

>> From the Library of Congress in Washington, D.C.

>> I'm Steve Menteur [Assumed Spelling] for the Library of Congress, with our podcast today on Music and the Brain, another in our Series. And I'm joined by Professor Michael Kubovy, a Professor of Psychology at the University of Virginia, and also by Judith Shatin, who is also a Professor, she's the Kenan Professor of Music at the University of Virginia, and they're about to give a presentation here at the Library on the Mind of the Artist, and talk about how music and the brain and their research correspond to some of the other things we've been hearing over the last few weeks. Judith and Michael, you are teaching a course at the University of Virginia together, called Mind of the Artist, can you tell me the genesis of that course and how it works with the two of you teaching together?

>> Judith Shatin: The Genesis is that the University of Virginia did a call for courses that were interdisciplinary as part of a program called Teacher for a New Era, and the idea behind this was to prepare outstanding teachers for K through 12 education. It was supported by the Carnegie Foundation, the Annenberg Foundation, and the Ford Foundation. And Michael and I for the first year of the three that we did this were also joined by our colleague, David Summers [Assumed Spelling] in the Art Department. And we were very excited about the prospect of doing an interdisciplinary course that would give students a deeper sense of what it is that artists do, the kinds of thinking that goes into making art, and we created a course in which we grapple with a number of issues -- the origins of art, issues of biography, how those affect us. Michael, you might want to add some, as well?

>> Michael Kubovy: The general theme was to try to counteract people's impression that creating art is like purging yourself, that is you are just dumping emotions. A film comes to mind, Dead Poets Society, where the recommendation to the budding poet is to be in touch with your feelings and rebel against your parents and then you'll be a good poet. Well, what we were trying to argue throughout the semester is the way in which artists do have minds, it's not just emotion. So we took the question of what it means to be a genius, for instance, and showed that the notion of genius is at the intersection between an individual's talent, the judgment of gatekeepers and the judgment of an audience. It's not a personal property, that you are a genius. You're deemed a genius because you do have certain skills. Gatekeepers think so and the audience responds. It's those kinds of analyses that we engaged in, in addition to the kind of things that we will be talking.

>> Judith Shatin: We also looked at the history of some of these notions. Very few people think of the fact that the association of genius with great talent is relatively recent, and that in the times of the Romans you were born with a genie who would stay with you and help develop your character. And what we've come to think of as genius is really post-Renaissance and, in particular, 19th Century, the idea of the great individual. So looking at some of these concepts and what their historic origins are or inspiration and how that went back to the Ancient Greeks and the idea that you were taken over by these demoniacs. So looking at those and helping people to understand that even the way we contextualize

the creation of art is historically constructed and how in many societies they don't even have a special concept of making art, art is part of what your daily function is.

>> Did your students seem to change from the beginning of this course to the end, do you think they sort of got it and made a big change in their lives and their thought?

>> Judith Shatin: Well, we certainly heard from some of them. It's, of course, hard to know whenever you're teaching a course exactly what the affect was, but we did teach this course three times. We are not currently teaching it, but it was very interesting and I personally, as an artist, have had the response that Michael was talking about. Sometimes in surprising situations where people seem to think that it really is a question of just spilling out your emotions and do not have an understanding of the kinds of technical development that one spends many years learning.

>> So as I was thinking about this it turned out that this morning I turned on my iPod and the thing that seemed to be queued up to go next was Peter and the Wolf. And it got me to thinking about meaning and music because all of sudden a voice came on and said, okay, the flute is a bird. And then you heard the flute doing a bird-like thing, and then it said the oboe is a duck, and it pretty much went quack, quack, quack, and so forth and so on. And that seemed to me to be one way that music could be said to have meaning, but obviously there are lots of other ways. So why don't we start perhaps with the Peter and the Wolf example, if you don't mind, and then let's take off on a conversation together?

>> That sounds like a good idea. So one of the things that we're planning to talk about is a series of experiments that people have been doing, trying to find out to what extent music resembles language. The main experiment that I'm going to talk about is a beautiful experiment in which the researchers recorded EEG.

>> Electroencephalogram?

>> That's right, and they used a technique called event related potentials, that is they did this by averaging many, many traces of EEG. And the point of the study was to see whether music can evoke the same kind of brain response as language. And this experiment is so cleverly designed because what they did was to use a phenomenon called priming, which is if you are expecting a certain word it takes you less brain power to process the meaning of that word. So they set up this expectation and found that the brain responded accordingly with words. Now take the word wide and present music that sounds broad, that sounds wide. And then they show the word wide, and look at the brain activity, and it's exactly the same as if you had primed with a sentence like his eye scanned the broad horizon, exactly the same response. So that is the key experiment that I'm going to be describing in some detail to argue that there's some surprising similarities between language and music.

>> Okay, now tie this up for me with my first example, if we said, okay, the bird sounds like this flute, and then he said bird, and then you hear

the flute doing something bird-like, and then he says, okay, the bird was this flute -- you could look into the brain and you could substitute the flute for the word bird and see the same activity, is that what you're saying or is it something different?

>> Judith Shatin: It really depends I think on what specifically the instrument is doing. So I think in your example it's quite lovely because it has a light quality, a very facile quality, and the specific sound evokes for us the sound of a bird, whereas, the oboe has a nasal quality, it's used in a lower register, and so there are elements that that shares with the duck, there's the nasality of the sound, I think there's a relationship. So we're going to be speaking about several different kinds of levels of ways in which music can share meaning with both our experience of other, how objects move, how we perceive things in the world. And in the particular example you're describing and this is done very consciously as part of a narrative, so it would be called program music. But I think one of the things to remember here is that it's very inventive for him to have figured out exactly how to use the instruments because you can, of course, use the oboe to make very different kinds of sounds that are very elegant melodies and very smooth sounding, and I think most of us would be very unhappy with the comparison to a duck and, in fact, it would be incorrect for many of the things that they do.

>> Michael Kubovy: Okay, now let me add something.

>> Please, Michael?

>> Michael Kubovy: There's some very interesting studies, about why one would use a bird, a flute to represent a bird? So if I play a high pitched sound that's coming from a speaker behind a screen, and the placement of the speaker is neither high nor low, but I tell you that this sound, I ask you is this sound coming from a speaker up above or a speaker down below? People are going to think that it's coming from high up. So, actually, there's a correspondence between the quality of the instrument and where one thinks it's coming from. So the bird in the progophiac [Assumed Spelling] example is perfectly suited to a flute because both seem to be high up.

>> But let me ask you what would be the counterargument for me to say let's say we have a sound on the drum that's going to be loud and harsh, and then I'm going to say that this represents pain? To me, that's -- you could think maybe that's Pavlovian, that you're going to represent these two things, you're going to connect them, and they don't necessarily have anything to do with a connection, other than the one we're telling you they have.

>> Judith Shatin: Well, I think that refers to what we're going to be speaking of as associative links because, for instance, one of the other beautiful examples in this study that Michael was mentioning had to do with this, as well. For instance, that we associate fanfares with the notion of king because we have experienced that multiple times, so I think that if you made -- first of all, it would have to be very loud and at a certain level, of course, with the decibel level of 120 or more it is painful, but a loud drum in and of itself isn't necessarily painful,

so it also depends a lot on the context, what's the music around it, what's the speed, is it hitting metal, is it creating a sound that we've experienced as being painful? Because if you simply tell us this is representing pain, unless there's a believable connection from something we've experienced we may not experience it. So I think there are the two elements, whether we have some kind of associative experience that enables us to make the connection.

>> Michael Kubovy: So, for example, if you think of the shower scene in Psycho, where you have these violins producing glissandi that are very dissident, it feels like a knife is cutting into you, that sounds like a sharp pain. And that issue of something that sounds like an experience is an absolutely fascinating issue, that is how is it possible that something sounds like something feels? There are some very interesting studies on cross-modal influences, that is how visual information affects auditory information or how auditory information might give rise to visual imagery or bodily feelings, and that's another thing that we're going to be talking about, which is music being embodied in one way or another, and we will address that issue, as well. So, in fact, we've already covered the main types of relationship between meaning and music in the few minutes that we've been talking.

>> Okay, that's fascinating. Now is there some pushback? It seems to me that the idea that music has extra musical meaning is not without some controversy. Have not there been critics and composers and musicians and others ...

>> Judith Shatin: Of course, but I actually don't even know that I really like the term extra musical, as though it's something else that's added in. As a composer, myself, I've, of course, thought a great deal about these issues, and even when I am composing music that is I guess you would call it absolute music, if you want to go by the old absolute versus program music, I am struck by how the shapes and designs that I work with, even though they're abstract may have elements that still partake of narrative shapes and, or of shapes that we have experience with. And because of that the examples that I'm going to be talking about are drawn from my own music because I've found retrospectively looking at it that even pieces that didn't have that kind of intentionality still give rise to that experience, not only from me, but for other people who have listened to them. So there's a sense in which I've come to think of all music as being in a sense program music or in a sense embodying aspects of our experience as bodies, as experiencers of the world.

>> And when you talk about musical shape, are you talking about things like something that starts on a low note and goes to a high note, something that starts quiet and goes loud? What are the elements that you consider to be part of musical shape when you're thinking about this?

>> Judith Shatin: Musical shape has to do with register, as you've just mentioned, with timbre, with tempo, with density, with volume, with contour, really the whole complex web of how music unfolds is what I take to be its shape.

>> And, Michael, your research I imagine has made a connection between the musical shape and our expectations and our experience?

>> Michael Kubovy: Well, I've been working on several very interesting problems that are not about music, per se, that is the way I think about my work both on the psychology, visual art, and the psychology of music, is that I'm studying the cognitive foundations, that is what mental apparatus do we need in order to perceive music, to parse it, to understand it. Let me give you an example, if you think about a pattern of sounds, like clapping -- now if you repeat this over and over again, typically people will hear the beginning of the bar at the beginning of the three-note group. So there are some ways in which the mind automatically parses the musical pattern, the rhythmic pattern. Now what I'm particularly interested in is the issue of ambiguity in parsing of music, so I create patterns of this type and play them to people who then have to indicate what the beginning of the pattern is. And what I've been doing with colleagues is try to understand what the mechanism that the brain is using to reach the conclusion that this rather than something else is the beginning of the bar. Now it turns out that the results that we're getting reveal a very interesting similarity between finding a contour in the visual world and a contour in the temporal flow of music. So by using information theory, which is a mathematical theory of where we are picking up more bits of information and where less, we've been able to construct a theory that actually predicts where the bar will begin and actually predicts ambiguities, so it fits and the same kind of phenomena occur in the finding of contours because contours can be very noisy, can be unclear, can be fuzzy. And so the visual system needs to have mechanisms to extract this kind of information. So I've been very interested in analogies between vision and audition and have been for years now constructing various kinds of models of these processes. I could give you a second example.

>> Sure, please?

>> Michael Kubovy: A student of mine, Mike Shucks [Assumed Spelling], was a student at Northwestern University, and he studied percussion. And he discovered that there's a debate among percussionists about whether you can influence the duration of the sound with a gesture that you make with a mallet? And he cleverly tried to resolve the debate empirically by doing this study. And so what he did was to videotape a performer who thought that he could influence the duration of the sound with his gesture. He played the sound to participants in his experiment without the videotape, had them judge the duration, there was no difference, but when they saw the videotape and heard it and had to judge the duration of the sound had a huge difference. And he's now finishing his Ph.D. with me, where we are studying, trying to understand exactly how it's possible that visual information can actually influence what you hear, not just what you see, it actually influences. It's not that you think that you heard a longer thing, you actually hear something longer.

>> And should I be picturing him over the drum or the percussion instrument with kind of a poised, thinking that making the audience think that it's still going when it's really not or?

>> Michael Kubovy: That's exactly what's going on, but we have refined the experiment, so we're not using a video, we're just using a dot, an animation, that is essentially an animation of the mallet head. And so the gesture is now the movement of a dot, and it works beautifully.

>> Judith, let me ask you something that is along the lines that I've been thinking about, as I've been thinking about the presentation that you all are going to give. And I used to work on a national radio show, where the producers often said that they couldn't risk letting listeners hear music that was outside of their expectations, that was too modern, that was too outside of what they might expect in Baroque or Classical or other kinds of music. And they used to say, well, we need to get the audience to trust us and then we'll give them something a little different, and then a little more different, and by that time they'll actually hear the new music in the way that we'd like them to. As a composer this must drive you absolutely crazy.

>> Judith Shatin: You've got that right.

>> And I'd like you to respond to that in terms of the psychology, in terms of the work that you've been doing with Michael, and in terms of your own work, about how we get listeners ready and primed, to use your word, to hear new music that's outside of their expectations?

>> Judith Shatin: I think that one extremely effective way is simply to speak to them on the occasion that they are hearing it and to try to help them have some ear posts to identify as they're going along. I have found over and over on occasions when I have -- most recently I had a work performed by the Richmond Symphony, and many people came to the pre-concert talk. And they were very appreciative afterwards of the explanation that helped them, they felt, find their way into the piece, but I also found that many people who had not heard the talk also indicated that they had very much enjoyed the piece. And I think that too often those who are in control of what the programming is make decisions for the audience that are simply unfounded and that may have to do with the very narrow sense of what contemporary music is out there. And I think that a lot more could be done to get people excited the way they are about seeing new art, to hear what's new, what are people up to, and not, much as I love the classic repertoire, to make it a living museum and not just a museum of pieces that were composed 100 and more years ago.

>> The other thing that this brings to mind was a concert I once heard in Germany with Gustav Penderecki [Assumed Spelling], they played a new piece of his, it was a world premiere, it was very exciting, and then I think he was there, and came out in front and said I'm glad you enjoyed this, but I'd like you to hear it again.

>> Judith Shatin: Well, actually, that can be very effective, and I'm scheduled next February to have a concert that's similar to that with the Cusat Quartet [Assumed Spelling] at Symphony Space, Ophelia Theater [Assumed Spelling].

>> That's in New York City?

>> Judith Shatin: In New York City. They are playing different trains by Steve Rife [Assumed Spelling], and they've commissioned me to do a new piece on the topic of the American Journey. And they're doing the concert at seven o'clock and at nine o'clock p.m., so you can either hear the pieces twice or you can elect to hear one or the other. But depending on the length I think that one of the issues for new music, if you don't have the opportunity to hear it again it can be difficult to take it all in, so depending on the type of piece I think it can be very effective.

>> Now before we end I'd like to know if the two of you had something that is kind of one of the headlines of something you're going to say tonight that we neglected or something you'd like the people who are listening to this podcast to have a deep interest in music and the brain, something that you'd like to leave them with?

>> Michael Kubovy: Well, I think that the main point is that the question of how music means is complex and that it is tractable, that is science can figure it out, and we're on our way.

>> Judith Shatin: I think what I would like to say is I, of course, agree with that, but in addition music has so many multiple meanings for us and people identify with and respond to music on so many different levels, it's such a rich part of our experience, and to me that's what makes all of this so exciting.

>> Thank you very much. That was Judith Shatin, Kenan Professor of Music at the University of Virginia, and we were also joined by Michael Kubovy, Professor of Psychology at the University of Virginia, on our podcast for Music and the Brain at the Library of Congress. And thank you, both, for joining us today.

>> Michael Kubovy: Thank you.

>> Judith Shatin: Thank you.

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