

Minor Thirds

Yutaka Nishiyama

I received an email from someone named Meira Leonard. At first, I thought it was junk mail and nearly deleted it. But noticing that the subject read “Major and Minor Chords,” I paused and read it.

I had published an article about minor chords (Nishiyama, 2010) that was later translated into English (Nishiyama, 2011), which she had apparently read. I must say, it was quite moving to know that there are people overseas who have questions and doubts similar to mine.

The musical scale is generally considered to start with do (do-re-mi-fa-sol-la-ti-do), but by starting instead two degrees below, from “la,” you get a minor key, which has a somewhat melancholy air. This is employed in works such as *Für Elise*, *Romance Anónimo*, and Mozart’s *Turkish March*. It is curious that even when using the same scale of seven notes, shifting everything by two changes the mood in this way.

Representing the major scale do-re-mi-fa-sol-la-ti-do and the minor scale la-ti-do-re-mi-fa-sol-la as whole tones (W) and semitones (S), we get

WWSWWWS and WSWWSWW.

In both cases, there are five whole tones and two semitones, but their positions are changed. The seven-tone scale here is called Pythagorean tuning, which divides an octave into twelve semitones comprising five whole tones (doubled semitones) and two semitones.

$$5 \times 2 + 2 \times 1 = 12$$

There is no clear explanation as to why starting from la creates a melancholy sound, but one suggestion (Akutagawa, 1971) is that the minor key is critically different from the major key due to its short distance between the fundamental and the third sound; in other words, it has a narrow pitch. The extent of separation between two notes is referred to in music as a scale degree. Each pitch is considered to have the same height, so the scale degree between do and mi in do-re-mi is 3. Furthermore, the do and mi extend over two whole tones, so this is referred to as a major third. La-ti-do is similarly a third, but they span a whole tone and a semitone, so this is called a minor third. Perhaps do-re-mi feels strong and la-

ti-do feels sad because of this inclusion of a semitone.

Do-mi-sol, which combines do-re-mi and mi-fa-sol, is called a chord. Do-mi is a major third and mi-sol is a minor third, but this is called a major chord. Combining la-ti-do (a minor third) and do-re-mi (a major third) gives the minor chord la-do-mi. So in chords, too, the minor third is important: minor chords with a minor third base feel sad. A composition is a combination of major and minor chords. For example, the Japanese song *Tabibito yo* [Oh, Traveller] (lyrics: T. Iwatani; composition: K. Dan) is composed in D-minor, alternating between minor and major chords:

Dm-Dm-Dm-Dm

F-Gm-A7-Dm

Note that using minor chords does not necessarily make for a sad composition. Music is formed as a balance between major and minor chords, and it is when minor chords become predominant that a general aura of melancholy arises.

Indeed, while many people feel that compositions in minor chords feel dark, not all share this opinion. Even music in major chords can feel sad to some, depending on the performer and the instruments used, not to mention the mental state of the listener at that particular time and place. So, keep in mind that my “theory of minor thirds” is a hypothesis of limited application at best.

There are no scales for natural sounds, like those of the wind or a burbling stream, much less major or minor chords. Even so, it is interesting to consider how dividing an octave into twelve parts comprising whole tones and semitones as a scale of seven notes can result in music that feels happy or sad, depending on where you place the semitones. Pythagorean tuning is quite a clever method, and is indeed fundamental to modern music.

References

- Akutagawa, Y. (1971). *Ongaku no kiso* [Fundamentals of Music] (in Japanese). Iwanami Shinsho, 67.
- Nishiyama, Y. (2010). Tancho ni tsuite kangaeru [Considering Minor Keys] (in Japanese). *Rikei e no suugaku*, 43(1), 23–27.
- Nishiyama, Y. (2011). The Mathematics of Minor Keys. *International Journal of Pure and Applied Mathematics*, 67(2).