

# Brain Circuit Training for Musicians

New research shakes up well-worn practice routines

By [Patrick Sullivan](#) posted August 2015

Bored brains learn little. That principle has always made intuitive sense to bass player Paul Robinson—and it has suffused his teaching for decades. In a field that has traditionally pushed students to play a passage over and over until it's perfect, Robinson has taken a different approach. His students change gears often, moving from one exercise to another.

"When we keep changing the tasks that we have in front of us, it's like a fresh start every five or ten minutes," Robinson says. "And when the brain has a fresh start, it's more focused and in tune with what you want to accomplish." Robinson, a professor at Ohio State University, is excited to see a growing body of research supporting his long-held view that endless repetition isn't the best way to learn music—or anything else. "We actually have scientific evidence," he says. "It's not just intuition anymore."

Robinson has been inspired by the work of Christine Carter, a musician and performance psychology researcher who has teamed up with cognitive neuroscientist Jessica Grahn to study effective music-practice strategies at Western University's Brain and Mind Institute in London, Ontario. Carter is researching practice techniques drawn from cognitive and sports psychology to extract principles and techniques that can help musicians. These are some of the techniques Robinson has used with his own students.

## **Keep It Random**

His "out of the hat" exercises are exactly what they sound like: Students randomly draw cards requiring a three-to-five-minute focus on a particular skill or piece of music—anything from études or pizzicato to practicing in the dark.

"Every card is a new challenge," he explains. "It's random, and it's interesting, and it keeps them focused."

He's even created his own smartphone app, available on iTunes, that generates random string-crossing exercises.

For Robinson's younger students, changing things up is especially critical. "If I tell a nine year old to practice minor scales for half an hour, I don't think they'd accomplish much," he says. "But if I ask them to practice minor scales and then arpeggio and then bowing and then something else, it keeps them focused."

Older students, of course, have more patience. But they also benefit from changes of pace and division of practice time into multiple shorter sessions—three 40-minute blocks instead of a two-hour marathon.

## **Embrace an Athletic State of Mind**

Both Robinson and Carter say that brain-based practice strategies haven't yet spread widely in music practice and education, in sharp contrast to the athletics world, where applied sport psychology is a major force. "Musicians rely heavily on tradition, which is obviously an essential source of information

for our practice and performance,” Carter explains in an email. “It is time, however, to look to our athlete colleagues for how to incorporate more recent advances in learning research into our regular practice.” One of the most interesting concepts, she says, is the idea of “desirable difficulties”—a term coined by Robert Bjork, a psychology researcher at the University of California–Los Angeles. The idea is that making practice more difficult can actually increase long-term retention.

As a young clarinetist, Carter herself used the repetition model of learning. She’d repeat a challenging passage over and over again, gradually increasing the tempo, striving for perfection. It kept failure to a minimum. “This spoke to my inner perfectionist and felt quite comfortable,” she says.

But it’s not an efficient way to learn. Carter practices completely differently today. She now relies on the kind of “circuit training” Robinson teaches. “Interleaved practice” is the term applied to this approach. “Rather than repetitively ‘drilling’ one passage before moving on to the next, work on one passage can be frequently alternated with work on one or more other passages,” Carter explains. “Alternation between pieces is more challenging than constant repetition, because your brain has to continually recreate the action script for what you are about to do,” Carter says. “Interleaving requires more effortful processing, and this increased mental activity leads to greater retention—the real goal of practicing.” One example Carter cites is a study of baseball players practicing to hit different pitches—fast balls, curve balls, and so on. Researchers found that a random practice schedule interweaving different pitches was more than twice as effective as sessions in which players swatted at the same pitch over and over again.

### **Train the Brain**

But one of the biggest obstacles musicians face in adopting fresh practice techniques is actually the human mind itself, which seems to play tricks to keep us in comfortable patterns of repetition. Changing things up often doesn’t *feel* more effective. In many studies comparing traditional repetitive practice to interleaved approaches, Carter says, participants came away feeling they’d learned more with block practice. That was true even though the studies showed that interleaved practice actually led to far greater learning.

The best antidote to that self-trickery may be for musicians to watch the strides they make in performance by stepping outside their practice comfort zone. Carter points to one of her students this year who made striking improvement. The young woman came into the clarinetist’s studio with low confidence and a “play-it-and-repeat-it” approach to practice.

“Once she learned that there are many possible practice techniques for any given passage and how to use them in a way that engaged her mind, she took off,” Carter says.

The student started having positive performance experiences for the first time in her life. “For her and all my students, what is most exciting to me is watching them take control of their learning,” Carter says. “Once they understand what leads to long-term retention, they dare to venture into the discomfort zone, continually finding new ways to challenge themselves in practice. Ultimately, this gives them security when it matters—in performance.”