

# Harmonics and Overtones

When we strike a bowl, we do not hear just one note.

What we hear is a combination of a fundamental tone and multiple additional frequencies called overtones or harmonics.

The fundamental is the main pitch we recognise.

The overtones are higher frequencies that sit above it.

Together, they create the full sound we perceive.

This is true of all vibrating objects, including the human voice.

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## What Are Harmonics?

When an object vibrates, it does not move as a single unit. Different parts of the material vibrate at different rates simultaneously. This produces layered frequencies.

In simple terms:

The fundamental tone is the base frequency.

Harmonics are whole-number multiples of that base frequency.

For example, if a bowl vibrates at 100 Hz, it may also produce vibrations at 200 Hz, 300 Hz, 400 Hz and so on. These are part of the harmonic series.

The richness of an instrument depends on how these frequencies interact.

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## Why Bronze Produces Complex Harmonics

Bronze is an alloy. Its internal structure is not uniform. The combination of copper and tin creates subtle irregularities in how the metal vibrates.

This contributes to:

- Complex overtone stacking
- Evolving sound texture
- Warmth and depth
- A sense of tonal movement over time

The sound often feels layered and immersive.

However, bronze bowls do not produce only pure harmonic overtones. They also produce **inharmonic partials**.

Inharmonic partials are frequencies that are not exact whole-number multiples of the fundamental tone. Instead of fitting neatly into the harmonic series, they sit slightly “between” or outside those predictable intervals.

Because the metal is irregular and hand-formed, different areas of the bowl vibrate in slightly different patterns. This creates micro-variations in pitch relationships.

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## **What Inharmonic Partial Mean for the Body**

Inharmonic partials create subtle acoustic tension.

The nervous system does not experience the sound as a single clean line. It experiences complexity. Slight beating patterns, shimmering movement and evolving interference patterns are created when frequencies are close but not perfectly aligned.

In the body, this can:

- Increase sensory engagement
- Interrupt repetitive thought patterns
- Invite the brain to shift out of rigid predictability
- Create a feeling of movement or internal “stirring”
- Support release through subtle vibrational unpredictability

Rather than locking the system into a stable tonal centre, inharmonic content can gently destabilise patterns.

For some people, this feels deeply immersive and regulating.

For others, especially if the nervous system is already highly activated, it can feel intense.

This is not good or bad. It is information.

Bronze bowls tend to create a more dynamically evolving field of vibration. The body responds not only to pitch, but to the relationship between frequencies.

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## **Quartz and Harmonic Behaviour**

Quartz has a more uniform crystalline structure.

Because of this, crystal bowls often produce:

- A very strong fundamental tone
- Clearer overtone emphasis
- A more stable, focused sound

The tone may feel cleaner and more penetrating, with less of the evolving complexity found in bronze.

Quartz bowls generally produce fewer inharmonic partials. The sound often feels more linear and sustained, with less internal acoustic turbulence.

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## **How the Body Responds to Harmonics**

The nervous system is constantly processing layered sound information.

Complex harmonic sound can:

- Draw attention inward
- Reduce cognitive dominance
- Encourage breath depth
- Support subtle shifts in nervous system tone

The body does not consciously analyse harmonics. It responds through sensory processing.

This is why two bowls that appear similar can feel very different when played.

We are working with frequency relationships, not just notes.

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## **In Practice**

Understanding harmonics and inharmonic partials helps us:

- Listen more precisely
- Choose instruments intentionally
- Adjust volume and placement
- Recognise when complexity is supportive or overwhelming
- Work skillfully with tone rather than just volume

We are not just playing a note.

We are working with layered resonance — and with how the body interprets acoustic complexity.