

## An Auditory World: Music and Blindness

**W**hen I was growing up in London in the 1930s, I especially enjoyed the visits of Enrico, the piano tuner, who would come every few months to tune our pianos. We had an upright and a grand, and since everyone in the family played, they were always getting out of tune. Once when Enrico was ill, a substitute tuner came—a tuner who, to my amazement, got around without a white stick and could apparently see normally. Up to that point, I had assumed that, like Enrico, all piano tuners were blind.

I thought of this years later in regard to my friend Jerome Bruner, for in addition to his many other gifts, he is immensely sensitive to music and possesses extraordinary powers of musical memory and imagery. When I asked him about these, he said that he did not come from a musical family but that he was born with congenital cataracts, not operated on until he was two. He was functionally blind in his first two years, seeing only

light and shadow and some movement before his cataracts were removed—and this, he thought, forced him to focus on sounds of all sorts, especially voices and music. This special sensitivity to the auditory has stayed with him all his life.

It was similar with Martin, my musical savant patient, who wore thick pebble glasses like Jerry Bruner; Martin had been born with very severe farsightedness, more than twenty diopters, which was not diagnosed and corrected until he was almost three. He too must have been functionally blind as an infant, before he had glasses. Did this play a part in making him a musical savant?

**T**HE IMAGE OF the blind musician or the blind poet has an almost mythic resonance, as if the gods have given the gifts of music or poetry in compensation for the sense they have taken away. Blind musicians and bards have played a special role in many cultures, as wandering minstrels, court performers, religious cantors. For centuries, there was a tradition of blind church organists in Europe. There are many blind musicians, especially (though not exclusively) in the world of gospel, blues, and jazz—Stevie Wonder, Ray Charles, Art Tatum, Jose Feliciano, Rahsaan Roland Kirk, and Doc Watson are only a few. Many such artists, indeed, have "Blind" added to their names almost as an honorific: Blind Lemon Jefferson, the Blind Boys of Alabama, Blind Willie McTell, Blind Willie Johnson.

The channeling of blind people into musical performance is partly a social phenomenon, since the blind were perceived as being cut off from many other occupations. But social forces here are matched by strong internal forces. Blind children are often precociously verbal and develop unusual verbal memories; many

of them are similarly drawn to music and motivated to make it central to their lives. Children who lack a visual world will naturally discover or create a rich world of touch and sound.<sup>1</sup>

At least there are many anecdotes to suggest this, but Adam Ockelford has moved beyond these casual observations to systematic studies in the last twenty years or so. Ockelford has worked as a music teacher at a school for the blind, and is now director of education at the Royal National Institute of the Blind in London. He has been especially concerned with a rare congenital condition, septo-optic dysplasia, which leads to visual impairment, sometimes relatively mild but often profound. Working with Linda Pring, Graham Welch, and Darold Treffert, he compared thirty-two families of children with this condition to an equal number of control families. Half of the children with SOD had no vision or could perceive only light or movement (they were ranked as "blind"); the other half were "partially sighted." Ockelford et al. noted that there was far more interest in music among the blind and the partially sighted than among the fully sighted. One mother, speaking of her seven-year-old blind daughter, said, "Her music is always with her. If there is not music playing, she is singing. She listens to music while in the car, while falling asleep, and loves to play the piano and any other instrument."

Though the partially sighted children also showed a heightened interest in music, exceptional musical abilities were observed only in the blind children—abilities that surfaced spon-

1. Indeed, we all sometimes block out the visual world to focus on another sense. My father was fond of improvising, thinking, at the piano. He would get into a sort of reverie and play with a dreamy look, his eyes closed, as if translating straight to the keyboard what he was hearing in his mind. And he would often close his eyes to listen to a record or the radio. He would always say that he could hear music better when his eyes were closed—he could exclude visual sensations and immerse himself fully in an auditory world.

taneously, without any formal teaching. Thus it was not SOD as such but the degree of blindness, the fact of not having a significant visual world, that played a key role in stimulating the musical propensities and abilities of the blind children.

In various other studies, Ockelford found that 40 to 60 percent of the blind children he taught had absolute pitch, and a recent study by Hamilton, Pascual-Leone, and Schlaug also found that 60 percent of blind musicians had absolute pitch, as opposed to perhaps 10 percent among sighted musicians. In normally sighted musicians, early musical training (before the age of six or eight) is crucial in the development or maintenance of absolute pitch—but in these blind musicians, absolute pitch was common even when musical training had been started relatively late, sometimes as late as adolescence.

A third or more of the human cortex is concerned with vision, and if visual input is suddenly lost, very extensive reorganizations and remappings may occur in the cerebral cortex, with the development, sometimes, of intermodal sensations of all sorts. There is much evidence, from Pascual-Leone and his colleagues as well as others,<sup>2</sup> to show that in those born blind or early blinded, the massive visual cortex, far from remaining functionless, is reallocated to other sensory inputs, especially hearing and touch, and becomes specialized for the processing of these.<sup>3</sup> Even when blindness begins later in life, such reallocation can occur. Nadine Gaab et al., in their study of one late-blinded musician with absolute pitch, were able to show extensive activation of both visual-association areas while he listened to music.

2. See, for instance, Amedi, Merabet, Bermpohl, and Pascual-Leone, 2005.

3. People with congenital or acquired blindness may be able to form fairly accurate and detailed auditory maps of their immediate environment. The acquisition of such a power was beautifully described by John Hull in his book *Touching the Rock*.

Frederic Gougoux, Robert Zatorre, and others in Montreal have shown that "blind people are better than sighted controls at judging the direction of pitch change between sounds, even when the speed of change is ten times faster than that perceived by controls—but only if they became blind at an early age." A tenfold difference here is extraordinary—one does not usually encounter a whole order of magnitude difference in a basic perceptual capacity.

The exact neural correlates underlying musical skills in the blind have not yet been fully defined, but are being intensively studied in Montreal and elsewhere.

In the meantime, we have only the iconic image of the blind musician, the large numbers of blind musicians in the world, descriptions of the frequent musicality of blind children, and personal memoirs. One of the most beautiful of these is the autobiography of Jacques Lusseyran, a writer and hero of the French Resistance who was gifted musically and played the cello as a boy even before being blinded at the age of seven. In his memoir, *And There Was Light*, he emphasized the immense importance of music for him after he lost his sight:

The first concert hall I ever entered, when I was eight years old, meant more to me in the space of a minute than all the fabled kingdoms. . . . Going into the hall was the first step in a love story. The tuning of the instruments was my engagement. . . . I wept with gratitude every time the orchestra began to sing. A world of sounds for a blind man, what sudden grace! . . . For a blind person music is nourishment. . . . He needs to receive it, to have it administered at intervals like food. . . . Music was made for blind people.