Faster and Faster

Charles Shrader

Over the course of a few chilly Belgian days in February 2017, the top floor of the Orpheus Institute simmered with a peculiar, playful excitement. Tom exhaled, focused, and positioned himself at the Erard action model. Bobby stood behind the camera; Michael awaited the next run. The game—and the microphone—was on.

M: "For real, no rehearsal."
T: "Nerve-wracking…"
B: "Ready, Tom? And…recording."
ta-Tum.
B: "Ok. And…recording."
ta-Tum.
B: "And…recording."
*ta-**Tum***.
B: "And…recording."
Tum.
B: "And…recording."
Tum.

Tom clicked his tongue in frustration. "I think the fastest was your third one, and then you got cocky," Michael jibed at Tom; Bobby chuckled as Tom walked away, recovering.

This lighthearted yet deceptively nuanced project, which they called "Faster and Faster," was both a technological experiment and a tournament of speed. Using the Orpheus team's three action models (Erard, Walter, revised Erard), how fast could each player repeat a single note? Who would be the speed champion? And what would it tell the artist-researchers about handling the featured actions, in particular the Erard action for which Beethoven had ordered such puzzling revisions?

"Faster and Faster" would stage a friendly international duel that brought players and technologies together into even sharper resolution, crystallizing the notions of comparison and competition that have arisen earlier in this book. Not unlike a football match decided on penalty kicks, each "Faster and Faster" participant would be given five consecutive tries at repeating the note at the farthest left of the action model, middle C. There would be no do-overs: if the hammer did not re-engage for a second stroke (or volley, as I call it here), the chance was lost and recorded as a FAIL. The psychological stakes, and the fun, thus formed around a split of attention: each player would push both the instrument and the other player to take risks and stretch their limits. Momentum could shift with any exceptionally fast stroke or any FAIL, lending narrative tension to each turn. Consistency, as a final layer, would be valued as a counterweight: could the players sustain a mixture of success and speed?

To examine the action models closely and measure the repetitions, the team called on Bobby to design Orpheus's own sonic version of football's VAR or tennis's HawkEye. A slow-motion video camera allowed each keystroke to be tracked down to millisecond, while a microphone recorded each array of attempts and accompanying commentary. Not only were Michael and Tom pitted against each other across the immediate medium of action models, but suspense would reign until the tape was analyzed.

After the match, the players reviewed their data. Though they had long since recovered from the light machismo of the match itself, the players nevertheless felt compelled to pass off the account to an *ex post facto* chair judge. A scholar of the piano and an avid fan of sport, I was happy to assist. I dove into the cache of videos, audio, conversation transcriptions, and statistics, enjoying the multimedia blend of competitive dynamic, player psychology, and technological affordance.

Winning "Faster and Faster" would demand a delicate balance of power and speed from player and action alike; the tiniest slip could determine the organological breaks of the match.

The competitors

Michael, the Chicago-based American fortepianist and former student of Tom, took the instrument first in each round. Michael's demeanor, measured and kind, masked the verve with which he attacked the keyboard. His only purpose throughout the competition was absolute speed: he wanted to make the repetition as fast as possible, regardless of sound quality or phrasing.

Tom, the Belgian-Canadian leader of the Orpheus project and longtime fortepiano scholar and performer throughout Europe and North America, brought a sporting ebullience to the match as well as an aesthetic conceit. His aim: an iambic repetition, with a pleasing, crisp accent landing on the second stroke, built for speed *and* style.

But how would the actions respond?

Round 1: The Erard

The first event was the original Erard action, whose key weight, key depth, and overtone profile furnish a more enriched tone than many of its competitors. Sebastian Erard had championed his product's ability to repeat, as well, but for the fortepianist more accustomed to the lightness of Viennese instruments it could prove a special challenge.

Michael's first attempt demonstrated his overall technique. His hand began about four inches above the keys and released down, always assuring a fast launch. He would then rely on the bounce of his wrist and index finger as well as the gravity of his forearm to send up the second-stroke volley.

Tum. The model's muffled response had registered a surprising first-attempt FAIL. Michael's index finger had gotten caught in the depth of the key, and the hammer haplessly fell back to rest without a second strike.

Already in the hole, Michael was forced to make a small adjustment on his launch-speed for the second try. The corresponding difference in "rebound" (or "First strike to resting" in Table 2 below) proved quite large, giving Michael more than enough time to get the hammer back into place for a repetition with a speed of 101 milliseconds. Michael then launched his third attempt with the same speed as his first attempt—another FAIL! Michael grimaced audibly. He would have to hold back for the rest of the round. He successfully clocked in his last two tries but left precious speed on the table.

After hearing Michael's first-round struggles, Tom was prepared to pounce at his turn. Tom had settled on a compact motion, never starting more than an inch above the surface of the keys, counting on the wrist and the muscles of the index finger itself. He wound into his first attempt; first contact was smooth and confident, and the release into the second stroke was perfectly timed, producing a crystal-clear repetition of 88 milliseconds. The "replay" showed that

Tom's second-stroke volley had been so keen that the hammer was not even allowed to return to its low resting point while still re-engaging the escapement. His next two attempts, though actually marginally slower, sounded each more authoritative than the last, giving the psychological impression of greater speed.

Now on a roll, Tom let loose, but barreling overconfidence had its price. Two thudding FAILS to match Michael's ended his round – hence Michael's aforementioned comment about Tom's "cockiness." Tom's diary from that day explains his perspective.

> I was second: I felt I had the upper edge. Michael had 'failed' twice—significantly at the outset—so he immediately had to play safe, and his second attempt wasn't very fast at all. I felt like I could afford to "just deliver," without thinking of the competitive context.
>
> I completely nailed my first attempt: perfect muscular movement, perfect timing. I felt on a streak and after three successful runs (which felt more or less identical), I decided that I could afford to take more risk. Mistake: my first failure. Not willing yet to accept that no faster run would be possible (and still basking in the success of the three first runs), I tried again—but just a hair slower: my second failure. My competitiveness clearly took the better of me. I stopped listening to or feeling the technology.

Tom had gained a strong upper hand, but he left himself little margin for error in later rounds. Tables 1–3 first show the times of the repetitions themselves, then the time intervals that make up the three elements of each attempt: launch, rebound, and volley. Note that all numbers refer to the motion of the *hammer*, not the key itself or the hand. (There is always a small delay between the touching of the key and the initiation of the hammer's movement.)

MICHAEL	TOM
FAIL	88
101	92
FAIL	94
107	FAIL
103	FAIL
Average of three best results:	
104	91.3

Table 1. Time of repetition, original Erard model (milliseconds)

Launch (Launch to 1st strike)	Rebound (1st strike to resting)	Volley (Resting to 2nd strike)
34	51	FAIL
38	72	29
34	48	FAIL
36	52	55
32	51	53

Table 2: Time intervals for MICHAEL, original Erard (milliseconds)

Launch (Launch to 1st strike)	Rebound (1st strike to resting)	Volley (Resting to 2nd strike)
63	61	27
61	68	24
37	47	47
46	60	FAIL
39	47	FAIL

Table 3. Time intervals for TOM, original Erard (milliseconds)

Round 2: The Walter

Next up was the Walter, a touchstone for fortepianists and model of the Viennese commodity that had occupied valuable territory in Beethoven's parlor. The renowned light touch, shallow key-dip, and bright tone of its *Prellmechanik* made for a lively set-up for speed.

Leading off, Michael squared up his first attempt with his high approach again, but this time the result was blazing. As he launched the hammer up at 36 milliseconds, his finger barely entered the well of the springy key, setting up a smashing volley on his second stroke (20 milliseconds). The result: the fastest repetition of the tournament at 68 milliseconds.

Michael's next three tries were speedy, as well: 74 (including a lightning-quick 19 volley), 91, and 91 milliseconds. His third try featured the fastest launch and rebound of the tournament, but unfortunately he could not catch up to deliver what would have been a total knock-out blow, his finger delayed by *just* getting caught in the key bed. Indeed, he did not escape unscathed: a final attempt FAIL and the inconsistency of his repetitions left behind the smallest cloud of doubt.

Tom had his opening. Tom released his economical, iambic stroke as before, but it ran into a little trouble without the weight of the Erard key to counterbalance it. His finger reached the bottom of the key earlier than he anticipated, requiring a slightly outsized motion to return the finger to a volley position. Nevertheless, his average times on Walter repetition slightly improved over his Erard result (91 down to 88), his iambic premise held, and he had no FAILS at all.

Michael had succeeded in gaining on Tom in the overall competition, but the last round contained the greatest technical challenge: the Erard that Beethoven hoped would feel more like a Viennese action.

MICHAEL	TOM
68	87
74	91
91	101
91	94
FAIL	86
Average of three best results:	
77.6	88

Table 4. Time of repetition, Walter model (milliseconds)

Launch (Launch to 1st strike)	Rebound (1st strike to resting)	Volley (Resting to 2nd strike)
36	48	20
41	55	19
25	34	57
39	38	53
34	38	FAIL

Table 5. Time intervals for MICHAEL, Walter model (milliseconds)

Launch (Launch to 1st strike)	Rebound (1st strike to resting)	Volley (Resting to 2nd strike)
40	51	36
54	57	34
35	45	56
41	56	38
46	57	29

Table 6. Time intervals for TOM, Walter model (milliseconds)

Round 3: The revised Erard

As Beethoven had learned over two centuries earlier, a "viennicized" Erard could behave both as a compositional inspiration and an unruly chimera. Slow-motion video capture yielded its most intriguing discoveries yet: after each launch's impact with the strings, the revised action's hammer returns to its rest position with an extraordinary wobble but nevertheless at high speed, causing a very high bounce off of the backcheck before the hopper can even reset for a volley. Altering the balance point and key-dip produces the trade-off of (at least initial) unpredictability in return for speed and resonance potential.

Michael, evidently unfazed by the chimerical action, approached the final round buoyed by his Walter performance. His first repetition ran roughshod over the unfamiliar mechanism (91 milliseconds). It was a huge improvement over his performance on the original Erard model;

Tom could only try to stifle his curses of (impressed) indignance. Though he stumbled into a final FAIL on his second attempt, Michael maintained his composure for the remainder of the round. His last two attempts churned out even faster than his first.

Tom, on the other hand, found himself quickly flummoxed. Though he landed his first try, he could easily perceive that it was slower than Michael's (102 milliseconds). Tom's iambic repetition sounded more labored; the crispness had dulled. When he tried to pick up the pace for his second try, the volley-stroke was silent—one last FAIL. Though he managed to increase speed with his third attempt (98 milliseconds), he was deflated with his final two tries, showing a significant overall dip from his results on the original Erard. Nevertheless, his consistency held.

MICHAEL	TOM
91	102
FAIL	FAIL
97	98
85	104
90	105
Average of three best results:	
88.6	101.3

Table 7: Time of repetition, revised Erard (milliseconds)

Launch (Launch to 1st strike)	Rebound (1st strike to resting)	Volley (Resting to 2nd strike)
32	43	48
35	57	FAIL
28	40	57
30	41	44
32	40	50

Table 8: Time intervals for MICHAEL, revised Erard (milliseconds)

Launch (Launch to 1st strike)	Rebound (1st strike to resting)	Volley (Resting to 2nd strike)
49	54	48
53	57	FAIL
66	68	30
58	60	44
50	54	51

Table 9: Time intervals for TOM, revised Erard (milliseconds)

For all the back-and-forth, the end of the tournament offered no clear-cut winner; the players thus declared a sportsmanlike draw. Michael had clearly gained highest speeds, but Tom had been more consistent, showing overall balance in speed (smaller range of repetition speeds) and success (one fewer FAIL).

What comes of going faster and faster: a revisionary listening

The competition had bolstered commonsensical ideas about the Erard and Walter actions. The construction of each action favored different parameters of speed and sound, which in this instance differentiated the two pianists according to comfort and technique when placed under the psychological pressure of a tête-à-tête. But Tom especially had been taken aback and disappointed by his experience with the revised Erard; it mirrored his uneasy first experience with Beethoven's own instrument in Linz. "It wasn't even competition with you, Michael," he mused at the end of the recording. "It was competition with the action." Beethoven's revised apparatus had tested and touched Tom's breaking point again.

Beethoven himself appears to have reached not just one, but two different breaking points with that very action. The first time occurred in light of his comparison of the Erard action with the Viennese instruments of his education and professional life; the second followed his order for the Erard's transformation. As this book's final pair of chapters is about to propose, seeking the content of Beethoven's encounter with these breaks opens up a rich field of investigation for piano researchers. What comes of attempting to alter the grain of an instrument so well-balanced as an Erard? "Faster and Faster" explored the vertical and immediate dimensions of this question, but what of the lateral and unfolding temporality of phrasing, for example? What does a piece like the "Appassionata," composed on—or more provocatively, *in competition with*—the revised action, tell us about Beethoven's relationship to an instrument that he once felt had accorded him great prestige? The Erard and Beethoven, it appears, had pushed each other to the brink.

"Faster and Faster" toyed with this psychological line of success and failure, outcomes decided by the interaction of player, technology, and circumstance. It offered an historical progression of comparison as an introduction to the physical sensations of interaction with piano technologies, leading to the conundrum of the revised action.

As the Orpheus research team peeled back layer upon layer over the months and years of investigation into the Erard, however, the notion of "revision" began to take on new meanings, revise its own shape, negotiating these failures and successes into a larger, not-so-linear picture of development and change. Though Beethoven in the end abandoned the Erard, the resulting challenge for us today is to hear its music as "revisionary"—that is, subject to rereading and reappropriation, inviting us to explore the unstable and living processes of listening to, performing, and composing on a piano.