



Optimizing Pianism

Evidence-Based Perspectives

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Newsletter #1 – March 29, 2026

(International Piano Day)

Welcome to the Optimizing Pianism newsletter – the place where science, art and pianism come together.

*Each week, a 5-minute fact for a life-time of better pianism.
No more guessing. No more time-wasting. No more injuries.
Just better tools for making better music!*

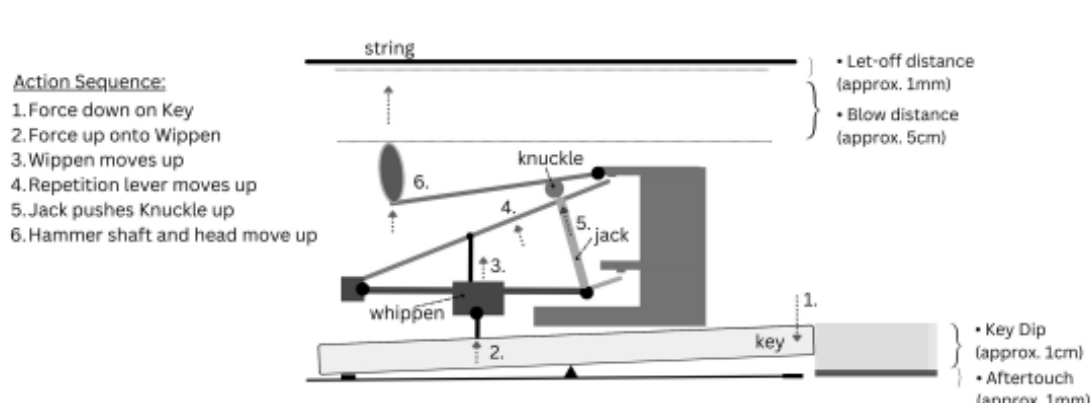
TOPIC: Piano sound production

With over 300 years of conflicting theories about 'how to play the piano', and with a lot of misinformation to set straight, it is difficult to decide where to begin our myth-busting journey! And so, I have decided to start at a logical beginning: the place where the piano sound is made – the very same place where many theories of touch, and the minds of those who create them, depart from reality.

FACTS:

Piano sound production – sequence of events (see diagram below)

- Our finger presses the key.
- Via a system of levers (the 'action'), a hammer speed is generated.
- After approximately 5 cm into its journey, the hammer is released from the lever system.
- The hammer continues to move upwards towards the string for a very short distance (the 'let-off distance' – approximately 1-2 mm). Like a ball thrown towards a wall, it flies unaided and unaffected by what our finger then does to the key, what our arm gestures are, what our body feels, what our thoughts are, what we hope for it, what we believe it will do, what our facial expression is, what the make of the piano is, or whether an expert or a dog put it into motion.



(Picture from *Optimizing Pianism*, p.96.)

- the string, unaware of the hammer, and less so of the purpose that we have for it, will be hit by this hammer for an exceedingly brief moment of time (approx 0.002-0.003 s) after which, it vibrates and makes its sound.
- hammers hitting the string faster produce a louder sound. PERIOD.
- hammers hitting the string slower, produce a softer sound. PERIOD.
(• the maximum possible hammer speed depends on the instrument, but is in the range of 5-10 m/s, and correlates to *fff* dynamics. Speeds beyond this do not produce louder volumes from the string and are appropriately called 'over playing'.
- if the hammer felt is *more* densely compressed, either intentionally by the intervention of a piano technician (what the pros do), by default of it having hit the string millions of times over many years (what happens to the unmaintained pianos in conservatories around the world), or as a result of the pianist causing it to hit the string at high speed (ie playing loudly), it becomes 'hard', and will rebound off the string faster and produce a tone with a greater range of higher harmonics. This, we perceive as a 'brighter' sound.
- if the hammer felt is *less* densely compressed, either intentionally by the intervention of a piano technician, by default of it being new and not yet having hit the string millions of times, or as a result of the pianist causing it to hit the string at a low speed (ie playing softly), it remains 'soft', and will rebound off the string slower and produce a tone with a smaller range of higher harmonics. This, we perceive as a 'dull' sound.
- hammers in the upper register of the piano are lighter and harder than those of the lower registers, allowing them to rebound off the smaller strings quicker (to allow them to vibrate properly) but at the default cost of making them 'brighter' in sound. The opposite occurs in the lower register.

Thus, by design, a hammer that hits the string faster will be BOTH louder AND brighter, and a hammer that hits the string slower, will be BOTH softer AND duller. The pairings cannot be broken, unless by delusion. It is physically impossible and erroneous to claim that a hammer can hit a string slower and produce a louder (or brighter) sound, just as it is impossible and erroneous to claim that a hammer can hit a string quicker and produce a softer (of duller) sound.

Conclusions

The notion that 'arm weight' – or any other weight – changes the hammer weight is false. The notion that 'arm weight' directly influences the hammer speed, its felt compression or its interaction time with the string is false. The hammer mass does not change at any stage any more than a ball flying through the air does. Whether we choose simple, efficient touch movements or complicated, inefficient movements to generate the hammer speed is our choice (more on this later, as this is where the game of touch can be won or lost) – but the fact remains: *the hammer could not care, and most certainly does not know, how it came to move at the speed that it does.*

Want more?

Read pp.51-54: The Physics of Touch and Tone quality.

Read pp.54-55: Hard-hammer-bright-tone reality meets Piano-pedagogy beliefs.

Read pp.96-99: the Piano action, escapement, let-off, aftertouch, (and read the references!)

Of course, at this point everyone now asks: but can't the pianist do more to change the quality of the piano tone? Isn't there more to it?

Stay tuned for next week!

Cam

P.S. In the meantime...

- **Recent news:** Artist Spotlight by Move Records ([LINK here](#))
- **Previous weekly newsletters** ([LINK here](#))
- **Read the book:** *Optimizing Pianism – Evidence-Based Perspectives* ([LINK here](#))
- **Comments, suggestions or topic requests:** ([Tell me HERE](#))

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