean, where's the missing ~18 square inches of my pizza?!

## Satisfying or violating expectations

Neuroscientists are finding that music can give us pleasure (or not) in much the same way as my pizza experience.

How?

Well, it seems that our past listening experiences combine to form our own unique internalized personal music library. A set of templates and expectancies about the rules and structure of music, ranging from pitch to timbre to volume to melody/harmony/rhythm/etc. Essentially, an intuitive sense of what sorts of sounds we can expect to hear, and how these sounds are likely to unfold over time.

The essence of music, and what appears to make us have an emotional reaction, are thus the "positive prediction errors," or the unexpected, delightful surprises that we didn't see coming. Aural events that violated our expectations, and provided us with something better than what our predictions led us to believe we would be forthcoming.

The way this is done in music, is much like it is done in storytelling.

By leading the listener down a path...

Creating an expectation of where the path is likely to go...

Building up the anticipation...

And heightening the suspense...and delaying the inevitable...wait for it...wait for it...

...before finally revealing that their expectations were right.

Or instead...by surprising the listener!

Setting them up to expect a particular resolution, but revealing something way cooler instead. Something that they didn't see coming.

What's really intriguing about all of this is that the key part of the music listening experience may not be just the emotional high points per se, but in the build-up *which leads* to those moments.

Case in point, a recent neuroimaging study out of McGill University found that the neurotransmitter dopamine was released not just during the so-called "peak emotional moments," but also in the *build-up* to those moments a few seconds prior.

## Anticipatory pleasure

Think about the last time you had plans to do something particularly exciting and fun on a weekend. Much of the emotional benefit of having plans in advance lies not in the fun activity itself, but in the emotional boost you get from *anticipating* and looking forward to your fun evening out.

Like the last week before going on a long-awaited vacation. No matter how stressful or difficult a week of work you have, it doesn't seem to feel as bad, because you're so excited about the upcoming trip. The vacation may even end up being a total drag, but it doesn't change the fact that you gained a great deal from the uplifting period of anticipation beforehand.

## Take action

Think about your music in terms of tension and release. Anticipation and resolution.

What happens when you focus more deliberately on increasing anticipation? On having fun with the audience and leading them down the path you want them to take, knowing exactly what they are likely to predict, and then subtly (or not so subtly) delighting them with a surprise that only you knew was coming?

Totally unrelated, but I'm curious and on the lookout for a good movie to watch (hmm...is that abuse of the blog?). What are your picks for movies with best/worst endings ever? Share below...

## Additional reading

Read about the study here: [Why Music Makes Our Brain Sing](#)

Check out the audio clips subjects listened to, and how they ended up ranking in terms of popularity (#1 is definitely more appealing than #60, but there's something entertaining about #60 too...): [Audio clips from music reward value study](#)

Lady Gaga totally gets it: [Lady Gaga interview with The Telegraph](#)

And for fans of Lost and J.J. Abrams, check out his terrific TED talk, which gets at this from another angle.

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### **Date Created**

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