

“Could radically change our concept of learning.”

– Jerome Bruner

The Power of *Mindful Learning*

With a New Preface
by the Author

Ellen J. Langer

author of *Mindfulness*

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10 9 8 7 6 5 4 3 2 1

Contents

Acknowledgments

Preface to the Second Edition

INTRODUCTION

1 WHEN PRACTICE MAKES IMPERFECT

Overlearned Skills

Whose Basics?

The Value of Doubt

Sideways Learning

Can a Text Teach Mindfully?

2 CREATIVE DISTRACTION

The Puzzle of Attention

Enhancing Novelty

Soft Vigilance

Rethinking Attention Deficit Hyperactivity Disorder

3 THE MYTH OF DELAYED GRATIFICATION

All Work and No Play

Turning Play into Work

Turning Work into Play

4 1066 WHAT? OR THE HAZARDS OF ROTE MEMORY

Locking Up Information

Keeping Information Available

Drawing Distinctions

5 A NEW LOOK AT FORGETTING

Staying in the Present

The Dangers of Mindless Memory

Absentminded versus Other Minded

Does Memory Decline?

Alternative Views of Memory and Aging

6 MINDFULNESS AND INTELLIGENCE

Nineteenth-Century Theories of Intelligence

The Notion of Optimum Fit

An Alternative Ability

Linear versus Mindful Problem Solving

7 THE ILLUSION OF RIGHT ANSWERS

Hobbled by Outcomes

Actor/Observer and Other Perspectives
Uncertainty and Creative Thought
When Right Becomes Wrong
Mindfulness and Self-Definition
Learning as Re-imagining the World

Notes

Index

About the Author

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The Power of Mindful Learning

Preface to the Second Edition

When I first wrote *The Power of Mindful Learning*, I strongly suspected what lay at the source of all kinds of mindlessness—personal, interpersonal, and societal—but hesitated to state it boldly. Now after more than forty years of research on the mindlessness of ostensibly thoughtful action, I’m finally persuaded enough to state its cause in print.

Our schools are the problem. They unintentionally teach us to be mindless.

Schools do this in at least two ways. They teach us to evaluate each other and ourselves, and they teach us to seek or accept information as if it were absolute and independent of human creation. Both of these ideas were implicit in *Mindfulness* but not fully explained.

EVALUATION

Shakespeare warned us against being judgmental when he wrote “Things are neither good nor bad but thinking makes it so.” I would add that behavior makes sense from the actor’s perspective or else s/he wouldn’t have done it. When we evaluate someone negatively—he’s lazy, stubborn, gullible—we’re evaluating the person from our observer’s perspective. It doesn’t even occur to us that the person may instead be insufficiently motivated, steadfast, or trusting.

The great novels that we are given to read in school show us how behavior makes sense from the actor’s perspective. *Gulliver’s Travels* shows us that perspective changes as Gulliver enters kingdoms of tiny folk and giants and even horses. Adults reading *Lolita* from Humboldt’s perspective may even come to understand his attraction to the young woman.

True artists scorn nothing; they are obliged to understand rather than to judge.

ALBERT CAMUS

But these insights do not carry over when teachers evaluate students. Teachers are some of the most caring people among us. They are recruited, however, into a system that, in part, is mindless. Tests, grades, and labels are part of the judgmental culture of schools. A child is seen as distracted, for example, rather than as otherwise attracted. From this observer’s point of view, the problem is always seen to lie in the child.

Schools promote this mindless view when we are graded. Our culture has taught that virtually all traits/characteristics/talents follow what is called a “normal distribution.” That means a small number of us lie at each end of a continuum and have either a lot or a little of something good (for example, smarts or artistic talent) or something bad (aggressive tendencies or learning disabilities). Schools unwittingly confirm these societal expectations by awarding As to those whom they have identified as especially gifted and Ds and Fs to those they have put at the bottom.

Schools generally pay little attention to how, when, and by whom the criteria for grading were chosen. If the criteria were questioned and varied, students’ position on the continuum might change. But they are rarely varied. To make matters worse, once we are placed on the tail end of the distribution, social forces work to keep us there, setting us up for a lifetime of success or failure. Our fate as winners, losers, or just average is sealed. In Robert Rosenthal’s *Pygmalion in the Classroom*, teachers were told which children were

late bloomers from whom they could expect great things. Unbeknownst to the teachers, the children were actually chosen at random, but the labels became self-fulfilling. In grading an A student, teachers look for the sense their answers make. With the rest, it is easy to find evidence of incompetence. Without these labels, a teacher might ask a child to explain “wrong” answers. “One wad of chewing gum plus one wad of chewing gum equals one” might show a clever mind. But we don’t do that because we mindlessly believe things can be known with certainty and that we teachers and the books we teach from know the answers. It’s the very unusual teacher who is strong enough to buck a trend and see greatness where others failed to do so. In the words of Oliver Sacks, “People will make a life in their own terms, whether they are deaf or colorblind or autistic or whatever. And their world will be just as rich and interesting and full as our world.”

Once a child has been “evaluated,” a cascade of consequences follows. Telling the parents sets up another opportunity to build negative expectations. No matter how caring a teacher or parent may be, their assumptions leak out and influence other students, relatives, and neighbors. While we are in school, these views become part of our own self-concepts and we too tend to confirm them.

The consequences of all this grading and labeling are clear all around us. For a child judged harshly, the only way to get any attention or notoriety may seem to be through bullying or major misdeeds. All of us at one time or another seek to be noticed and admired (at least by a few peers). The behavior makes sense. For someone too timid to misbehave, depression could be the result.

Why does the bully bully? Can we see things from his perspective? Successfully pushing someone around can make us feel strong. Thus it seems mindless to me to try to put a stop to the abuse by telling bullies any version of “It’s not nice to pick on the weak” since doing so makes them feel big. A mindful alternative is to teach children that only weak people bully. If they knew they’d be seen as weak, there would be little reason to bully. Changing people’s behavior works better when we look at their actions from their perspective.

What about the winners? For them, life should be a smooth ride. But it’s not. Having been taught always to compare ourselves with others, even a winner will occasionally come up short. Why didn’t I win that award, get tenure, get the promotion? Am I now a failure? At Harvard, the home of some of the best and the brightest, it’s easy to see that being among the winners is not stress free. Depression, anxiety, and even suicide are not unknown here. All these may begin with the evaluations made in school. Many have written about the problems with tests. My claim is a bit stronger. I’m suggesting that all evaluation is mindless and problematic for the winners as well as the losers when the subjective nature of the criteria is not clearly stated.

Who set the criteria? After 9/11, I was listening to a radio show discussing whether women should be allowed to be firefighters. Eventually they came to the conclusion that if a woman can pass the test, she should be allowed to have the job. For me, the important question is: who created the test? In many situations firemen may have to be very strong, thus eliminating most women from the competition. But consider the situation after the fall of the Twin Towers in New York. No matter how strong, the men were not able to move the steel girders that were trapping some of the people in the flaming ruins. Equipment had to be brought in to do the job. Had there been some small and very thin women on the force, perhaps they might have been able to squeeze between the girders to provide some aid to those trapped.

The same is true for any set of criteria—someone chose them. We accept them as if handed down from the heavens, without acknowledging that had they been set differently, the outcome might change . . . I might win more tennis matches, for example, if instead of two serves, the rules allowed three. I’d hit the first serve hard and learn from it for the second serve and still have the backup third serve, which I could hit gently and make sure it went in.

When we fail, psychologists often suggest that it is better to ascribe the failure to insufficient effort than to a lack of skill. I agree if we are asking ourselves to explain our

failures. I think, however, that there is a more mindful solution than stopping to evaluate our performance. When people are playing games (for example, computer games, cards, or tennis), how often do they stop to seriously evaluate their performance? I would suggest, not very often. We make a move, it works or it doesn't. We make a face or curse and move on. When it doesn't, we try something new. Except in extreme cases, we don't take time out of the activity to grade ourselves and study the causes of each move. When professional teams are coached, except for perhaps a pre-game motivational speech, the advice is very immediate and behavior specific—do more of this or less of that—rather than changing one's attribution. Instead of rating our performance, I think it would serve us better to train mindful attention to the particulars of the game.

ATTENTION TO VARIABILITY

By labeling people according to skills we assume are fixed, we forget that no one is the same in all situations. Our evaluations of people, including ourselves, keep us from noticing this variability in behavior. Paying attention to variability gives us more control.

Consider learning disabilities in this context. People who are dyslexic may make more mistakes than the non-dyslexic, but they are still reading a lot correctly. Does it make sense to apply a pejorative label when most of what is read is correct? Because of the way we're taught to mindlessly accept diagnoses, we overlook all the instances when we're doing just fine. In fact, those who believe they are learning disabled would probably opt out of all sorts of reading activities, making the problem even worse. If instead they did notice how often they were correct, several things would probably follow. First, they'd feel better about themselves. Second, knowing that they get just a small percentage of what we read wrong, they'd be more inclined to look at the specific words they got wrong to see why these words were a problem and not others, and this might lead to solutions. Members of my lab and I are currently testing this. By showing dyslexic students how much they are getting right rather than wrong when reading passages, we expect self-esteem to increase. By having them mindfully attend to which words they got wrong, we also expect reading to improve.

When people are diagnosed as having "reading problems," the content of what is read is ignored and we mindlessly presume the difficulty is content independent. If we read literature the way we read news and science articles, and vice versa, much will be lost. In science and news articles, there is a point to be made and supported. We read these to get information. Language choice is not as crucial as it is in literature, where words matter more since they are used to evoke emotions, create enjoyment for the reader, lead to identification with the author, and so forth. If we read a Carver short story quickly to get to the point, we'd miss the whole experience. If we read most science articles attending to character development or waiting to be moved by the content, we'd be frustrated. Reading ability may vary with the content, yet a single label will not reflect such differences. Realizing that what appears negative in one context may seem positive in another, we might look on many disabilities differently. My students and I are currently testing the idea that autism is a hypersensitivity to other people's level of consciousness. Since most people are mindless much of the time, this hypersensitivity could be responsible for the autistic person reacting to others in a negative way more often than the "normal" person. If so, when they deal with a mindful person they just might shine. In that case, the problem would lie not in the individual but in a much too mindless culture. A very different treatment program from those that now exist would follow. Consider one more strange idea. When people are said to be perseverating, are they noticing subtle differences among things to which the rest of us are blind?

The face of the water, in time, became a wonderful book—a book that was a dead language to the uneducated passenger, but which told its mind to me without reserve, delivering its most cherished secrets as clearly as if it uttered them with a voice.

Life on the Mississippi

How many of us have spent time thinking about water?

Research I conducted with Maja Dijck and Matthew Cohen shows how differently children behave when with a mindful or mindless adult (Langer, et al.). We had experimenters posing as coaches interview young boys at camp. All were told to make the interview a positive experience for the child. Half of them were instructed to pretend they were interested in what the child had to say. The other coaches in the mindful condition, asking the same interview questions, were also asked to notice how the child changed verbally and nonverbally in the course of the interview. Noticing change is the hallmark of being mindful. The children in this group reacted with enthusiasm. Interacting with a mindless adult who was only pretending to take an interest in a conversation that lasted as little as fifteen minutes resulted in a significant drop in the child's self-esteem, positive feelings about the camp, and his willingness to help others.

We're planning on conducting another test of this with people who have drinking problems. The hypothesis is that a hypersensitivity to other people's mindlessness may lead to alcohol consumption to reduce the discomfort/sensitivity. In other words, we may be looking for problems in the wrong place. We may also be labeling certain behavior as a disability that in another context is an advantage.

If so, who actually has the problem?

TEACHING CERTAINTY

Let's turn to the second major way schools propagate mindlessness. Although science teaches us that everything is always changing and everything looks different from different perspectives, most teaching puts a premium on absolute answers. I got plenty of A's in school because I was able to memorize perspective-free facts. Battle of Hastings? Easy—1066. I may seem smart, but, sadly, I couldn't tell you anything else about that battle or most any other battle that appears in tests. These perspective-free facts create an illusion of knowing.

For instance, the attempt to date the dawn of human civilization has varied by millions of years depending on the source. Despite the fact that new findings about almost everything keep calling older findings into question, we still teach absolute facts. And in schools, the mindless keeper of the most (current) facts looks like the winner. But mindless knowing shuts off mindful seeking and all the advantages that result from being uncertain.

Unconditional teaching may also explain the paradox that girls outperform boys in lower grades but that something happens when they get older—at least with respect to math. Laura Anglin, Michael Pirson, and I set out to test the hypothesis that mindlessness may be the culprit. Taught to be docile in primary school, little girls given unconditional instruction learn the presented material mindlessly. Little boys are expected to be ornery and headstrong, less occupied by pleasing the teacher and less likely to assume the teacher is right. For the boys, the instruction may remain conditional rather than accepted as absolute fact. This serves them well when the material becomes more complicated and original "facts" are amended. For example, imagine learning that George Washington was unconditionally great versus taking that information with less certainty and then finding out that he had syphilis.

To test this, we gave a math lesson either conditionally or unconditionally to boys and girls who then were given a novel test that required deep understanding and flexibility in transferring knowledge. To teach conditionally, rather than teach 1 plus 1 is 2, for example, students would be told that 1 plus 1 could be 2 or is often 2. We found that for the group given unconditional instruction initially, boys outperformed girls on the novel test. The gender difference, however, was eliminated in the group given conditional instruction. Mindful learning significantly improved performance for the girls.

It's not just schools that propagate the myth of absolutes. Instructions for how to do most jobs, play a musical instrument, or play a sport tend to be given in absolute terms—"This is the way. . . ." Another kind of costly mindless learning probably occurs with respect to medical facts. Medical science, like all science, can yield only probabilities, yet medical findings are too often reported and consumed as absolute facts, neglecting context and individual differences. Realizing this, my lab and I are now studying beliefs regarding chronic illnesses (for example, chronic pain, arthritis, MS) to see how much control we can exercise over that which has been deemed more or less uncontrollable. One of the major ways we are doing this is helping sufferers notice the variability in symptoms and their relation to context. The method has been effective with chronic pain and arthritis. Throughout the day, people are asked to notice if they are experiencing the symptom and, if so, if it is more or less severe than just previously experienced. Then they are asked to think about why the symptom may now be more or less severe.

THE MYTH OF EFFORT

Because we assume that learning is difficult and always requires great effort, we keep trying to find ways to encourage students to study. Actually, the same is true for adults outside of school. If only s/he tried harder, all would be fine. In my view, it is the fear of evaluation—of not getting the right answer—and the tiresome sameness of most learning situations that makes learning seem effortful, not learning itself. What makes leisure time fun is mindfully noticing new things—that is learning. I discuss the importance of novelty in Chapter 2. What is new here is the discussion of effort itself. When children are playing computer games, they are learning, happy, and committed to the activity, and we don't need to seduce them to keep at it. We don't tend to notice how much they are learning because our usual assessments test children to find out what they don't know rather than what they do know. Regardless, all of the material we think they should know could be incorporated into these and other games.

On a television news show not long ago, I was asked what I thought about all the time kids spent on their smartphones. The newscaster was surprised by my answer. He expected me to confirm his view that it was a problem and that kids should instead be interacting with their parents and teachers. My view is that if anyone, young or old, is given the choice of interacting with a machine versus engaging with people who are being loving, interesting, and supportive, the latter will win out. The solution, then, is not to restrict their gadget usage but rather for the rest of us to up our game.

The distinction between school and play continues for adults in the distinction between work life and home life. The best most people strive for in this system is work-life balance. Balance is typically better than imbalance but does not compare to work-life integration. Why take as a given that work has to be hard and the workplace stressful? It is the monotonous repetition and fear of negative evaluation that is effortful, not work itself. A lack of novelty and a constant feeling of being evaluated are very stressful. Adults, however, have opportunities to change the context of their work, to look at it differently. By mindfully attending to different aspects of any situation, we can experience it differently.

For example, in my work at Harvard, I could see every semester as stressful since there are many aspects of the beginning of the school year that are challenging, not the least of which is a whole class of people I don't know. Alternatively, I could attend to the parts of the situation that I have handled before—for example, they are all still twentysomething. In doing so, I feel in control. Then again, I could notice so many familiar parts of the situation that I've been in for so many years that I could find it boring. It's all up to me.

What is the remedy for all of this mindless learning? A single solution would be mindless itself. But there are many suggestions implicit in what I've written above.

1. Our textbooks, work, and sport manuals could make learning more effective by being rewritten in conditional rather than absolute language.
2. Evaluations that are stressful should either be eliminated or clearly identified as using criteria set for a limited purpose and not relevant to all other skills.
3. If tests of competence are used, they could test for what the student knows rather than try to find out what is lacking. For example, "Write about what is most interesting or meaningful to you about the Battle of Hastings."
4. Teachers and parents (and employers) could look for what the students (and applicants) mean by their answers rather than looking only for errors.
5. Most important, however, is a wide appreciation for the power of uncertainty. Classes become deadly when presented in absolute terms and painful when they imply that others know the answers, and exams will sort out who has learned them and who has not. Once we realize that everything is always changing and looks different from different perspectives, we can be comfortable not knowing. To be mindful is to be confident and uncertain.

At the end of last semester, before the last class, I told students in my decision course that they couldn't come to class the following week unless they were wearing two different shoes. This was very hard for some of them, even though I assured them that no one who cares about them would care less if they were wearing different shoes and those who don't care would care even less. The next week, one of the students came and reported an incident in the elevator on the way to class. A young man looked at her shoes, looked at her face, looked at her shoes, looked at her face. After looking at her shoes one last time, he pointed to her shoes and said, "Was that intentional?" In response, she looked at his shoes, then his face, and then pointed to his shoes and said, "Was that?" The experience led students to be less concerned about mindless evaluations and freer to make decisions that are meaningful to them rather than unthinkingly accept the conventional expectations that may have been mindlessly created.

A generation that questions mindless rules, is skeptical of grades, and is comfortable with uncertainty could change the world. That is the power of mindful learning.

Introduction

Once upon a time there was a mindless little girl named Little Red Riding Hood. One day, when she went to visit her ailing grandmother, she was greeted by a wolf dressed in her grandmother's nightclothes. "What big eyes you have, Grandma," she exclaimed, clueless as ever, although she had seen her grandmother's eyes countless times before. "What big ears you have, Grandma," she said, although it was unlikely that they would have changed since her last visit. "What a deep voice you have, Grandma," she said, still oblivious to the shaggy imposter beneath the familiar lacy nightcap. "What big teeth you have," she said, too late, alas, to begin paying attention.

Certain myths and fairy tales help advance a culture by passing on a profound and complex wisdom to succeeding generations. Others, however, deserve to be questioned. This book is about seven pervasive myths, or mindsets, that undermine the process of learning and how we can avoid their debilitating effects in a wide variety of settings.

1. The basics must be learned so well that they become second nature.
2. Paying attention means staying focused on one thing at a time.
3. Delaying gratification is important.
4. Rote memorization is necessary in education.
5. Forgetting is a problem.
6. Intelligence is knowing "what's out there."
7. There are right and wrong answers.

These myths undermine true learning. They stifle our creativity, silence our questions, and diminish our self-esteem. Throughout this book we will examine them, sometimes through experiments carried out at Harvard and elsewhere and sometimes with insight drawn from fairy tales and folktales from around the world. The process of overturning these myths leads to certain questions about the nature of intelligence. In the last two chapters we will explore these questions and the ways in which our view of intelligence may support inhibiting mindsets.

The ideas offered here to loosen the grip of these debilitating myths are very simple. Their fundamental simplicity points to yet another inhibiting myth: that only a massive overhaul can give us a more effective educational system.

We can change school curricula, change standards for testing students and teachers, increase parent and community involvement in the process of education, and increase the budget for education so that more students can become part of the computer age. None of these measures alone will make enough difference unless students are given the opportunity to learn more mindfully. With such opportunity, some of these expensive measures might well become unnecessary.

Wherever learning takes place—in school, on the job, in the home—these myths are also at work and the opportunity for mindful learning is present. Whether the learning is practical or theoretical, personal or interpersonal; whether it involves abstract concepts, such as physics, or concrete skills, such as how to play a sport, the way the information is learned will determine how, why, and when it is used. The succeeding chapters explore the way each of these myths locks us into rigid habits of learning and offer keys to a more flexible and productive approach.

This book takes more of a "why-to" than a "how-to" approach. Nevertheless, the examples and experiments described implicitly suggest ways to learn mindfully. These are intended to guide our choices and to be adapted to each unique context, rather than to be

followed mindlessly.

Not only do we as individuals get locked into single-minded views, but we also reinforce these views for each other until the culture itself suffers the same mindlessness. There is an awareness of this in science. Scientists proceed along a path gathering data that builds on accepted wisdom. At some point someone turns everyone's attention to a very different view of the previously acknowledged truth. This phenomenon happens frequently enough that scientists are generally not surprised by what is called a paradigm shift. In a recent *New York Times*¹ article psychologist Dean Radin described four stages of adopting ideas: "The first is, 1. 'It's impossible.' 2. 'Maybe it's possible, but it's weak and uninteresting.' 3. 'It is true and I told you so.' 4. 'I thought of it first.'" I would add a fifth stage, "We always knew that. How could it be otherwise?"

The term *mindful learning* is used here in a very specific way, drawn from the concept of mindfulness that I defined in an earlier book by that name.² A mindful approach to any activity has three characteristics: the continuous creation of new categories; openness to new information; and an implicit awareness of more than one perspective. Mindlessness, in contrast, is characterized by an entrapment in old categories; by automatic behavior that precludes attending to new signals; and by action that operates from a single perspective. Being mindless, colloquially speaking, is like being on automatic pilot. In *Mindfulness*, I described the benefits of a mindful approach for our psychological and physical well-being. For instance, elderly adults given mindfulness treatments were shown to live longer than their peers who were not given such treatments. In this book I use the concept of mindfulness as a lens through which to explore its importance in the world I know best, teaching and learning.

In many of my classes students are quick to point out examples of their own and others' mindlessness. The examples often come from the texts and research under discussion. When I'm the perpetrator of this mindlessness, I examine it closely. Why didn't I reconsider the old information when presenting it in a new context? Why did I trot out the received wisdom on this particular topic? Such puzzles keep sending me back to investigate the way I learned the information in the first place.

Each year, in a course I teach on decision making and perceived control, to bounce my students out of their habitual state of mind I ask them if one can prevent pregnancy with a nasal spray. They laugh or at least grimace at this obvious absurdity. Then I show them what by now is an old newspaper article with the headline "Nasal spray as a new means of birth control," and their interest picks up. Their first response is not unusual. When faced with something that hasn't been done before, people frequently express the belief that it can't be done. All progress, of course, depends on questioning that belief. *Everything is the same until it is not*. If instead of asking, "Is it possible to prevent pregnancy with a nasal spray?" we ask, "How could we use a nasal spray as a method of birth control?" we set off on a different search, in a different frame of mind. Instead of dismissing the question as foolish, we start thinking about how to get from the nose to the egg and sperm. Once we generate possible ways of doing something, even if they are low-probability bets, the perception of a solution's being possible increases enormously. (I may have to come up with a new puzzle next semester, since recent research on pheromones and their influence on hormone levels has made a nasal contraceptive seem less incredible.)

Although with a range of ability and accomplishments, the students I meet are among the brightest imaginable. Yet even the very best can be mindless, insecure about what they know. Ironically, many are unhappy with an educational experience that has only rewarded them. Their dissatisfaction may result from certain of these debilitating myths, such as that expressed in "Study now, play later." Throughout their careers, these gifted students have learned to delay gratification. Why is study itself not gratifying? If not, how could it be? If rote memory is a tedious way to prepare for an exam, is there a more effective and more gratifying way?

These students have all been tested, tried, and found to be worthy of extreme praise. What does it mean when such an intelligent person gives a wrong answer? Is the wrong

answer a lapse, an indication of stupidity? Or does the “wrong” answer merit consideration? And if for these students, why not for all students?

In trying to answer these questions I will not limit the notion of learning to the classroom. In our so-called learning society the mindsets that hobble us can be found all over: from music lessons to investment analysis; from television viewing to psychotherapy. As we will see, our attitudes toward aging and advertising, our approach to decisions, and even our preferences in art, sports, or entertainment all depend on the views we hold about the nature of learning. As an example, a very intelligent friend of mine, successful in business, was told, to her dismay, that she had an attention problem. I was surprised. I burrowed into the vast literature on attention deficit hyperactivity disorder (ADHD), read the symptoms of the disorder, and was even more surprised to see that I have it as well. Or do I? What exactly does it mean to pay attention? We have to answer this question before we can sensibly talk about a deficit or disability.

From questions such as these I was drawn into a more general investigation of education and how we learn. By observation and experiment, I have come to see how seven particular myths make it hard to learn and in the process, make it hard to teach.

1

When Practice Makes Imperfect

When he arrived on the planet he respectfully saluted the lamplighter.

“Good morning. Why have you just put out your lamp?”

“These are the instructions,” replied the lamplighter. “Good morning.”

“What are the instructions?”

“The instructions are that I put out my lamp. Good evening.”

And he lighted his lamp again.

“But why have you just lighted it again?”

“These are the instructions,” replied the lamplighter.

“I do not understand,” said the little prince.

“There is nothing to understand,” said the lamplighter. “Instructions are instructions. Good morning.”

And he put out his lamp.

Then he mopped his forehead with a handkerchief decorated with red squares.

“I follow a terrible profession. In the old days it was reasonable. I put the lamp out in the morning and in the evening I lighted it again. I had the rest of the day for relaxation and the rest of the night for sleep.”

“And the instructions have been changed since that time?”

“The instructions have not been changed,” said the lamplighter. “That is the tragedy! From year to year the planet has turned more rapidly and the orders have not been changed!”

The Little Prince

ANTOINE DE SAINT-EXUPÉRY¹

Day after day the celestial lamplighter performed his well-practiced task. For him by now it was second nature. The planet, however, like the rest of the world, kept on changing. The routine stayed fixed, while the context changed.

One of the most cherished myths in education or any kind of training is that in order to learn a skill one must practice it to the point of doing it without thinking. Whether I ask colleagues concerned with higher education, parents of young children, or students themselves, everyone seems to agree on this approach to what are called the basics. Whether it is learning how to play baseball, drive, or teach, the advice is the same: practice the basics until they become second nature. I think this is the wrong way to start.

OVERLEARNED SKILLS

Before explaining this last statement, let me give an example of just one context for each of the skills I mentioned that might lead one to question this faith in practicing the basics.

As a child in summer camp I was taught to practice holding a baseball bat a particular way. The idea was to do so without thinking so that I could attend to other aspects of the game, such as the particular pitch I was trying to hit. Now, after years of lifting weights imperfectly, my right arm is stronger than my left. Should I hold the bat the same way in spite of this difference? Should everyone hold a bat the same way?

Because my driving skills have been overlearned, I flip my turn signal on automatically before making a turn. Now, suppose that I'm on an icy road about to make a turn, but the car is somewhat out of control. Wouldn't turning on the signal in the same

old way misguide the car behind me by seeming to indicate that the situation is well in hand? Would use of the flashing light be more appropriate in this context? Recently I gave a talk in New Mexico. I was driven from the airport to the hotel across a desert, without a car in sight for miles and miles. At each turn, the driver dutifully signaled.

Imagine overlearning the basics of driving in the United States and then taking a vacation in London, where people drive on the left side of the road. The car in front of you swerves out of control and you must react quickly. Do you slip back to old habits or avoid an accident by responding to what the current situation demands? It is interesting to consider that emergencies may often be the result of actions taken in response to previous training rather than in response to present considerations.

One of the “basic skills” of teachers, and all lecturers, is the ability to take a large quantity of information and present it in bite-size pieces to students. For those of us who teach, reducing and organizing information becomes second nature. How often do we, so practiced in how to prepare information for a lecture, continue to present a prepared lesson without noticing that the class is no longer paying attention? Presenting all the prepared content too often overtakes the goal of teaching.

For students, note-taking skills can be overlearned, practiced as second nature. Many of us have had the experience of turning to our notes and finding that we don’t have the vaguest idea what they mean.

Traveling makes us particularly aware of rigidities. In several Asian countries drivers drive on the left side of the road, and pedestrians on the busy sidewalks follow the same pattern as cars, staying to the right or left accordingly. The frequency with which I came close to walking into people when traveling in Asia made clear to me that even a simple exercise, such as walking on the right, if originally learned mindlessly, may be hard to change. Each time I traveled to a different country, the rules changed, and my awkwardness increased.

In an art gallery in Hanoi, I encountered the results of basic training in Western customs of politeness. The gallery owner offered me a seat from which to view the paintings. I politely refused. She offered it to me three more times. It appeared that her lesson did not include what to do if the customer preferred to stand. She took her cues as to what to do from her lesson, and not from the situation.

In Singapore, on my way to Chinatown, I asked the taxi driver how large the Chinese population was. He answered, “Seventy-six percent of the country is Chinese.” I said, “Are you sure it’s not 77 percent?” He laughed, although I think many would not have been sure what I was getting at. The government had published a report saying that 76 percent of the population was Chinese, and for many that remained fact without any awareness that births, deaths, emigrations, or immigrations could change the number at any moment. This is the way most of us have been taught to take in information—as though it is true irrespective of new contexts.

When we drill ourselves in a certain skill so that it becomes second nature, does this lead to performing the skill mindlessly? Do we set limits on ourselves by practicing to the point of over-learning? When we approach a new skill, whether as adults or children, it is, by definition, a time when we know the least about it. Does it make sense to freeze our understanding of the skill before we try it out in different contexts and, at various stages, adjust it to our own strengths and experiences? Does it make sense to stick to what we first learned when that learning occurred when we were most naive? When we first learn a skill, we necessarily attend to each individual step. If we overlearn the drill, we essentially lose sight of the individual components and we find it hard to make small adjustments.

Learning the basics in a rote, unthinking manner almost ensures mediocrity. At the least, it deprives learners of maximizing their own potential for more effective performance and, as we will see in Chapter 3, for enjoyment of the activity. Consider tennis. At tennis camp I was taught exactly how to hold my racket and toss the ball when serving. We were all taught the same way. When I later watched the U.S. Open, I noticed that none of the top players served the way I was taught, and, more important, each of them served slightly differently. Most of us are not taught our skills, whether academic,

athletic, or artistic, by the real experts. The rules we are given to practice are based on generally accepted truths about how to perform the task and not on our individual abilities. If we mindlessly practice these skills, we are not likely to surpass our teachers. Even if we are fortunate enough to be shown how to do something by a true expert, mindless practice keeps the activity from becoming our own. If I try to serve exactly as Martina Navratilova serves, will I be as good as she (apart from differences in innate gifts), given that my grip of the racket is determined by my hand size, not hers, and my toss of the ball is affected by my height, not hers, and given the differences in our muscles? Each difference between me and my instructor could be a problem if I take each instruction for granted. If we learn the basics but do not overlearn them, we can vary them as we change or as the situation changes.

WHOSE BASICS?

Perhaps the very notion of basics needs to be questioned. So-called basic skills are normatively derived. They are usually at least partially applicable for most people some of the time. They are sometimes not useful at all for some people (e.g., how to hold the racket for someone who is missing a finger or how to read a text for someone with dyslexia). They are not useful, however, as first learned, for everyone across all situations. If they are mindlessly overlearned, they are not likely to be varied even when variation would be advantageous. Perhaps one could say that for everyone there are certain basics, but that there is no such thing as *the* basics.

In the classroom, teaching one set of basics for everyone may appear to be easier for the teacher because the teacher needs to know less, a single routine leaves little room for disagreement and hence may foster obedience to authority, and it seems impossible to give individualized training to several people at once.

There are ways, however, to foster mindful learning of basic skills in classrooms full of potential experts. The rationale for this change in approaches is based on the belief that experts at anything become expert in part by varying those same basics. The rest of us, taught not to question, take them for granted.

THE VALUE OF DOUBT

The key to this new way of teaching is based on an appreciation of both the conditional, or context-dependent, nature of the world and the value of uncertainty. Teaching skills and facts in a conditional way sets the stage for doubt and an awareness of how different situations may call for subtle differences in what we bring to them. This way of teaching imposes no special burden on teachers. Rather, it may increase their own mindfulness as it helps individual students come closer to realizing their potential.

Consider an example that may seem trivial at first, yet speaks to how difficult it is to change what we have mindlessly learned. At a friend's house for dinner I noticed that the table was set with the fork on the right side of the plate. Of course, being polite, I said nothing, although I felt as though some natural order had been violated. I couldn't seem to dismiss the thought that the fork goes on the left side of the plate, even though I was aware that the feeling was preposterous. I even felt that it made more sense in some ways for the fork to reside where my friend had placed it, given that most people in this country would retrieve it with the right hand. Where did my mindset come from? My mother taught me how to set the table when I was young. Her view was not discussed. It was not made into a big deal. It was simply stated, and I mindlessly learned it.

To linger in the kitchen a moment longer, consider how many people cook. Having once been taught when and how to use certain ingredients and spices it occurs to few of us to change recipes to accommodate changes in age, minor health problems, seasons, and the like. Yet unintentional changes sometimes bring about useful learning.

Once a year I attempt to bake. I have a wonderful recipe for marble cheesecake, which

I appear to be unable to ruin. The first time I made it I put it in the oven for a few minutes and then realized I had forgotten to add the heavy cream. I took it out of the oven and added the cream. The next time I used light cream, followed by half-and-half on the next occasion, with perfectly acceptable results. When I add the chocolate, for some reason the cake ends up speckled instead of marbled. Never having learned how to bake, I didn't see these deviations from the recipe as a disaster. I simply changed the name of the cake so it is not an inferior marble cheesecake. This no-fault cheesecake always tastes delicious to me because I use only ingredients I like, but more important, I enjoy varying it rather than mindlessly following an unconditional recipe.

Most of what we learn in school, at home, from television, and from nonfiction books we may mindlessly accept because it is given to us in an unconditional form. That is, the information is presented from a single perspective as though it is true, independent of context. It just *is*. Typically, no uncertainty is conveyed. Much of what we know about the world, about other people, and about ourselves is usually processed in this same way.

We can learn a skill by accepting at face value what we are told about how to practice it or we can come to an understanding over time of what the skill entails. Even in the latter case, we eventually try to get the skill down pat. In research Lois Imber and I conducted many years ago, we found that when people overlearn a task so that they can perform it by rote, the individual steps that make up the skill come together into larger and larger units.² As a consequence, the smaller components of the activity are essentially lost, yet it is by adjusting and varying these pieces that we can improve our performance.

Recently, with students Dina Dudkin, Diana Brandt, and Todd Bodner, I set out to test more directly the idea that teaching material conditionally allows students to manipulate the information creatively in a different context. Some ways of teaching conditionally may be surprisingly simple.

In a pilot experiment, high school students with the same basic experience and education were taught a lesson in physics.³ The lesson was on videotape, and all the students saw the same videotape. Before viewing the tape, however, half the students received an instruction sheet informing them that their participation consisted of two parts: "Part I consists of a 30-minute video that will introduce a few basic concepts of physics. Part II involves a short questionnaire in which you will apply the concepts shown in the video. The video presents only one of several outlooks on physics, which may or may not be helpful to you. Please feel free to use any additional methods you want to assist you in solving the problems." The other half of the group was told the same thing but with no mention of several outlooks or of additional methods. Our hypothesis was that the instruction to allow for alternatives would encourage mindful learning.

On direct tests of the material, the groups performed equally well. For questions that required students to extrapolate beyond the information given, to use it creatively, a different picture is emerging. Although nothing in either the video or the instructions forbade using previous knowledge and experience to help solve these problems, only the students given the mindful instructions tended to do so. Students who were not given these instructions were the only ones to complain about the material. Although it is too early in this investigation to be sure of the results (a situation of mindful uncertainty), a prior study done with Alison Piper, described fully in *Mindfulness*, suggests there is merit in this approach.⁴ In that study students were introduced to a set of objects either conditionally ("This could be a . . .") or in absolute form ("This is a . . ."). As in the pilot study just described, we tested to see whether conditional information allowed for alternatives. We found that only those students taught conditionally thought to use the objects in creative ways.

Another way of presenting information mindfully makes use of students' mindlessness. This approach was suggested to me by Jerry Avorn of Harvard Medical School. In a lecture given to our department he told of a drug that was tested in a randomized clinical study. Patients were given either the drug or a placebo, an inert substance, and did not know which they were given. On the chalkboard during his lecture

Avorn put a list of side effects, such as nausea, headaches, and fatigue, and wrote rather high percentages next to each. Seeing the list, we all assumed that this was a rather risky treatment, only to find out that the numbers corresponded to the placebo group.

In a similar way information, be it from psychology or history, can be presented with figures for the main variables reversed, and students can be asked to come up with explanations for these “facts.” We’re all very good at working backward and coming up with reasons to justify any opinion. In so doing we often box ourselves into a single view. I find that as students generate more and more reasons, they become more likely to believe that the “fact” is true. The more we think this way in or out of the classroom, the more we are likely to believe in one right answer. In the classroom, when I reveal that the fact is actually the opposite of what I presented, the students seem to get the point without further discussion. The more often we learn the basics with the recognition, from the start, that there are several, perhaps quite disparate, ways of accounting for information, the more open we are to alternatives.

To make this point clearer, consider a presentation of the classic Milgram study on obedience to authority (to students who aren’t familiar with it).⁵ In this study subjects played the part of a teacher. They were instructed to administer shocks to a learner whenever he made an error. Unbeknownst to the subjects, the learner was a confederate of the experimenter; despite his cries with every supposed shock, he felt no pain. The shocks appeared to increase in intensity, and subjects were instructed to continue even though the shocks might actually kill the learner. A certain percentage of the subjects obeyed the experimenter and administered the most intense level of shock. In discussing this study for teaching purposes, I make two columns on the chalkboard: percentage of those who fully obeyed and percentage of those who did not. In the first column I write 35 percent and in the second, 65 percent. Students generate explanations for why most people did not obey and I should add, they do so with great certainty: “People don’t like to be pushed around,” “People are compassionate and don’t want to see anyone suffer,” and so on. At this point I turn to the board and notice that I “mis-labeled” the columns.

Gender differences may also be a factor in whether new skills are learned in an absolute or conditional manner. Lori Pietrasz and I conducted a study to explore this question.⁶ We hypothesized that one reason males typically outperform females on athletic tasks might be a difference in the way they process instructions. In general young girls are taught to be “good little girls” which translates into “do what you are told.” To be a “real boy,” on the other hand, implicitly means to be independent of authority and “don’t listen to all you are told.” This difference should be especially salient in sex-typed activities such as sports. Our hypothesis was that motivation to be a good girl would lead to taking in information about the basics in an absolute or mindless way. Similarly, being a bit rebellious was expected to result in conditional or mindful learning.

To eliminate much previous learning, participants were instructed in how to play a novel game: Smack-it ball. The game is similar to squash except that a small racket that fits like a baseball mitt is worn on both hands. Half of the males and half of the females were instructed in how to use the rackets either in conditional or absolute language (e.g., “one way to hold your hand might be . . .” versus “this is how to hold your hand”). After practicing the game, we surreptitiously changed the ball to one that was quite a bit heavier and thus required different body movements. We noted performance at this time. It was expected that the instructions would not differentiate the male groups because they were assumed to conditionalize the instructions no matter how they were given by us. Females on the other hand were expected to be trapped by their original learning—when taught in an absolute manner—and not to adjust to the changed circumstances (the heavier ball). Thus their performance should be inferior to that of those taught in a conditional way. The findings confirmed our expectations. Moreover, when females were taught conditionally their performance was not different from their male counterparts.

It is interesting to consider other sex-typed tasks from this perspective. While girls outperform boys in early math classes, the reverse typically becomes the case in late high school and college. Much of what we are taught about math initially has to be amended as

we approach more advanced topics. Initially there are numbers; later we find out that there are prime numbers, irrational numbers, different number systems, etc. The more rigidly we learn the original information, the harder it may be to open up those closed packages to accommodate the new information. “Good girls” learn the basics in an absolute way from the teacher/authority.

SIDEWAYS LEARNING

The standard two approaches to teaching new skills are top-down or bottom-up. The top-down method relies on discursive lecturing to instruct students. The bottom-up path relies on direct experience, repeated practice of the new activity in a systematic way. Although both approaches have their advocates, I sought a third alternative. Rather than imposing an order from above or repetitively indoctrinating students through practice, my students and I investigated the effectiveness of activities that break with these two traditions. This approach could be called sideways learning. My no-fault cheesecake is an instance of sideways learning. The basics of cheesecake making were repeatedly varied, serving as a rough guide for making the cake rather than a rigid formula.

Sideways learning aims at maintaining a mindful state. As we saw, the concept of mindfulness revolves around certain psychological states that are really different versions of the same thing: (1) openness to novelty; (2) alertness to distinction; (3) sensitivity to different contexts; (4) implicit, if not explicit, awareness of multiple perspectives; and (5) orientation in the present.⁷ Each leads to the others and back to itself. Learning a subject or skill with an openness to novelty and actively noticing differences, contexts, and perspectives—sideways learning—makes us receptive to changes in an ongoing situation. In such a state of mind, basic skills and information guide our behavior in the present, rather than run it like a computer program.

Mindfulness creates a rich awareness of discriminatory detail. Theories that suggest that we learn best when we break a task down into discrete parts do not really make possible the sort of learning that is accomplished through mindful awareness of distinctions. Getting our experience presliced undermines the opportunity to reach mindful awareness. Sideways learning, however, involves attending to multiple ways of carving up the same domain. It not only makes it possible to create unlimited categories and distinctions to differentiate one task from another, but it is essential to mobilizing mindfulness.

Can novices be jostled into mindful awareness? How can a situation release our full mental resources and increase our ability to learn and retain complex skills? One pilot study (discussed later) suggests that expertise is not dependent on a particular hierarchical assimilation of basic skills, but that greater effectiveness and mastery may be accessible through inventive transformations of the routine.

Much traditional training, such as developed and organized training in classical piano, leads many people to believe that technique is identical to the internalization of some set of rules for correct performance. Yet the observations of critics evaluating a performer often raise questions about this assumption.

Certain players seem almost exclusively absorbed in the action of their fingers over the piano keys, as if forgetting how the rest of the body participates in playing and contributes to the support of the hands. If a pianist is preoccupied with the voluntary, manipulable end of the spectrum of neurological possibilities, this preoccupation resounds in the music. The performance sounds calculated, not shaped from a spontaneous response. Hence critics often comment on virtuosos who, for all their technical brilliance, are unfeeling, or mechanical, or characterless, and so on. Walter Gieseking, a well-known German pianist, asked his students to learn the music away from the piano, so as to do away altogether with attention to technique and correctness.

In such players there may be a lack of smooth coordination between agile hands and a motionless or inexpressive trunk. The energy generated for striking the keys is isolated.⁸

In a truly great performance all technical skills are transformed into a unique, context-sensitive, one-of-a-kind experience. This raises the question of whether technique, assimilated through hours of drill, is the essential or even the primary ingredient of mastery.

Expertise, of course, involves several dimensions. First, some element of genetic endowment may differentiate initial aptitude. Animals are born with the ability to walk and quickly manage to accomplish complex tasks requiring balance, acute perception, or navigational ability, a feat that humans could never emulate. Among humans, the existence of prodigies in domains such as music, mathematics, and chess indicates that the initial mental organization of some individuals can predispose them to rapid and relatively untutored mastery.⁹ To explore approaches to learning basic skills, it is necessary to look at skills that are more generally spread across the population, leaving aside the possibility that the truly gifted are different from the rest of us in ways genetically determined.

Clearly, some experience is necessary to acquire complex skills. Yet imagine a coach or piano teacher prescribing a set amount of practice, every day. To claim that any particular amount of time on a task is sufficient to learn that skill overlooks the state in which such practice is approached. How much piano, or golf, or tennis can one learn while daydreaming about some other activity? Pressed to its logical extreme, this teaching method would rely solely on moving the body, with the assumption that the mind would follow. If so, one could learn while asleep simply by having one's body moved in the proper patterns.

Although certain therapies have actually made use of some version of this mode (body therapies or neurolinguistic programming), full mastery is not their goal. Recognizing the difference between going through the motions and moving one's body in awareness brings us into the domain of mindfulness.

J. R. Anderson has described three stages of experience that result in the acquisition of a new skill.¹⁰ The *cognitive* stage involves first taking in enough information about the skill to permit the learner to perform the desired behavior in at least some crude approximation. This stage often involves self-talk, in which the learner rehearses information required to carry out the skill. The *associative* stage involves smoothing out performance. Any errors in the initial understanding of the skill are gradually identified and eliminated in this stage, and at the same time there is a drop in self-talk. The *autonomous* stage is one of ongoing gradual improvement in performance. In this stage improvement can continue indefinitely.

Paul Whitmore, Douglas DeMay, and I investigated whether learning can in fact be improved by changing the mode of the initial learning, the cognitive stage. In a small study, novice piano players were introduced to a simple C-major scale under two conditions, explicitly mindful or traditional practice. People were recruited for the study through flyers announcing a free piano lesson. They were randomly assigned to one of two groups. All subjects were given essentially the same instruction in piano, with the following variations. Members of group 1, the mindful instruction group, were instructed to be creative and to vary their playing as much as possible. These subjects were told: "We would like you to try to learn these fingering exercises without relying on rote memorization. Try to keep learning new things about your piano playing. Try to change your style every few minutes, and not lock into one particular pattern. While you practice, attend to the context, which may include very subtle variations or any feelings, sensations, or thoughts you are having." Halfway through the session they were reminded to try to keep learning new things, to change the approach every few minutes, and not to lock into any single pattern. Then the specific lesson was given, and subjects spent twenty minutes practicing it. The control group was taught to practice in a more traditional, memorization-through-repetition style.

The piano playing was taped for evaluation. Two graduate students in music who had extensive keyboarding and compositional experience rated the playing. In addition, subjects were asked how well they liked the lessons. The findings of this study confirmed our hypotheses. In comparison with the control group, the subjects given mindful

instruction in the early steps of piano playing were rated as more competent and more creative and also expressed more enjoyment of the activity.

Many keyboard masters played the organ while becoming expert on the piano. Mozart, Beethoven, Schumann, and Glenn Gould, for example, recommended organ practice to achieve greater clarity in composing and playing the piano.¹¹ Yehudi Menuhin said he thought his violin playing improved after he took up the viola. To play two similar but different instruments at once works against taking one set of basic skills for granted and thereby encourages an alert and mindful state. An awareness of alternatives at the early stages of learning a skill gives a conditional quality to the learning, which, again, increases mindfulness.

CAN A TEXT TEACH MINDFULLY?

Because a lot of learning takes place not from exercises planned by an individual teacher but from a textbook, the question arises whether a textbook can inform mindfully.

Todd Bodner, Randy Waterfield, and I tested the hypothesis that with slight modifications textbooks could encourage creative use of learned material.¹² We chose a learning situation that has broad implications for the world of finance. The Series 7 Examination is an exam that every stockbroker, indeed, nearly every person who wants to be involved in investment-related employment, must pass. It is the equivalent of the bar exam in law and carries with it similar stress and concern for a passing grade. It is a comprehensive test intended to protect the investors from people who are not competent to advise them.

We obtained a copy of the Series 7 preparation and testing materials and chose a twelve-page chapter to rewrite. Our selection was guided by two criteria: first, the material had to be obscure enough that our research participants would be unfamiliar with it, and second, understanding the material had to be crucial to passing the test. The chapter was rewritten so that all statements originally expressed in absolute terms now conveyed a more conditional meaning. For example, the original text read, "Municipal bonds are issued by states, territories, and possessions of the United States, as well as other political subdivisions. Such political subdivisions would include counties, cities, special districts for schools, waterworks, sewers. Public agencies such as authorities and commissions also issue municipal bonds." The more conditionally written text reads: "In most cases, municipal bonds are issued by states, territories, and possessions of the United States, as well as other political subdivisions. Such political subdivisions may include counties, cities, special districts for schools, waterworks, sewers, and other public purposes that may require the issuance of municipal bonds. Public agencies such as authorities and commissions may on occasion issue municipal bonds for a wide variety of public projects in addition to those mentioned above." As another example, the original text read, "For local jurisdictions such as cities, the most common taxing power is on property. An *ad valorem* tax on the assessed value of real estate is the source of funds the local government uses to support its expenses and debt (GO bonds). School taxes are also charged at the local level." The mindful text read, "For local jurisdictions, which could be counties and cities, the most common taxing power may be on property. An *ad valorem* tax on the assessed value of real estate is probably the source of funds the local government uses most often to support its expenses and debt (GO bonds). Of course, there are other ways a local jurisdiction can obtain money, one of which is through school taxes."

Harvard undergraduate students served as subjects. They were randomly divided into two groups. Half received the original version of the material, and half received the more conditional version. Students studied the material for twenty-five minutes and then took a two-part test. The first part tested creative use of the learned material. The second part tested students' grasp of the factual material through a multiple-choice format. In addition, we asked questions to determine whether the students liked the material they

studied.

In the test of creative use of the material, students were asked, for example, to “write as many different purposes for municipal bonds that you can think of.” The multiple-choice test asked such routine factual questions as “Which of the following supplies money to a local jurisdiction? (a) *ad valorem* taxes; (b) school taxes; (c) parking tickets; (d) a & b; (e) a, b, & c.”

Both groups performed similarly on direct tests of the material, but when creative use of the information was required, subjects who had studied from the mindful text clearly outperformed the other group. For our first example, for instance, students who had read the mindful text supplied six answers, whereas those who had read the original gave only four. For the tax question, 100 percent of the group instructed mindfully gave the correct answer (e), whereas only 36 percent of the other group answered correctly. In addition to outperforming the comparison group on the questions requiring some creative use of the information, the mindful learning group tended to like the material more.

To consider another example, imagine reading a programmed text on cardiopulmonary resuscitation (CPR). In very small steps, one by one, it teaches you how to rescue an adult. You’ve got it down pat. Another part just as methodically teaches you how to rescue an infant. You know all the required steps. A week after reading the text you are at a friend’s pool when her seven-year-old daughter gets in over her head and needs CPR. There’s not much time. What do you do? Now imagine that you learned each step of the original lesson conditionally, that is, with a sense that it might have to be adapted rather than as mindlessly sequential. Contrast your quandary in these two cases. You might now be better prepared to adjust to this new situation and more adequately adapt the steps to suit a fifty-pound child. Which way would you want to learn the lesson? How should we teach it?