RETHINKING PRACTICE

Malcolm Gladwell's widely read book *Outliers* is, you could argue, a study of the number 10,000. That's the amount of practice, in hours, necessary to become world-class at just about anything, he argues. Gladwell details how the "10,000 hour rule" helps to explain the rise of experts from Bill Gates to the Beatles. Exceptional talent equals an exceptional quantity of practice—10,000 hours to be exact. But of course what you do in practice matters as much as, if not more than, how much you practice. "A kid who practices hours of sloppy pick-up basketball every day is going to develop less than a kid who practices really well for two hours a day with good instruction and feedback," Michael Goldstein, one of the best teacher trainers in the country, recently told us. John Wooden seems to concur, offering would-be coaches this singular advice: "Never mistake activity for achievement."

On the basketball court, in the classroom, and in a thousand other places, you can work hard without getting very far. During practices, coaches urge hustle and effort, but they aren't enough, a fact that is especially challenging because hard work is so easy to see. Like a shiny, bright, and brilliantly distracting object, it draws our attention. We overrate hard work in evaluating the effectiveness of practice. "Bustling bodies making noise can be deceptive,"

Wooden wrote. Hustle and bustle can distract us from noticing when we're not actually that productive. This is just one of the ways that this chapter asks you to reexamine assumptions and truisms about how practice works.

Let's begin by looking at a youth sports practice. It is a brisk evening and a group of nine-year-old soccer players are bustling about on a patch of turf. The drill they're doing requires them to dribble the ball through a set of cones, then pass the ball underneath a bench as they run to one side of it, meeting the ball on the other side. Once they do this they move into a square of cones where they tap the ball back and forth between both feet quickly ten times. Next they race off to a new set of cones where they tap the top of the ball with alternating feet. The sequence ends with their dribbling in for a shot on goal. At first glance, the drill seems first-rate. It offers constant activity and continuous variation plus the opportunity to practice a myriad of skills. Busy bees! A closer look, however, reveals that what these players are doing may not lead to much improvement. It's not enough to just be busy.

Consider the part of the drill in which players tap the ball back and forth between both feet, for example. One of the keys to doing the activity correctly is to bend the knees slightly, as one of the coaches points out when she introduces the drill. However, you observe that many of the players complete the activity with their knees locked. Some appear to pass the ball fairly well, but in reality they are practicing doing it wrong, getting better at standing up straight instead of flexing their knees. Every time they run through the drill, they get more and more familiar with the feel of playing with their knees locked. As they do so, they get further and further from their goal. Now think of all the skills contained within these drills and all the ways players might be doing them wrong—shooting with a loose ankle or pushing the ball too far ahead on the dribble, and so on. Activity? Yes. Achievement? Not so much.

Surely the practice we just described isn't all that bad, but it could be much better. Training and development of an organization's talent that is "merely good" is not enough to make individuals or an organization significantly better than anyone else. Even a higher quantity of "good" practice won't really set your organization apart. To be significantly better you need to be significantly more productive in every minute that you practice. You need to be great. Fortunately, great is often not that far from good, and even small changes can increase by a striking degree the rate at which people develop.

Michael Goldstein applies this idea to teacher training. He observed to educator-writer Jay Mathews recently that less practice of better quality could yield more preferable results than more practice of lesser quality: "A rookie teacher who simply student teaches or acts as an assistant teacher might simply be repeating the WRONG moves." Imagine the benefits to the teaching field, Goldstein wonders, if the same amount of practical learning could be accomplished in a practice lab at one fifth the cost of a typical field placement, or at the same cost with five times the learning. And imagine the squandered investment. We send teachers out to "practice" the job in settings where there's not much supervision or specificity about what and how; not much feedback and oversight. We know the cost of training is immense, but for all we know, it doesn't help at all. Couldn't a similar argument be made about the training of doctors and lawyers and a thousand other professionals?

In the rules that follow we'll rethink eight assumptions many people hold about practice (and see the summary table at the end of the chapter). Reexamining assumptions can help you dramatically improve the quality of what you do to get your team ready for the game, a key meeting, a challenging work situation, an artistic performance, or a medical procedure. In all of those cases better practice will help you to win.

In reading this chapter, your goal need not be to turn what you do for practice upside down all at once so much as to tinker and improve it, piece by piece, to find what works better, until what you have is a killer app for improving people. See if this works. If so, keep it. You can be skeptical and still test new ideas, then decide whether each one is the right change to drive results. So choose an idea, maybe even a handful, and see where that takes you. These rules will start you on your journey.

RULE 1
ENCODE SUCCESS

We are fond of saying "practice makes perfect," and indeed the title of this book plays on the connection between practice and perfection. But it is more accurate to say that practice makes permanent. In practice you can master a skill thoroughly or not at all, and what you master can be the correct method or one where your knees are locked. Either way, what you do is likely to become encoded—it will be instilled in muscle memory or mental circuitry and become habit—for better or worse. Practice all the wrong moves and your team will execute the wrong moves when it's time to perform. Practice without intentionality and you will perform without much intentionality. A critical goal of practice, then, should be ensuring that participants encode success—that they practice getting it right—whatever "it" might be. While that may sound obvious, practice that encodes failure is common. There are a lot of reasons for this, but two seem especially pervasive. First, we can fail to observe our practices carefully and strategically enough to see whether participants are getting things right, and second, we can put participants in situations that make failure likely in a mistaken effort to steepen the learning curve. In a minute we'll tell you a bit more about those two pitfalls but first, a brief digression on the topic of romanticizing failure.

Someone you know, maybe your Uncle Lou, tells a version of this story. He will be thinking back to the days when he was just learning to (a) write a legal brief, (b) ride a bike, (c) dance the tarantella, or (d) shingle a roof, and say, "By God, I tried it a hundred times. Got it wrong the first ninety-nine, but I picked myself up. Eventually I got it." Your Uncle Lou may be right that he learned that skill pretty well, and the struggle may have been invaluable to him—but just because a great many things have been learned via Uncle Lou's method does not mean that it is

the most efficient and effective way to learn in general. Uncle Lou may have learned at a cost, in time and effort, that was ten times what was necessary. Which means that the real story could equally have been how good he might have been if he'd learned more efficiently. If your job or your passion is to make success systematic, to train people to do something better than anyone else—value investment cash flows, teach public school children, field ground balls cleanly—be skeptical of stories that romanticize failure. While failure may build character and tenacity, it's not as good at building skills.

Let's look more closely at those two common reasons why practice encodes failure. The first comes about because running effective practice requires a systematic attentiveness to participants' rate of success. "You haven't taught it until they've learned it," Wooden liked to say, and the best teachers test to see how much students have learned—a process called "checking for understanding"—every few seconds. They realize that lack of understanding builds on itself and gets harder to fix the longer you wait, so they are always asking themselves, "Are students getting it? Am I sure?" In the case of practice, systematic observation of participants to ensure that they can do what you tried to teach them should include not just checking but acting on the results. Practice should be designed so that a participant who fails to succeed at an activity tries it over again. This can be within the activity's original setting (they go back to the front of the line) or in an impromptu one-on-one session ("Let's try that a few times standing right over here, Charles"). Checking for mastery requires responding to failure to remediate it as quickly and as positively as you can. But it also means thinking differently. It means thinking about participant performance as data. If you were running a practice session and three participants got the activity wrong followed by one who got it right, you might be tempted to think, "Good, they finally got it." It's just as plausible that the correct response would be, "Uh-oh. Only one out of four of them

got it." In other words, the news is cause for concern, not celebration. In the soccer practice we described at the beginning of the chapter, players encoded dribbling a soccer ball wrong and therefore got better at doing it wrong. One contributing factor was the drill's design, which made it difficult for coaches and players to be attentive to whether success was happening—to check for mastery. With five different activities going on at once there was probably too much for the coaches to process with the kind of systematic, data-driven focus that checking for mastery requires. Every time they turned, there was a new thing to be looking for: locked ankles, bent knees, being up on toes. The result was lack of awareness about participants' level of mastery of each task. The complexity of the drill increased the likelihood that failure went undiagnosed—and thus continued.

Another source of encoded failure is the tendency of coaches to double down on difficulty in the hope that this will steepen the learning curve. If hitting a hundred pitches in the backyard will make your daughter a better hitter, it's easy to think that hitting a hundred 60-mile-per-hour pitches in a batting cage will make her better even faster, but that's not true. Facing pitches that are moderately above her current ability level is likely to allow your daughter to apply small corrections to what she does and see whether they work. It allows her to get more efficient with her technique. However, if the pitches are too fast and result in her consistently missing the ball, she's likely to start reaching desperately to make contact, disrupting the things she already does well and trying random rather than productive adaptations. Straining fruitlessly at the streaking ball, she risks developing new bad habits.

Cognitive scientist Daniel Willingham observes in his book *Why Don't Students Like School?* that people learn fastest when the problem solving they are asked to do requires them to make small and steady leaps, when problems are challenging but not sink-or-swim-ish. If the task is accelerated too much, learning slows down. What's more, Willingham observes, people like solving problems

when they are presented in a gradual and incrementally more complex way, which means people are actually happy when they are learning well. But this means that failure can also be costly. It may cause participants to give up. Only by immense forces of will do they keep going when they get it wrong time and again. The fact that Uncle Lou remembers his desperate, knocked-down-99-times struggle to learn so vividly only suggests that it was perhaps the only time in his life when he endured such a struggle.

Finally, it is important to consider what we mean by success. While we want participants to experience primarily success during practice, the ideal success rate still isn't 100 percent—if that's the case, then the activity isn't hard enough. You want a success rate that's high enough to be reliable: most of the participants get it right most of the time. If you start a process with a significant amount of error, don't stop until your participants have begun to encode success. If the error is persistent and prevalent, ask yourself whether there needs to be so much of it. Why not redesign the process instead, eliminating complexity or variables to make the task temporarily simpler, breaking a chain of skills down to focus on just one, or slowing things down so there's time to process the complexity and then speeding it up later on? As a rule of thumb, we use the following goal for practice: you want your participants to complete the fastest possible right version of the activity. If they aren't able to do it right, slow down and work back up to the original task. A corollary of this is to do the most complex possible right version your participants are able to sustain with consistent—if imperfect—success. If they aren't able to do it right, eliminate complexity until you start to see mastery. Then build back up from there.

Encode Success
- Engineer practice activities so that the success rate is reliably high; if the activities are especially challenging, ensure that they end with a period of reliable success so your participants practice getting it right.

- Check for mastery constantly. If activities don't result in reliable success, simplify temporarily so that participants start successful; then add complexity.
- Focus participants on the "fastest possible correct version" or the "most complex right version possible" for any activity.

RULE 2
PRACTICE THE 20

The 80/20 rule, commonly cited among economists to explain a wide variety of events, is sometimes known as the "law of the vital few." It's a pattern that holds true again and again: 80 percent of results turn out to come from 20 percent of the sources. Your business digs into the data and finds that 80 percent of its profits come from 20 percent of its customers. Or in seeking to understand those high-value customers, the company finds that 80 percent of the useful information comes from 20 percent of the data points. Even though you spend a ton of money gathering the rest of the data, it doesn't actually help you that much.

The law of the vital few relates to practice as well. It suggests that to become great, you should focus more on practicing the 20 percent of things that most create value than the other 80 percent of things you could plausibly spend time on. You'd practice that 20 percent of things obsessively—80 percent of the time, some would argue—eschewing things of lesser value and becoming, metaphorically (or literally), the football team that runs five plays so well that even when everyone in the stadium knows they're coming, they're still unstoppable. With practice you'll get stronger results if you spend your time practicing the most important things.

One of the most counterintuitive but valuable things we've realized about practice is that the value of practicing something *increases* once you've mastered it. Most people say, when participants get to proficiency, "Good, they know how to do that. Now

let's move on." But if you are practicing one of those most important skills—one of the 20 percent of skills that drive 80 percent of results—don't stop when your participants "know how to do it." Your goal with these 20 percent skills is excellence, not mere proficiency. Keep going so that what you develop is automaticity, fluidity, and even, as we'll discuss later, creativity. Being great at the most important things is more important than being good at more things that are merely useful. Xavi Hernandez, one of the top soccer midfielders in the world, makes this point in an interview in England's *Guardian*. Xavi describes a single practice activity that characterizes Spanish soccer and explains its dominance. "It's all about *rondos*," he says, referring to a game in which four or five players pass a ball rapidly around the outside of a square and one or two players pursue the ball. "*Rondo, rondo, rondo.* Every. Single. Day. It's the best exercise there is. You learn responsibility and not to lose the ball. If you lose the ball, you go in the middle. Pum-pum-pum-pum, always one touch." The drill is so useful that players do it over and over—at the expense of something new. The value of the drill doesn't decrease as they get better at it; it increases. And in the end the fact that the Spanish have a specific name for this drill expresses its importance—and, incidentally, the usefulness of naming drills to allow participants to discuss them more efficiently. To be, like the Spanish, the best in the world and to develop a competitive advantage, be alert for the times, when participants learn something in an especially valuable type of practice, when it would be more productive to say, "Good, let's keep practicing this until we're truly great."

So how do you find the 20 percent of the things that are the most important to practice? You may know these things already from experience. If so, great. If not, data can be an excellent source of insight. What do your customers tell you they appreciate? What do your employees say makes them value their managers? What math skills most lead to mastery of algebra a year from now?

What procedures in the operating room are most common—or are most likely to lead to errors, which could be eliminated?

If clear data are not available, consider harnessing the wisdom of crowds. We're stealing the phrase here from the book of the same name by *New Yorker* financial columnist James Surowiecki, who points out that aggregating the opinions of multiple people often yields an accurate analysis of a challenging situation—even if none of the people is an "expert." In one example, a missing submarine is found in the midst of thousands of square miles of open ocean by averaging the guesses of multiple scientists as to its location. No individual was close, but the average of all individual opinions was stunningly accurate.

If you're struggling to identify your 20 percent of things—if you don't know what the five most important things for a budding saxophonist to practice are—assemble a group of relatively informed people and ask them to name their top five. Using the five most frequently cited ideas as your answer won't be perfect, but it will be darned good and will allow you to begin practicing each topic to excellence. The goal is not to be good at basic skills and then move on. The goal, again, is to be great at the most important things.

It's worth noting that the 20 percent will change over time and thus require periodic reassessment. Assessing your 20 percent is also a smart way to use data. Tim Daly, president of The New Teacher Project, recently did this to revise the way his organization trains teachers. Daly realized that teachers TNTP placed in schools often never succeeded if they failed to learn to manage classroom behavior within the first two months. He asked his team to redesign training, dramatically reducing the number of topics on which new teachers received training and focusing on the skills they would need to establish a classroom culture until that goal was achieved. This change allowed them to spend 80 percent of their time on 20 percent of the skills and to better prepare their teachers for success. After that there would be more time, they

realized, to practice skills that would be more important over the long run—a new 20 percent.

Your first instinct may be that organizing practices around the 80/20 rule will cause you to spend more time planning. The short answer is that you're probably right. You can't decide on Friday at 2 P.M. what you'll do for professional development that afternoon with your teachers; you can't decide each afternoon while driving to your daughter's basketball practice what you'll do at practice that day. The longer answer, however, is more nuanced. You have to build a map of your goals from the outset. And you have to design extremely high-quality activities for each of your 20-percenters that get progressively more complex. On the other hand, once you've done that, you'll no longer waste time preparing a smorgasbord of activities that you'll use briefly and discard. You invest in developing better activities that you will use over and over. In the end this may save you work.

Practice the 20
- Identify the 20 percent of things you could practice that will deliver 80 percent of the value.
- Practice the highest-priority things more than everything else combined.
- Keep practicing them: the value of practice begins at mastery!
- Save time by planning better in advance.
- Engage participants by repeating productive drills with minor variations instead of constantly introducing new ones.

RULE 3
LET THE MIND FOLLOW THE BODY

A colleague of ours, a teacher we'll call Sarah, spent a lot of time practicing giving directions to her students. She did this because students had sometimes struggled to follow her directions and

several observers suggested that one reason might be the directions themselves: what Sarah asked her students to do was sometimes not so clear. So Sarah practiced, first writing out sequences of concrete, specific observable directions, a technique known as *What to Do* (described briefly at the end of this book). Then Sarah practiced saying aloud the directions she'd written as if she were delivering them to her class. She did this both on her own and with colleagues, and made revisions based on the surprising amount of insight she gained from hearing the words aloud. During the period of time when she was practicing her directions, she tried to make the skill a habit—that is, her natural way of thinking—so she practiced in every setting she could think of, even if only briefly.

A few weeks later, Sarah asked a colleague to observe her class. Afterwards, her colleague's first question was to ask Sarah herself how she thought it had gone. The good news, Sarah observed, was that the class had gone relatively well. Students had been orderly and productive, so at least she hadn't been embarrassed. But she apologized: she hadn't had a chance to try many *What to Dos* except at the beginning of class. She didn't demonstrate the skill she'd been practicing. Perhaps the observation had been a waste of time. Her observer had seen something totally different, however. She had seen Sarah use *What to Do* time and again when students needed a quick correction to help them back on task. Sarah, in short, had been using the thing she had practiced without even realizing it.

Sarah had made a habit of a skill through practice; in the game, when her mind was processing other things, it relied on the new habit without her realizing it. This experience may well be familiar to musicians and athletes and others who practice regularly. Once you have learned a skill to automaticity, your body executes, and only afterwards does your mind catch up. Customer service representatives who are trained to be calm with angry customers don't get any less frustrated in an adversarial situation; rather, they have normalized an emotionally constant response by

practicing it. They do it without thinking, and this is exactly the point: the best way to get employees to behave calmly in the face of difficulty is not to ask them to consciously choose to exude calm during tense calls; it is, rather, to practice being calm in tense situations over and over so that it happens automatically.

In *Incognito: The Secret Lives of the Brain*, science writer David Eagleman describes not only the ways our brains do things we are not fully aware of, but the critical importance of our brains relying, entirely unconsciously, upon behaviors we've learned by rote. In one example, he describes research conducted on amnesia patients, whom researchers had learn and practice a video game. Because they had no short-term memory, they were unable to recall playing the game, but when they played again their scores improved at the same rate as those with fully functioning memories. The takeaway: You don't have to be aware of your knowledge to use it.

In fact, awareness often gets in the way. It is not a quirk of survival but a necessity that, speeding down the highway, your foot moves to the brake pedal well before your conscious brain has time to get involved in analyzing the decision. For people who perform for a living, the imperative of training the mind to execute unconsciously is also strong. Eagleman describes the ironic fact that "a professional athlete's goal is to not think." Rather, his goal is to develop "economical rote algorithms" during practice so that "in the heat of battle the right maneuvers will come automatically." Consider hitting a baseball. It takes about 0.4 seconds for a serious fastball to reach the plate. "Conscious awareness takes longer than that: about half a second," writes Eagleman, so most batters are not consciously aware of the ball's flight. The entire process happens before the batter becomes aware of it. Success is based on habits the batter has built but cannot consciously manage in the moment when they are most needed.

A synergy of conscious problem solving and automaticity developed through practice. This phenomenon is evident every

time you drive. Not only do unconscious habits you've burned into your memory determine many of your actions, but while all of this is happening you may engage in some of your deepest and most reflective abstract thinking. While you are executing a series of complex skills and tasks that were at one time all but incomprehensible to you, your mind is free to roam and analyze and wonder. If you use practice to build mastery of a series of skills, and if you build up skills intentionally, you can master surprisingly complex tasks and in so doing free your active cognition to engage with other important tasks.

Our colleagues Nikki Frame and Maggie Johnson, you may recall, met for ten minutes every morning to practice responding to unexpected student answers. In the course of a few weeks, they managed to master the skill. One of the results was that Nikki and Maggie were left with additional processing capacity during class, which allowed them to focus on intellectually abstract and strenuous tasks.

Imagine how powerful this idea could be if applied in other highly technical or complex settings. Imagine doctors practicing, for a few minutes a few times a week, reacting calmly to agitated patients during examinations. Once they were able to do this with equanimity, it would both limit patient agitation and increase the processing capacity doctors had to listen to and assess their patients. They would solve complex problems at a higher rate by limiting the brain's focus on manageable aspects of the interaction. We will pick up this realization—that rote learning works in synergy with deep thinking—in our next rule, Unlock Creativity . . . with Repetition.

Let the Mind Follow the Body

- Stress learning skills all the way to automaticity so that participants can use them automatically—and before they consciously decide to.
- Build up layers of related automated skills so that participants can do complex tasks without actively thinking about them.

- Automate fundamentals, but also look for more complex and subtle skills that may also respond to automation. It's a false assumption that only simple things can become habits.

RULE 4
UNLOCK CREATIVITY . . . WITH REPETITION

Here's a useful observation from John Wooden that establishes a corollary to Rule 3: "Drilling creates a foundation on which individual initiative and imagination can flourish." If Rule 3 suggested the power of learning things by rote because it allows you to do them with unconscious efficiency, its corollary, Rule 4, focuses on what your conscious mind is doing while your unconscious mind is executing. To examine this, you might ask yourself when in the day you have your most creative thoughts. The answer is likely to be when you are taking a shower, driving your car, brushing your teeth, or jogging; that is, when you are doing some task you have done a thousand times and can complete automatically. What your mind is often doing when you are executing such tasks is thinking creatively. One way to get more creative is to give your mind the capacity to wander a little bit in settings where it had previously been encumbered—that is, by automating skills required in those settings.

Athletes and other performers often describe how, after a certain amount of experience and practice, the game "slows down" for them. What this means is that at certain points in the game their mind has gotten access to new processing capacity because complex actions have come to require a smaller percentage of available capacity. All of a sudden they can look up and see an open teammate or a new passing lane. This gives us more perspective on the connection between automaticity of high-frequency skills and creativity, a connection that Johann Cruyff makes even clearer.

Cruyff, counted among the five or so greatest soccer players of all time, is often cited for his unparalleled creativity. In a game, he would suddenly flout deeply rooted expectations about what to do in a certain situation and do something entirely unexpected—with devastating effect. In an interview, he was asked to recall players who, in his youth, were better than he was but who failed to succeed. Recalling them, he said, "They were very good players. But at a certain moment it has to be done quicker, where instead of having two meters to control the ball, you have half a meter and if the ball moves half a meter, you've lost it. When there was pressure it was all over. It had to be faster." Cruyff didn't say he had become more creative. Instead, he noted his automaticity at core skills— the 20 percent—under pressure. He was automatic and therefore prone to thinking about other things while executing. Creativity, it turns out, is often practice in disguise, and to get more of it, it often helps to automate other things. If you want to unlock creativity at certain critical moments, you might identify skills required at those moments and automate them in order to free up more processing capacity for creative thinking.

It's worth pausing here to observe that arguing in favor of more drilling would set many American educators on edge. Many educators perceive drilling—which they characterize with the pejorative "drill and kill"—to be the opposite, the enemy, of higher-order thinking. To them, an explicit correlation between imagination and drilling would be anathema. Learning that asks students to memorize and automate will reduce their ability to generate creative thoughts and make cognitive leaps, such educators might argue.

The problem with that argument is that learning generally doesn't work that way. As cognitive scientists like Daniel Willingham have shown, it's all but impossible to have higher-order thinking without strongly established skills and lots of knowledge of facts. Cognitive leaps, intuition, inspiration—the stuff of vision—are facilitated by expending the smallest possible amount of processing

capacity on lower-order aspects of a problem and reapplying it at higher levels. You leap over the more basic work by being able to do it without thinking much about it, not by ignoring it. This synergy between the rote and the creative is more commonly accepted in many nations in Asia. "Americans have developed a fine dichotomy between rote and critical thinking; one is good, the other is bad," write the authors of one study[1] of Japanese schools. But they find that many types of higher-order thinking are in fact founded on and require rote learning. Creativity often comes about because the mind has been set free in new and heretofore encumbered situations.

In business school Doug once worked in a group trying to solve a macroeconomic problem. It came down to an equation made up of dozens of variables scrawled across a whiteboard. Solving it seemed impossible. Then, a member of the team—educated in Eastern Europe, not coincidentally—walked to the whiteboard. "This part of the equation must be negative," he said, circling a series of variables. "This coefficient is negative, and every other value is positive." He then circled two more strings of variables. "These two must be positive, because in this one all of the values are positive and in this one we multiply two negative values. So we have, really, in this equation a negative times two positives. This must give a negative." He sat down: "Like this, we will all go bankrupt." He had leapt over and across the problem in a way no one else had, not because he ignored the rote work but because he was so facile at it. To skip over the mundane parts you have to know them cold. John Wooden said that "[I] wanted to be as surprised as our opponent at what my team came up with when confronted with an unexpected challenge." What's counterintuitive is Wooden's belief about how you got there. Drilling let players' creativity emerge under pressure.

We began experimenting with the idea that increasing repetition could unlock creativity and individuality in our own teaching workshops and applied this idea to an activity called the "Strong

Voice" layup drill. In the activity (described in the back of the book), teachers practice prompting a slouching student to sit up. They cycle through a line playing the roles of teacher, student, and coach (who gives feedback). They practice using nonverbal skills to ensure compliance. The first time we ran the activity, we asked people to go through the line two or three times. What we saw was people doing something and thinking about it at the same time. Participants were completing the task but awkwardly and without adaptation to their own style and manner, so we made some simple changes.

First, we split groups in half. Instead of practicing in groups of eight, they practiced in groups of four. This doubled the repetitions each participant got. On the first try, participants were all over the map in their approaches; people tried using gestures that worked as often as they tried ones that didn't. They made sweeping, almost theatrical hand gestures, for example, that seemed strange and awkward. Over time, successful ideas began to emerge, and as a group they began to "get it," to internalize a vision of what the activity, well implemented, should look like: symmetrical posture and slow, controlled gestures. Variation decreased. People borrowed ideas from one another and began to look like each other. Some educators might have argued that the drill was causing creativity to decline. But then as we continued to practice, variation began to reemerge. Teachers made subtle changes to their gestures or their tone. Slowly, individuals developed their own style. Some were stricter; some were warmer. Some communicated with hand gestures; others gravitated to facial expression. Variation reemerged. Creativity was back—within a narrower range but with greater effectiveness.

After one workshop in which participants had completed perhaps fifteen iterations of the drill, one teacher made an especially insightful comment. On a final round of the activity, we asked teachers to assume that the student they were correcting was their most motivated and positive student, on a difficult day. "I felt

like I was teaching from light," she said. "I was correcting, but it was positive—because I cared about her. I could feel the difference and I started to think, *My gosh, why don't I always teach from the light?*"

The three of us have returned to her observation time and again. We find it inspiring and powerful—in part because it is indicative of the type of people who teach and why we love the work so much, but also in part because it emerged from the meditative nature of practicing a mundane and unheralded moment, over and over. This insight might never have happened without an activity that may have at first appeared banal. Repetition gave rise to meditation and then wisdom.

Unlock Creativity . . . with Repetition

- Automate skills to free participants' cognition to be more creative.
- Look to automate skills at exactly the moments you need creativity most, to free up processing capacity.
- Push participants to reflect later, after they've practiced enough to better understand what they are doing.

RULE 5
REPLACE YOUR PURPOSE
(WITH AN OBJECTIVE)

Everyone has a purpose in mind when they lead practice, but to truly turn activity into achievement, replace your purpose with a clear and focused objective. The difference may seem semantic, but an objective is different from a purpose in four key ways.

The first difference between a purpose and an objective is that an objective is measurable. Having a purpose means knowing what you want to work on—passing, for example. Having an objective

means defining specifically what your participants will be able to do by the end of the session—"be able to pass the ball accurately on the ground for distances of twenty yards." When an objective is measurable it means that at the end of the session you can tell, via observation or a quick assessment, whether you have succeeded at teaching it. You can't see whether your players can pass by the end of an hour: in what setting and under what circumstances do you mean? As a result you can't really tell whether you've accomplished anything. By contrast, you *can* see whether players can consistently pass the ball accurately over distances of twenty yards on the ground, though measuring that might cause you to get even more specific: "be able to pass the ball accurately on the ground for distances of twenty yards so the receiving player does not have to adjust his position on eight out of ten tries." Framing your goal precisely and measurably lets you understand more clearly what your players can do and how effective your teaching was, and allows you to set high standards—"we're not done until we get it eight of ten times."

Second, an objective should be manageable: you should be able to accomplish it in the time available. You couldn't expect players to master the skill of passing in an hour of practice; they'll spend years mastering all of its nuances and skills and settings. But depending on the skills they've mastered in previous sessions, you might hope to have them master a singular aspect of passing. And only by knocking down all the pieces of passing effectively, day by day, will they master the larger art.

Here's what those first two criteria might look like in a professional setting. If you were working with a group of surgical residents, you would replace a purpose like "We're going to practice preparing for surgery" with an objective: "We're going to practice applying our preoperative checklist with a full team, identifying and fixing small errors." That would be a focused objective. We'd bet on a team that addressed ten such precise objectives in sequence over a team that engaged in generalized practice ten times in a row.

In addition to being manageable and measurable, an objective should also come with mastery guidance—one or two things to focus on in doing it right. You tell your surgical residents, "to do it right you want to focus on getting your light source shining down on the incision, and to use standardized signals to ask team members to adjust lighting." In the case of passing the ball accurately on the ground over long distances, you'd want your players to focus on locking their ankle when striking the ball and following through with their knee raised. This allows participants to practice with focus and intentionality and to concentrate on successful execution versus mere completion of an activity.

Last, an effective objective is made ahead of practice, and this is perhaps the biggest challenge of all. Many practices begin with the thought, "What am I going to do tomorrow?" (or even this afternoon!). When you ask this question, you are starting with an activity, not an objective—with the action, not the reason for it. In the end, you can't decide if an activity is the right one to do until you know why you're doing it. Instead, start by asking what you are going to accomplish, and then ask what the best route to that goal is. When an objective is made first, before the activity, it guides you in choosing or adapting your activities. When it comes second, after you decide what you'll do, it is a justification.

This may seem like an esoteric difference, but it isn't. We once videotaped a champion teacher in his classroom, a guy who amidst a school of "pretty good" had achieved consistently outstanding results among his students. After taping his class, we lingered to watch a training session run by the principal of the school, who asked the staff to write down the percentage of their planning time they used to plan their lesson and the percentage to define their objective. The principal went around the room asking teachers to share what they wrote. "Ninety percent of my time on the lesson activities, ten percent on the objective," said one teacher. Another said 95 and 5; a third, 80 and 20. The principal came to the

teacher we'd taped, the champion teacher: "Ten or twenty percent of my time on the activities," he said, "eighty or ninety percent of my time on the objective." Great teachers understand that you start with the outcome you desire. The strategic decision about what skill to refine is the essence of teaching. When we would practice responding to off-task student behavior via a drill we called "behavior lab," one teacher, like Jen in the story from the Introduction, would stand at the front of the room and try to teach while the rest of us played students—some being productive, some disruptive. But we were not at first specific enough about what we were working on, and so teachers would face a random set of behaviors to address—not what they had reflected on, not what they were especially weak or strong at. Lacking intentionality, we failed to make teachers much better. Over time we learned to set particular objectives: sometimes for each session of behavior lab, sometimes for each round, occasionally for each participant. Our results improved immensely.

A final observation is necessary here. A good objective operates in concert with other objectives. It builds on skills your participants have recently mastered and leads to more comprehensive and complex areas of mastery. Your objectives may involve learning nothing new except integrating skills your participants mastered previously. As you strive to reach this point of integration, perhaps some aspect will appear especially difficult and will require further attention—that is, another practice session that repeats the original objective. Your purpose adapts then to the rate of mastery demonstrated in practice, and you aren't afraid to circle back and repeat a topic, possibly multiple times.

Replace Your Purpose (with an Objective)

- Replace the vague idea of a "purpose" with a manageable and measurable objective that is made ahead of practice and gives mastery guidance.
- Teach skills in a sequence of objectives of increasing complexity.

- Include objectives that focus on integrating previously mastered skills.
- Adapt objectives to the rate of participants' mastery.

LEARNINGS: UNDER SIX SECONDS

Caleb Porter, coach of the United States Under-23 National Soccer Team, sets a measurable goal for his players, not only in practice but in games. Any time they lose possession of the ball, they must do anything they can to win it back within six seconds. If they fail, they return after that to "normal" defensive strategy. While most coaches tell their teams to work hard to win the ball back after they lose it, Porter's goal, adapted from one used by top coaches in Spain, is measurable and the difference is important. With a more general goal of working hard to win the ball back, players would likely believe they had accomplished the goal in every situation. Doesn't every player believe he or she worked hard to get the ball back? Porter's objective, by contrast, allows him to hold his players more accountable—because it is objective. It also allows him to set measurable goals. He could set a goal of earning the ball back in the first six seconds 60 percent of the time—during a game or during practice. He could support it with what teacher trainer Michael Goldstein calls "feedback with a number." "We achieved our six-second goal 40 percent of the time." This allows players to constantly know where they stand and for the coach to set goals without always being the source of the judgment. It's very different to say, "We won the ball back 40 percent of the time. We need to win it back 60 percent of the time. Let's keep working," than it is to say, "We didn't work hard enough to win the ball back. We need to practice working harder." The team can run drills with exactly the same objective it'll have during their games.

RULE 6
PRACTICE "BRIGHT SPOTS"

One purpose for practice is to help people get better at things they can't yet do. This type of practice plays an important role in our

lives: we look for areas that need improvement and work on them. But it's important not to get stuck in a deficit mindset. Using practice to get even better at the things we're already good at is also a powerful opportunity.

In *Switch*, Dan and Chip Heath coined the phrase "Bright Spots" to talk about the often overlooked and underleveraged power of what works. It's easy, they note, to bewail what's wrong rather than see the power of what's right. We borrow their term to remind ourselves that in a practice setting, immense value can be realized by focusing on things participants are already good at—and making them even better.

One of the most reassuring aspects of Doug's study of high-performing teachers was the realization that champions—teachers who were positive anomalies in the field—were just like the rest of us in many ways. They too had weaknesses. Sometimes they explained things poorly. Their lesson plans had gaps some days too. What differentiated outstanding teachers most was how dynamic their strengths were. Consider one math teacher, who we'll call Bill and who achieved breathtaking results year after year. His math knowledge had occasional gaps in it, and he was decently organized but not outstandingly so. Sometimes he realized, standing in front of class, that he had forgotten to copy something he needed. Sometimes a problem he put in his lesson plan didn't pan out. What made Bill outstanding was his gift for inspiring students to give their best. Combined with energetic pacing, this engaged students in class and ensured that they happily completed problem after problem. You could sense the power of Bill's strengths as soon as you entered his room: there was a buzz, an urgency, that exuded from the smallest actions of the most challenged students, and the power of these things trounced the times when Bill had to ask a student to go make a copy for him. In fact, there were many teachers like Bill; only their profile of strengths and weaknesses differed. One might be a bit

weak in the area of motivating and inspiring students, perhaps, but was a world-class lesson planner.

One conclusion you could draw from this is that if you wanted to make more game-changing teachers, you might obsess a little less on mitigating every weakness and focus more on maximizing strengths, on getting them so good that they override weaknesses. If a participant notes that he or she is already good at something you propose to practice, it's usually in an effort to avoid practicing it, but in fact it's all the more reason to practice—because practicing strengths is more likely to make them great. As an added bonus practicing strengths helps us remember what we are good at and feel positively about the profession or performance at which we hope to excel. The more people enjoy practicing, the more they will do it, and the better they'll get. Having strong presenters practice presenting can make them feel even more confident and joyful. You might give them advanced presentation formats in which to apply their skills, or assign other job tasks where their presentation skills might be applicable. Spotting things that people are good at and finding ways to use those skills more broadly is one of the most productive things an organization can do for an employee, or that practice can do for a participant.

Practicing bright spots can be particularly effective when practicing as a team. In any one team, chances are that not everyone shares the same strengths; one person's bright spot becomes another person's model, which can be very valuable to the entire team (for more on modeling see the third chapter). The whole team benefits. The person who demonstrated gets the opportunity to shine and to feel the respect of peers. He also gets even better, as performing in front of peers who are insiders and know the difference between good and great can raise the level of performance as well as the quality of feedback. The team is strengthened by these reminders that their colleagues bring important skills to the work they share. Everyone is inspired to strive for excellence.

Practice "Bright Spots"

- Identify and practice areas of talent as well as areas of weakness.
- Seek ways to apply established skills in new settings to leverage strengths.
- Use one participant's strengths to model for other team members and speed replication across the group.

LEARNINGS: YOUR BEST STUFF (AND NAMING IT)

Legions of coaches seek to make practice interesting by "changing things up" constantly and introducing new drills. There are times and places where this makes sense; too much repetition can be boring. But good practice activities appreciate in value the more you use them. Rather than wearing out, they get better. Repeating high-quality activities has lots of advantages, including in many cases increased enjoyment for participants.

The more you repeat an activity, the better your participants get at doing it. You avoid tedious time spent learning simply how to complete the activity. Using a familiar activity, or a minor adaptation of one, you can skip the long descriptions and demonstrations required to roll out something new. Participants can do the activity right the first time without false starts and errors. They are familiar with the logistics of the activity (like where to stand and what will happen next) and therefore can focus on the skill they are learning. If you're worried that this may make your practices less interesting, you might be wrong. Being a part of a practice where you are active, busy, and know what to do is just as likely to be more engaging than a practice beset by a lack of productivity.

It's also worth doing what John Wooden did: keeping track of your best activities and reflecting on what worked. As you make minor tweaks to improve them, the value will go up. The fourth time you do an activity is far more valuable than the first. By then you will have refined

(Continued)

it to be most effective and efficient, with minor kinks worked out. See your best activities as assets and invest in them over time.

The last step may be giving your practice activities names. This allows you to talk about them efficiently ("We're going to use feedback here in much the same way we do in our Strong Voice layup drill"), and it allows people to begin doing them at a minimum transaction cost: "Ten minutes of the Layup Drill . . . Go!"

RULE 7
DIFFERENTIATE DRILL FROM SCRIMMAGE

George has recently been promoted to principal at his school and is about to facilitate his first staff meeting. There is a lot riding on it. He will be setting precedents for his leadership and the way he hopes the faculty will work together. The challenge is to facilitate the meeting efficiently and drive a high-quality discussion that addresses real organizational challenges, all while making sure that his team comes to believe that he listens carefully and values their ideas. In preparation for the meeting, he completes two activities, allowing him to practice in important, but different ways. First, working on his own, he goes through the meeting agenda and, for each segment where he will ask for input or comments, writes out possible responses from faculty members, each response on a note card. He then flips through them, reading them one at a time out loud and practicing responding with active listening skills—restating the comment or highlighting some part of it to show that he took it seriously, even if he disagreed. When his tone feels off or his comments poor, he immediately doubles back and answers the card a second time. He goes through the stack of cards several times, drilling himself until active listening feels natural.

Next, George enlists Carly, the principal of a nearby school, to help. She asks him to run through the whole meeting from top

to bottom, pretending that it's the real thing. She plays the part of different meeting participants, chiming in during the participatory moments with a variety of comments—some from George's note cards and others of her own. She varies the tenor and tone: sometimes enthusiastic, sometimes skeptical, sometimes feigning confusion. In this practice, however, she discourages George from stopping midstream to revise a response. George has to practice implementing all of the skills he's been working on in real, sustained time, with all of the unpredictability of participants' moods and all of the distractions of following the agenda and running the meeting. It's a sort of rehearsal.

The two forms of practice illustrate the difference between drill and scrimmage. The first activity was a drill. A drill deliberately distorts the setting in which participants will ultimately perform in order to focus on a specific skill under maximum concentration and to refine that skill intentionally. Drills strive to maximize the amount of mental energy focused on a skill. They increase density, the number of productive iterations of a skill per minute of practice. In the actual meeting, George will not field comments in rapid succession; they'll be spread out. And he will not need to respond to every comment, nor will he use active listening every time. He certainly won't have opportunities to refine his responses. But in George's drill, he distorted the ultimate performance (the staff meeting) to concentrate on the area he needed to work on most. He amplified the number of comments he responded to and packed them together so that he could develop what David Eagleman calls "rote algorithms" through frequent, intentional, close-quarters repetition. He was able to immediately "fix" any answer he didn't like, so he encoded success. In short, he chose to develop skills by applying them in an artificial environment with intense focus. Had he merely performed the second activity, he would have had only a fraction of the opportunity to practice—not enough to develop proficiency.

A scrimmage, by contrast, is designed not to distort the game but to replicate its complexity and uncertainty. The practice that Carly helped George complete was designed to do this. Opportunities to work on active listening came about unpredictably, which gave George less practice but a better sense for whether his skills were meeting-ready—whether he could execute when he was distracted or didn't have advance warning. To this end Carly tried to replicate the involvement of multiple participants with different voices, styles, and agendas, just as George might find in the real meeting. During this scrimmage, Carly didn't let George stop and go back if he didn't like one of his answers. A scrimmage usually replicates key aspects of the performance's flow, like the sequence of key events, the amount of time you'll have, the location you'll perform in, or the distractions you might face. In some cases a scrimmage can heighten aspects of game conditions. Carly might have played the role of an especially difficult faculty member, for example, one tougher to handle than most if not all George was likely to face. Or, during a scrimmage, a pro sports team might broadcast excessive crowd noise to prepare its players for distraction. The distinction between drill and scrimmage is imperfect, but remains important. Among other things, the purposes are different, for drills focus on skill development and scrimmages on evaluation and final preparation. You use the former to focus maximum attention on the thing you want to learn, and the latter to answer questions: Are you ready to play the game or run the meeting? Which members of your team are prepared? Whose mindset responds best to the pressure of performance?

When and how much should we drill? When is scrimmage the best choice? Wooden again provides some insight. Given the benefits of twenty players on the court with five balls in an engineered and predictable learning environment as compared to ten players on the court with one ball in an unpredictable series of interactions, the "Wizard of Westwood" consciously chose to drill

more—and scrimmage less—than most coaches. He was aware of the discrepancy and thought it was a key factor in his teams' success. Wooden reserved scrimmaging for evaluating his players. Once he knew where they stood, he preferred to focus on maximizing teaching and learning. This is important. While scrimmaging is often fun, its ease of use makes it easy to rely on and can lead to a practice without a clear objective.

Some coaches also believe that scrimmage is the only way to teach participants to integrate skills. Drills can easily integrate skills, however. Indeed, a whole category of drills integrates previously mastered skills. For example, before engaging in a full-on scrimmage with Carly, George might have added a second drill in which he tried to integrate active listening and redirection of off-topic comments. In such a drill, Carly might have mixed in comments that threatened to take George off topic with those which presented opportunities for active listening. This may seem like overkill, but consider the value. After initial drilling, many people are eager to take their skills into the game or engage in scrimmage, but often this doesn't go smoothly. It can be frustrating and chaotic. A graduated practice is what sets the champion coaches in all fields apart from the merely good.

Differentiate Drill from Scrimmage

- Use drills to distort the game and focus intensively on development of one or several skills.
- Use scrimmages to evaluate your readiness for performance.
- Recognize that scrimmaging is generally less efficient as a teaching tool.
- Recognize that success in scrimmage is the best indicator of true mastery—participants can perform a skill when the time and place of its application is unpredictable.
- Consider using a sequence of drills that integrate new skills with previously mastered skills before—or in lieu of—scrimmage.

RULE 8
CORRECT INSTEAD OF CRITIQUE

John Wooden said, about practice, that no error should go uncorrected. Armed with this insight, you might be inclined to set up practice so that every time a player made a mistake you pulled her aside and said, "Quicker and sharper cuts, Luisa!" Would that give you incredible results? Maybe. But what Wooden wanted was correction, not critique, and the difference is that critique involves telling a participant how to do it better but correction means going back and doing it again, and doing it better—as soon as possible. So in an ideal practice, a player might go right back into the line and practice cutting more sharply, say. Only when she has done correctly what was at first erroneous has correction been accomplished. Practice, as we've pointed out, is about inscribing habits on the brain through repetition with variation. What makes you execute an action in performance is having done it in practice. So critique—merely telling someone that she did it wrong—doesn't help very much. Only correction, doing it over again right, trains people to succeed.

It may be worth reflecting that the body's neural circuits have very little sense of time. If you do it right once and wrong once, it's encoded each way equally in your neural circuitry. It may matter little which one happened first. The ratio is one to one. If you are correcting, then, correct in multiples. If one of your tennis players hits backhand incorrectly, doing it right once will help erase the error, but doing it right three or four times right away will begin to overwhelm the wrong memory with the right one. Think about saying, after an error in corrected, "Yes. Good. Now do it five more times!"

Earlier, in our discussion of Rule 4, we told you about our own version of the classic basketball layup drill—a drill in which teachers practice using the technique Strong Voice to ask a student to

sit up. They roll through the drill multiples times, often with different iterations, asking the slouching student to sit up by employing elements of body language and tone of voice.

As we ran this activity, we often noticed the time lag between our critique and the correction step. Participants heard our advice—"Keep your body symmetrical; try not to tilt your head"—and went to the back of the line. Sometimes we ran out of time before people got a chance to try again, however, and sometimes the participant's memory of the incident wasn't fresh by the time they got another chance. We began sending people to the front of the line instead. This let them try it right away and feel themselves getting better in the span of a minute. This is one way to turn critique into correction and make correction happen quickly and with greater accountability. It's worth noting that the process of correction does not even require a coach. Self-correction, the process of observing our own subpar demonstration of a skill and repeating the action more effectively, ideally multiple times, is forever open to us.

Correct Instead of Critique

- Strive to ask participants to redo an action differently or better rather than just telling them whether or how it could have been different.
- Try to shorten the feedback loop and achieve correction as quickly as possible after an action that requires intervention.
- Always maintain a teaching mentality and focus on the solution ("cut more sharply to the basket") rather than the problem ("your cut wasn't sharp").
- Seek opportunities to correct privately. When you correct publicly, make it clear that it's a common error, then make sure to correct, not critique, by asking all participants to repeat the action.

RETHINKING ASSUMPTIONS ABOUT PRACTICE

Rule	Assumption	Reexamination
Encode success	Practice makes perfect. Work hard and you'll improve.	Practice makes permanent. Practice can be unproductive or even counterproductive unless you practice doing it right.
Practice the 20	Practice as many useful skills as you can.	Practice fewer, more important things, better and more deeply.
Let the mind follow the body	Prepare to perform by preparing yourself to make decisions during the game.	Prepare to perform by preparing yourself not to have to make decisions during the game.
Unlock creativity . . . with repetition	Rote learning gets in the way of higher-order thinking.	Higher-order thinking relies on rote learning. Automaticity frees your mind to create.
Replace your purpose (with an objective)	You should have a purpose for your activities during practice.	You should have an objective that is manageable, measurable, made first, and includes mastery guidance.
Practice "bright spots"	Use practice to fix what you're not good at.	Use practice to get better at things you already do well.
Differentiate drill from scrimmage	Practice activities are best when they replicate as many aspects as possible of the performance itself— that is, when they are scrimmages.	Drills—which isolate a skill—are often more productive than scrimmages, specifically because they distort the game.
Correct instead of critique	Feedback automatically helps people get better.	Using feedback and doing it over again makes people better.