

Evidence That Performing From Memory May Be More Challenging for Pianists Than Others (What?!)

Description

Back when we were in college, my wife and I would sometimes “argue” about whether her instrument (piano) or my instrument (violin) was the more difficult of the two.

I would always complain about how truly difficult it is to play in tune¹ And if you’d like to learn more about why exactly intonation is so tricky, and how to get better at playing more in tune, check out [cellist Minna Chung’s podcast episode](#) which looks at the science (and math) of intonation.², while she would point at how thin my stack of music was relative to hers, and argue that the sheer number of notes pianists have to play (and memorize) clearly beats my intonation card.

Indeed, when it comes to discussions about memorization, and whether musicians ought to perform from memory or not, it does seem like pianists are often at the center of the debate. Case in point, [Stephen Hough’s eloquent take on the subject](#) (or [this podcast episode](#) where he expands on this further), or this [WQXR radio spot](#), this [NY Times piece](#), or even [this entire blog devoted to memorizing music](#).

So...is performing from memory really more challenging for pianists than it is for other instrumentalists? And if so, why might that be (spoiler alert: it’s not related to the number of notes)?

Turns out there is actually some research and some data in this area! Which may be just as relevant to a number of non-piano instruments as well!

Context-dependent memory

Most research on memorization in music has focused more on exploring various encoding strategies (like structural analysis, practicing hands together or separate, etc.) than on the retrieval process.

But there are many factors that can affect recall too. One, is a phenomenon known as *context-dependent memory*. This is the curious observation that we have better recall of information if we are tested on that material in the same environment where we learned it.

For instance, way back in 1975, two psychologists tested members of a scuba diving club on their ability to recall a list of words while sitting on the dock (dry), or submerged underwater in their scuba gear (wet).

As it turned out, participants were able to recall the words just fine whether they were on land or underwater – as long as they did their learning and recalling *in the same context*.

In other words, those who learned in one environment and then were asked to recall in a different environment (wet-dry or dry-wet) recalled fewer words than those who did their learning and recall in the same environment (wet-wet or dry-dry).

Unpredictable, yet reliable

Other studies have replicated this effect in the years since, and even expanded on the idea of context to include internal mental states like mood.

It's important to note that context-dependent memory effects are notoriously unpredictable and tricky to study, since it's difficult to predict in advance what specific elements of an environment will matter.

Nevertheless, [enough studies](#) have found a memory advantage for recall in the learning environment, that we can be reasonably confident this is probably a legit phenomenon.

So what does this have to do with pianists?

A piano study!

Well, one of the unenviable realities of being a pianist is that they must spend most of their time practicing and learning and getting comfortable on one piano, yet perform on some strange foreign unfamiliar piano when it matters most. And sure, all pianos have the same number of keys, and are they're located in all the same places, but the weight and "touch" of the keys can be vastly different, not to mention the sound.

A University of Houston study ([Mishra & Backlin, 2007](#)) thus sought to see if practicing on one piano, and performing on a different piano could increase the likelihood of memory slips.

A tale of two pianos

32 first and second-year college piano students were asked to memorize a short [16-bar piece](#) composed specifically for the study. The students learned the piece on either a 7-ft Steinway grand, or a Kawai upright (both of which were located in the same teaching studio).

Then, they were asked to perform the piece from memory on either the same piano that they used when learning the piece, or the other piano.

And how'd they do?

Results

Those who did their practicing and performing on the same piano did well on their performance test,

scoring an average of 26.46 (Steinway) and 27.96 (Kawai) out of 32.

But it was a different story for the students who were asked to switch to a different piano for their performance. They had way more memory issues, evidenced by incorrect rhythms and notes, and ended up with average scores of 14.08 (Steinway-Kawai) and 15.96 (Kawai-Steinway).

Yikes!

I was never much of a pianist, but I did take piano lessons as a kid, and used to swear to my piano teacher that I sounded better at home, and imply that her piano was to blame. So I was right! Ha! Sweet, sweet, vindication!

Then again, to be fair, I didn't practice very much and refused to learn bass clef, so there may have been some other contributing factors...

Ok, so what are we supposed to do with this information? Is there anything we can do to counter the context-dependent memory phenomenon?

Take action

Fortunately, yes! It turns out that [learning material in multiple contexts during learning can help](#) to strengthen our ability to recall information in a new environment and nullify the context-dependent memory effect.

So even though I know we all have a tendency to gravitate towards our favorite practice rooms and favorite pianos, it seems like it'd be particularly important for pianists to embrace opportunities to practice and do run-throughs on many different pianos, not just the ones that feel most comfortable. In that sense, while it's easy to complain about practice room pianos not always being in tune, or how some keys are stuck, or the action isn't to your liking, it's kind of a luxury to have access to so many different pianos, as it takes way more work and effort to arrange time on different pianos when we leave school.

I imagine this would also apply to organists, harpists, percussionists, and other instrumentalists who may not be totally familiar with their performance instrument in advance.

Of course, it's less clear how much of an impact the context-dependent memory effect would have on other musicians who use the same instrument but still must practice in one type of setting (e.g. practice room, or one's home), and perform in a very different physical and acoustical setting like a concert hall. I'd imagine that there's still benefit in practicing in different spaces, no matter the instrument, but with regards to the context-dependent memory effect in particular, I guess I'll have to keep looking to see if there's any research that looks at this with string/wind/brass/vocal performers...

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References

Mishra, J., & Backlin, W. M. (2007). The effects of altering environmental and instrumental context on the performance of memorized music. *Psychology of Music*, 35(3), 453–472.
<https://doi.org/10.1177/0305735607077838>

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