# Unchained By Melody

**In *Musicophilia*, his latest book, neuroscientist Oliver Sacks reflects on the powerful role of music in the lives of people with neurological disorders, including his own.**

BY ANDREA COOPER

To say that Oliver Sacks, M.D., is one of the best known neurologists in the world doesn't do him justice. He's the closest thing to a rock star that a neurologist has ever become, and the author of numerous *New York Times* best-sellers, including *Awakenings*, which inspired a movie featuring Robin Williams and Robert De Niro, and *The Man Who Mistook His Wife for a Hat*, a strange, fascinating collection of case histories.

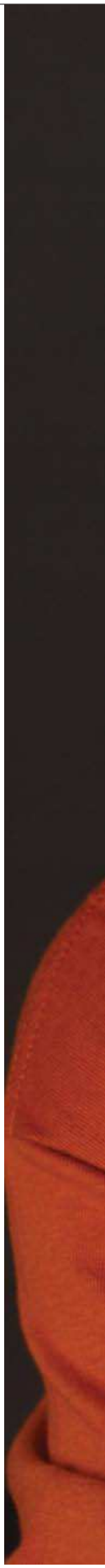
When you consider how popular his books have been, it's easy to forget that they aren't murder mysteries or bodice-ripping romances but stories about the *brain*.

Recently named professor of clinical neurology and clinical psychiatry at the Columbia University College of Physicians and Surgeons in New York, Dr. Sacks is also a Columbia University "Artist"—a new position designed to help bridge the gap between neuroscience and other disciplines such as economics, social science, law, and the arts. Meanwhile he continues to see patients, and his tales from the neurology ward are permeated by an "intuitive sympathy," as he calls it, as if the essence of the doctor-patient relationship required one to become a human tuning fork.

Through *Musicophilia*, Dr. Sacks suggests that music can do more than jog the memory, a wonderful capability in itself. For many of the people he describes—their sense of self shattered by illness or injury—songs provide a surrogate feeling of structure or personal continuity. Parkinson's patients reclaim their fluidity of movement or speech; people with Alzheimer's rediscover, if only briefly, a coherent and continuous sense of identity.

**NEUROLOGY NOW** *Why does music so deeply touch people with dementia and other neurological disorders?*
**OLIVER SACKS** That's a great mystery. Music doesn't convey information in the usual sense; it doesn't represent anything in the external world, but it can move one to the depths. Music has a power to elicit every emotion, and every mood, and every state of mind there is. I think this is why it exists in every culture. It may speak to people with dementia in a way that is deeper than language, and this can be especially important if language is no longer available.

**NN** *In the book, you describe a climbing accident during which you used music to help you survive—you say you were "musicked along." You also mention a time when you had musical hallucinations.*
**OS** 1974 was quite a year for me. I did rather worse than break my leg on a mountain, and I was trying to awkwardly push myself down with a useless leg. Then I thought of the Volga Boatmen's song [a folk song] and got into a rhythm: I think I couldn't have got down and been rescued if I hadn't. Later, after



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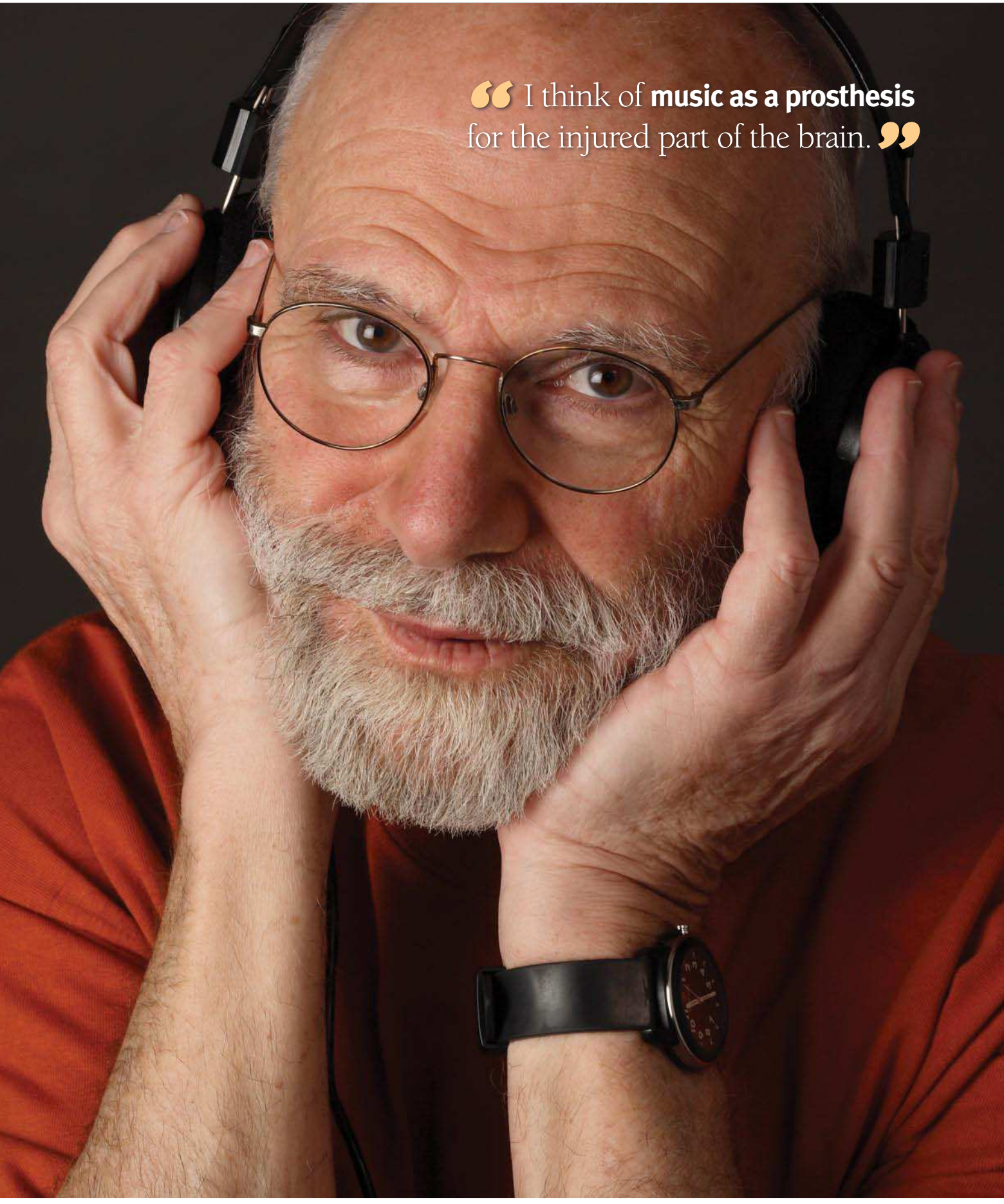
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> “I would see people with Parkinson’s who couldn’t move a step or utter a syllable, but could **dance or sing**.”

the leg had been paralyzed and out of action for a couple of weeks, music was crucial in bringing it back. This is something I’ve seen with other people. After an injury, you lose the motor patterns and can forget how to move properly. Music, especially the rhythm of music, can bring you back.

Prior to that incident I was very insomniac and was taking too much chloral hydrate, an old-fashioned hypnotic. It gave me some strange, tenacious dreams, including musical dreams, which would continue into the waking state as hallucinations. I never had those before, and I’ve never had them since.

**NN** *Did having these experiences give you greater insight into your patients?*

**OS** I think so. I also get quite severe migraine auras, usually visual migraines. But once I had a migraine in which I could no longer recognize musical tonality or melody. A Chopin ballad was being played on the car radio and it sounded like it was being beaten out on a steel sheet.

I think all of these experiences have helped me to imagine, to understand, what some patients may go through.

**NN** *How can musical memories be retained by someone for whom so many other memories are lost?*

**OS** I describe this especially in Clive, the musician who became amnesiac. I’ve seen it in many other patients. In general, if one has an amnesia, one loses personal memories, memories of events in one’s life—autobiographical memory. But you do not lose skills. You don’t lose the power to perform, whether it’s something simple, like walking around and getting dressed, or something complex, like cooking an omelet or playing a sonata.

So what one has learned to *do*—actions—are not forgotten, though facts and experiences may be. With music, there’s something very special because of its intense coherence. Every bar of a piece naturally follows a previous bar and leads to the next, and the music is held together by a sense of expectancy. So even if one doesn’t know a piece, one feels where it is going.

**NN** *Is that because this information is stored in a separate part of the brain?*

**OS** I think so. I like to imagine a sort of storage box, a treasure house deep in the brain, in the basal ganglia, the cerebellum—parts of the brain which are not usually affected by a stroke or by brain damage.

**NN** *People can develop amnesia following an accident or a blow to the head or an illness such as encephalitis. What happens in the brain when amnesia develops?*

**OS** The hippocampus, a structure deep in the temporal lobes, is involved in memory. In normal memory, this structure holds an experience and then sends it out to be put into permanent storage in the cortex. But if the hippocampus is destroyed or damaged, then it can’t do that; no permanent memories will be formed.

Clive’s case is severe. But I think we all experience something like amnesia when you can’t remember the thought you had a moment ago, or when you’re reading yourself asleep and forget the sentence you read moments before.

**AWAKENINGS** **Robert De Niro and Robin Williams in the film version of Sacks’s memoir by the same name.**

**NN** *Explain how music helps patients with aphasia, which often develops as the result of a stroke.*

**OS** It was discovered years ago, in 4- and 5-year-old children, that if the left hemisphere had to be removed because of intractable seizures, language would be lost for a while but then reconstituted using the right hemisphere. One knows that the brains of children are very plastic, but it wasn’t thought anything comparable could happen in adults. Seemingly it can, although it requires a great deal of expert work and a lot of investment: 70 or 80 long, careful sessions of melodic intonation therapy, which teaches patients to sing or intone short phrases, after which the musical elements are removed slowly. The patient may regain the power to speak without the aid of intonation.

I was amazed to see people who were really almost speechless able to have quite fluent—not 100 percent normal, but quite fluent—conversations. And not merely of a stereotyped or reportorial quality, but to say complex things. This is an amazing example of cerebral plasticity. When things can’t be done one way, the brain will often find other ways of doing them.

**NN** *For patients, is there any therapeutic difference between playing music, singing it, or listening to it?*

**OS** I don’t think there’s much to be said for the so-called Mozart Effect, which has to do with casual exposure to music.

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**COMPOSITION SPACE**
**Dr. Sacks in his home office, where he plays music, reads, and writes.**

But I think there's a great deal to be said for active involvement with music, whether it takes the form of music therapy in a hospital or learning an instrument and following a score.

**NN** *Why is the relationship between the patient and the therapist so important?*
**OS** Every teaching or therapeutic relationship will work better if there's trust and affection. Working together is crucial here, as it is in growing up. One acquires language by conversation with one's parents. Language is a social phenomenon. You get it by speaking with someone and, prior to that, by singing with someone. The "with" is crucial.

**NN** *Aphasia patients may have unconscious automatism—a kind of automatic or uncontrolled speech, ranging from curses to song lyrics. In the book, you wonder whether language embedded in unconscious automatism can be released for conscious use.*
**OS** This is a big question. You find some people with aphasia who can't utter a sentence in the normal way but can sing a song with the lyrics. Perhaps they may be able to recite a poem or a prayer they've learned, because this is held [in their minds] as a sort of performance.

Can you disembed it? It's not easy, but I think it is possible to some extent. This is exactly what melodic intonation therapy is designed to do, but it may not work with everyone. It's not to be seen as an easy, magical solution.

**NN** *What do we know about the effects of music upon people with Parkinson's?*
**OS** This goes back to what sort of stumped me more than 40 years ago, when I would see these people with very severe Parkinson's who couldn't move a step, couldn't utter a syllable; but, given music, they could dance or sing. They could achieve a sort of flow of movement and speech that wasn't available to them otherwise.

In general, when one has a disease of the basal ganglia—such as Parkinson's—and low levels of the neurotransmitter dopamine, the flow of movement, speech, thought, and feeling has either stopped or takes on a stuttering, sputtering quality. Music can reorganize this and give the people a pattern and timing and rhythm. So in this way I do think of music as a sort of prosthesis for the injured part of the brain.

**NN** *The effects of music don't seem to carry over for Parkinson's patients in the same way they do for people with dementia. Parkinson's patients no longer can make the same fluid motions after the notes have faded.*
**OS** People with dementia and aphasia—especially aphasia—are learning something. There is perhaps a permanent change in the brain. For people with dementia, certainly, behaviors can change. I think it's an on/off phenomenon with Parkinson's, although if you can carry an iPod with you, you may be able to call up music most of the time.

**NN** *If you play music that people with dementia enjoyed when were younger, the music can soothe them. Why is that, and what are some of the newer advances using that knowledge?*
**OS** People can become very isolated with dementia, and music therapy as group therapy can have a tremendous bonding effect. People not only respond as individuals to familiar music; they sing together and become a group. They become conscious of and interact with each other. Music has great powers to both calm and animate people, to engage them and give them focus.

**NN** *The effect can be lasting even after the music has ended.*
**OS** Yes, I think the power of music can certainly outlast the music for an hour or two, so someone who has been in some hopeless state of tormented, confused agitation is then in a good, calm, somewhat coherent mood for the rest of the afternoon. One can also sometimes see longer-lasting effects.

**NN** *I noticed that many examples in your book involve classical music, occasionally jazz. Do you think other forms of music would have the same effects?*
**OS** Yes, I think so. I do describe one terrific drum session that was basically rock. Provided music is lively and has a strong rhythmic component, and appeals to the person, then I don't think it matters what the music is. No doubt in other cultures, Indian ragas or African polyrhythms would be equally good.

**NN** *What do you anticipate to be the next breakthroughs in this field in five to ten years?*
**OS** We'll probably understand much more accurately what's happening in the brain when we recognize, remember, play, or listen and respond to music. So far neuroscience has been a *visual* neuroscience. But a whole order of magnitude and complexity is involved in listening to music. NN

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*Andrea Cooper has written for many major magazines and media outlets, including* Time, National Geographic News, Reader's Digest, Redbook, *and NPR's* All Things Considered.