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Absolute Pitch, Perfect Pitch, Relative Pitch, and other Musical Notes
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Bottom line... nobody knows.

Ward (1998) spoke about having perfect pitch (also called absolute pitch) as the ability to identify or reproduce a given particular note. For example, if I requested the note “A” (440 Hz), a person with perfect pitch could seemingly pluck it out of the air. Then again, it would also be fine for the person with perfect pitch to initiate a note of his or her choosing. In other words, a person with perfect pitch might engage in a discussion about politics, geography, the weather, etc., and then, for no reason whatsoever offer up the sound of a “G.” However, Ward also noted (excuse the pun) perfect pitch has as a mandate, that there must be no objective reference. That’s important, too, as many of us have perfect “relative” pitch (to be discussed below).

However, before getting to relative pitch…First, just to be sure we’re all on the same page, musical notes are absolute, well-defined pitches. Musicians tune their instruments to the same “concert” pitch. For example, some might use pitch pipes or a tuning fork to emit a 440 Hz “A” or another tuning fork to emit a 512 Hz “C” (actually, most of us use electronic tuners that make it ridiculously simple to tune-up, but that’s another story).

Thus, the notes we talk about have references and are repeatable, much like temperatures in Fahrenheit or Celsius. They are universal—85 degrees Fahrenheit is 85 degrees Fahrenheit regardless of where it’s measured. Further, when listening through good-to-excellent sound reproduction systems, notes are preserved. An “F” is always an “F.” For instance, Paul McCartney wrote and originally performed “Yesterday” in the key of “F.” Anywhere I go in the world, if I hear the original “Yesterday,” it’s in “F.”

Now here’s the fun part. From that “F,” many of us (musicians, in particular) can determine almost any other note. In other words, using “F” as a musical foundation, we can easily determine (as can most musicians) B flat and C. Trust me. From C, I can easily get to G or D....so the thing is, once we get our “musical foundation,” we can think through the notes to get to other notes, that’s called “relative pitch.”

Sometimes, I can “fake” my way to absolute pitch. That is, I can think through “Yesterday” in my brain, move it up or down (in pitch) a little, find the “right” pitch, and then I've got “F” and after that, easy peezy. Of course, faking it doesn’t always work, and it usually surprises me when it does, but when it does, it’s kinda neat.

Perfect Pitch for Colors?
We can all pluck out of our brains the colors red, blue, or green. We don’t necessarily need a reference. We can see a wavelength of visible light and immediately know which color it is without consciously comparing it to other colors. Then again, one could argue sighted people always have visual references for color available (as long as our eyes are open), so maybe that’s different. Then again, one could make the same argument for normally hearing people, too. We each know the sounds of our own voice, the sound of other voices, dial tones, car sounds, birds chirping, etc., and as long as we’re not in an anechoic chamber, we have an auditory reference, too.

Neuroplasticity?
Reports surface now and again indicating people with perfect pitch have unusually large temporal lobes, or more specifically larger than average planum temporales. In other words, the argument is that people with these unusual anatomic brain features have perfect pitch because their cerebral auditory centers are larger than normal. Maybe. Nonetheless, it begs the questions—Did the individual have perfect pitch first and therefore the planum temporale became more prominent? Or, was his or her planum temporale prominent, thus encouraging the development of perfect pitch?

Neuroplasticity may be at work here, as might chickens and eggs. Perhaps within those people with a “primary” cognitive ability for/of perfect pitch, perhaps their planum temporale became more prominent in response to the benefits received from having perfect pitch?

In other words, maybe because they could pluck a 440 “A” out of the air, they enjoyed playing an instrument and because they had the

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cognitive ability to play music, their planum termporale grew in response to their musical studies and ability? So maybe the essence of perfect pitch is cognitive? Levitin and Rogers (2005) report that to define a tone without external reference (i.e., to have perfect pitch) is something that must be initiated early in life and requires specialized brain mechanisms.

Sacks (2008) reports MRI studies from Harvard in 1995 showed clear evidence the corpus callosum (the anatomic structure that connects the two cerebral hemispheres) was larger in musicians than non-musicians, and more specifically, the planum temporale was "asymmetrically" larger in musicians with perfect pitch. Presumably due to neuroplasticity and physically recognizable brain characteristics, Sacks claims modern anatomists can easily recognize the brains of musicians. Chicken? Egg?

I suspect we've all heard reports that blind people have more acute auditory skills? Perhaps this, too, relates to neuroplasticity? The BBC reported that for people born with vision, who lose it at a young age, are better in auditory discrimination tasks than normally sighted people. Further, they reported older studies (from the 1980s) indicating higher percentages of blind people have perfect pitch than do sighted people. If this is so, presumably it's because visual centers of the brain (in people who lost their vision at a young age) are not used as they would be in sighted people, and these areas have been re-assigned, via neuroplasticity? Perhaps auditory functions were shifted to areas previously assigned to vision?

Gaab, Schulze, Ozdemir, and Schlaug (2006) employed a pitch-memory task with blind and sighted musicians. All subjects had perfect pitch. The goal was to see if the same neural correlates were used by each while performing musical tasks. They reported the blind musician used more parts of his brain (bi-hemispheric visual-association areas and more parietal and frontal areas) than sighted musicians while engaged in musical tasks. Sighted musicians used more of the right primary auditory cortex and cerebellum than did the blind musician.

The researchers concluded that indeed, blind and sighted musicians use different neural networks while performing musical tasks.

Levitin (2006) suggests absolute pitch (AP) is indeed rare. He states that most of us can identify sounds as easily as colors, but we don't categorize them necessarily by the name of the note, we usually categorize sounds by timbre (rhymes with amber). Further, he notes many non-musicians may have absolute pitch, but as they are non-musicians, they may just not think about it very much, or, they may not have the same vocabulary (as musicians and audiologists) to describe their abilities related to perfect pitch.

Levitin reported that between 1860 and 1990 there were 100 articles published on AP. However, from 1990 to 2005, there was another 100. Clearly, interest in AP has grown dramatically, and we may one day have an answer. In the meantime, Chicken? Egg?

For More Information, References and Recommendations:

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