The Practice Strategy That Could “Bulletproof” Your Memory Under Pressure

Description

I took piano lessons for several years as a child. But I didn’t get very far because I had a rather peculiar approach to learning.

Due to my principled objection to the existence of other clefs, I never bothered to learn bass clef. Anytime I got a new piece, I just memorized the left hand part first. And then I played off the music while looking only at the treble clef.

Kind of ridiculous in hindsight, but then again, I was a stubborn kid. ?

And apparently, the apple does not fall far from the tree. Because when my daughter was taking piano lessons, she had her own unique approach to learning.

Unlike me, she was open to learning both clefs. But in an interesting twist, she refused to look at the music. So she simply poked around on the keyboard for the right combination of notes until it sounded right.

If you can imagine giving a beginner typist a blank keyboard with no letters printed on it (isn’t that the awesomest thing ever?), you’ll have a pretty good idea what we experienced in our home every day.

Needless to say, it drove my wife (a pianist) crazy. Whom I’d often hear yelling “LOOK AT THE MUSIC!!!” from various corners of our apartment.

But then I came across a memorization study which made me wonder if our little one was actually onto something.

Could some version of this practice-without-the-score strategy actually have benefits when it comes to performing more securely from memory? And under pressure in particular?

Stress and memory

There’s a pretty robust literature which shows that stress and anxiety disrupts memory. Whether it’s taking a stressful math test, speaking in front of an audience, or giving a performance, we are prone to memory slips when the pressure kicks in.

But are memory issues under pressure inevitable? Or could there be a way to strengthen memory, and make it more stress-resistant?

A team of researchers (Smith et al., 2016) noticed that most of the research in this area hasn't been all that concerned with what specific memorization strategies their participants used, so they put together a study to dig a little deeper.

Two memorization strategies

The researchers recruited 120 participants, and randomly assigned them to one of two groups – a **study group** and a **retrieval practice group**.

30 nouns

Everyone was first presented with a list of **30 nouns** to memorize.

The **study group** then **re-studied** the 30 nouns.

Meanwhile, the **retrieval practice group** skipped right to practice tests. With no further study or review, they tried to recall as many items as they could remember from the initial presentation.

30 photos

Next up was a collection of **30 photos** to memorize.

Once again, the **study group** had time to re-study the 30 photos.

The **retrieval group** again skipped right to a practice test where they were asked to recall as many photos as they could.

Nouns and photos combined

Then, the **study group** was given a chance to review the original 30 nouns and 30 photos combined.

Meanwhile, the **retrieval group** attempted to recall as many of the 30 nouns and 30 photos as they could from the original presentation, with no opportunity for review.

A short distraction, and one last study/practice test session

Finally, after a short distractor task, the **study group** reviewed all 60 items one last time, while the **retrieval group**tried once again to recall as many items as they could.

And did these two approaches to studying lead to any differences in memory performance?

Adding it all up

Before we take a look at the results, let's do a quick recap.

All in all, the **study group** had **three** opportunities to study or review the material.

The **retrieval group** on the other hand, had **zero** traditional study sessions. They received **one single presentation** of nouns and photos, and with no further opportunity to review the material, were tested on their memory of the original presentation of words and photos from the very start.

On paper, that's an awfully lopsided advantage of study time for the **study** group. But how much would this matter when tested 24 hours later?

Memory tests under stress

When participants returned to the lab for testing, half of the participants – 30 from the **study group**, and 30 from the **retrieval group** – were asked to give a speech and solve math problems in front of 2 judges and 3 peers, so as to make them a little anxious and increase their stress levels.

Five minutes into this stressful task, they were asked to recall either the nouns or photos that they learned the previous day.

And twenty minutes later – which is about when the stress hormone cortisol reached its peak – they were asked to recall the other set of items that they learned the previous day (i.e. if they were tested on nouns on the first test, they were asked to recall photos on this test, or vice versa).

Memory tests with no stress

The other 60 participants were also asked to recall the nouns and photos they learned the previous day, but they did so at 5 and 25 minutes into completing a totally non-stressful task.

Results

As you can imagine, stress did have a negative effect on memory – *but only for those who studied in the traditional way*.

When stressed, the **study group** did worse on the memory test. Despite all of their study time, they were only able to recall **7** items when stressed, compared to **8.7** items when not stressed.

But the participants who did **retrieval practice**, seemed to be unaffected by stress. When they were tested during the stressful task, they were able to remember an average of **11.1** items. Which was essentially indistinguishable from their fellow retrieval practicers' recall performance when *not* stressed (**10.3** items recalled).

Even cooler…

Being able to strengthen memory under pressure is cool, but did you notice how the **retrieval practice group's** memory score when stressed (11.1) was better than the **study group's** score when *not* stressed (8.7)?

It's like **retrieval practice** enabled participants to perform better in the worst-case scenario than regular studying enabled participants to do in the best-case scenario.

Why wasn't studying more helpful?

The authors cite a convergence of research, from neuroscience to cognitive theory, noting that retrieval practice seems to strengthen memory more effectively than traditional studying, as it creates multiple pathways to retrieval.

Sort of like if Hansel and Gretel had left not just a trail of breadcrumbs, but also a trail of pebbles (of either the Fruity or Cocoa variety, but maybe Fruity better for visibility, Cocoa for taste?). And left a string tied to a tree at the entry of the forest. And used a map and GPS too.

The idea being, more retrieval attempts results in a greater number of distinct ways to access the same information.

What does retrieval practice look like for musicians?

When I was a kid, I never thought about memorizing a piece until it was totally learned. I saw memorization as a task that you engaged in during the "polishing" stage of learning a piece, when you were getting it ready for performance.

But how might things change if we saw memorization as an integral part of learning a piece from Day 1? Not as some add-on at the end of the learning process?

Some musicians already approach learning in much this way. Where they spend the first week or twosemi-memorizing new pieces in a basic sort of way. So that they can play it from memory, howeverimperfectly and haltingly, from a very early stage.

A 2007 study (Chaffin) for instance, tracked a concert pianist's practice as she learned Debussy's *Clair de Lune,* and found that she made a deliberate effort to emphasize memory from the very beginning, even if it meant "muddling" along in a start-and-stop-and-pause-and-think-and-start-again kind of way at the outset.

Whether it's semi-memorizing an entire piece or simply making teeny tiny daily attempts at recalling even a single phrase or two, integrating some memory component into daily practice does make a lot of sense…

After all, despite how disorienting my daughter's practicing was to listen to, now that I think of it, she never did seem to have any issues with memory on stage! ?

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References

Chaffin, R. (2007, April 1). Learning Clair de Lune: Retrieval Practice and Expert Memorization. *Music Perception*, *24*(4), 377–393. https://doi.org/10.1525/mp.2007.24.4.377

Smith, A. M., Floerke, V. A., & Thomas, A. K. (2016, November 25). Retrieval practice protects memory against acute stress. *Science*, *354*(6315), 1046–1048. https://doi.org/10.1126/science.aah5067

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