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Consider these hypothetical situations:

SEVERAL WEEKS AGO, YOU PAID \$50 FOR A TICKET to a basketball game in a nearby city. The game is tonight, but the star is out sick, nothing depends on the outcome of the game, and it's beginning to snow. Do you think you would go to the game or not?

YOU OWN A SMALL BUSINESS. There are two applicants for a managerial position. Smith has decent credentials but no outstanding accomplishments. Jones piled up an impressive record at two previous jobs and has rave recommendations from previous bosses. Smith gave a terrific interview, full of energy and interesting ideas. Jones's interview was lackluster. Which applicant would you be inclined to hire?

YOU READ IN THE PAPER this morning that people who take multivitamins have fewer heart attacks and are less likely to get cancer than people who don't. Does this information make you more likely to take multivitamins?

You won't find questions like these on IQ tests, but there are smarter and less-smart answers to them. If schools want to prepare students to make wise decisions throughout their lives, educators at all levels need to ask themselves whether they're teaching students the critical-thinking skills they'll need to answer such questions.

Research shows that some courses frequently taught in college definitely improve thinking skills. These courses include microeconomics, statistics, psychology, philosophy, and scientific methodology, especially methodology of the social and behavioral sciences. After four years of college, students who've taken these courses are much more capable of solving many everyday problems, reasoning about common life events, and evaluating claims made by the media, politicians, and advertisers (Lehman & Nisbett, 1990; Morris & Nisbett, 1993). And with some modifications, these courses could do even better at teaching thinking than they do now.

With ever greater frequency, high schools are teaching concepts that can improve critical thinking, often doing so in courses with the same names they have in college. There should be yet more such courses. But high school teachers in all content areas, at least as much as college

teachers, can give a huge boost to the critical-thinking skills such courses provide. The key is to define concepts in lots of informal, everyday ways—and show their usefulness for ordinary judgments and decisions.

Three Thinking Exercises

Consider that decision about going to the basketball game. Most of us might be drawn to going to the game (although probably with some degree of reluctance) because we don't want to "waste" the money we spent on it.

Economists don't think like the rest of us, though. They would say that if we decide to slog through the snow to see a game we fully expect to be uninteresting, we're falling into a *sunk cost* trap. We can't get our money back by going to the basketball game. We'll just be paying twice—once for the ticket and once for the tedium. Economists don't eat crummy meals they paid a pretty penny for, and they would scoff at a politician who urged continued funding for a military plane acknowledged to be of inferior quality "because the money already spent should not be wasted."

It's good advice to keep a mental balance sheet that distinguishes between past costs and future costs—and remember that only the future costs should be considered in any decision about consuming something or continuing a project. If you find yourself being persuaded to go to that unpromising basketball game, ask yourself whether, if you hadn't bought a ticket to it, you





would accept a free ticket from a friend. If the answer is no, pull a novel out of the bookcase and settle down in front of the fire.

If you hire the job applicant with the routine record and the impressive interview over the applicant with the solid record of achievement and the disappointing interview, you'll probably be making a mistake. A statistician would point out that the interview provides a very small sample of behavior. What's more, a research psychologist would explain that interview behavior can be quite different from job behavior. In fact, typical employment interviews (as well as typical interviews for university or medical school admissions) do a notably poor job of predicting the kind of performance we care about.

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What about the decision whether to take multivitamins? The newspapers are constantly presenting information about the findings of health research. Exercising regularly, watching cholesterol and blood pressure levels, drinking in moderation, taking multivitamins, and so on are associated with health and longevity. But these are all what behavioral scientists call *confounded variables*. The people who take multivitamins also tend to do everything else that sounds like it might be good for you.

There's only one way to scientifically establish whether multivitamins improve your health—strip away the confounding variables and assign people at random to either take a multivitamin or not, and then wait at least a few years and see how they fare. As it turns out, the takers fare not a whit better than the non-takers (Offit, 2013).

Unfortunately, even many health writers seem to have no idea of this simple principle—or at any rate, they tell us about health findings without bothering to let us know whether these findings are based on flawed data or on results obtained

by the gold standard of research, namely the randomized controlled trial.

Teaching Smart Decision Making

Adding courses like microeconomics, statistics, psychology, and scientific methodology to the core high school curriculum is a good start. But just putting these subjects in the course catalogue may not be enough. Even at the college level, courses that could teach critical thinking only do a fraction of what they could to improve thinking in everyday life. At my university, for example, the microeconomics text mentions the concept of sunk cost only once and gives only a single example of it. We need to do more than that.

But surprisingly, we don't need to do all that much more. Some colleagues and I decided to test whether we could teach powerful concepts about reasoning in the laboratory (Morris & Nisbett, 1993; Nisbett, Fong, Lehman, & Cheng, 1987). We taught college students some of these concepts in brief sessions—20 minutes or so for the concept of sunk cost, another 20 for the concept of confounded variables, and so on. We called the students weeks later in the guise of a researcher conducting an opinion survey, asking them questions that required understanding of the concepts. We found that their answers reflected the reasoning principles they had learned. This research suggests that powerful concepts from economics, statistics, and many other fields can be taught in a brief time and that such brief instruction can still improve students' reasoning.

Unfortunately, taking a course in economics or statistics the way these courses are commonly taught will not necessarily enable you to transfer important concepts like *sunk costs* and *confounded variables* to real-life problems. To make a difference in people's understanding of the world and their behavior, we need to define the concepts in ordinary language and frame them in ways that show how they apply beyond the discipline to everyday personal, professional, and civic decisions.

We also need to present the concepts in more than one way. The textbook definition is likely to be a good start—but just a start. For the *sunk cost* concept, for instance, we might try, "Economists remind us that the rest of your life begins now,"



and then give several examples of how the concept is used in daily life.

The statistical principle that helps people see why an interview is likely to be a weak guide to future job performance is *the law of large numbers*. Describe this principle to students in understandable ways: “More evidence is better than less evidence, especially when there is variability in the thing you’re trying to evaluate. So one reading is enough to find out how tall someone is, but lots of readings are necessary to find out how good a baseball player or worker someone is, or how funny or honest that person is.” Then give students several examples of the relevance of the law. For example, a high school senior should avoid being overly influenced by a visit to a college if the senior has lots of friends attending the college who like it a lot or don’t like it much. The senior’s day at the school is pretty slim pickings compared with the hundreds of days the friends have spent there.

What we teach students about the English Corn Laws or how to factor a polynomial is going to be mostly lost in short order. But powerful principles of reasoning may never fade. Every time they’re used, the likelihood of using them again in a different context becomes greater.

Pass It On to Students

Important as it is, algebra is going to be relevant to only a few students’ lives. But concepts from statistics and probability are going to be relevant to huge areas of all students’ lives for as long as they live. Elementary microeconomics and basic behavioral science methodology ought also to be in every curriculum. It’s simply not possible to make sensible choices in every area of one’s life without having an acquaintance with the fundamentals of cost/benefit analysis and without understanding the basics of scientific methodology of the kind

that gets taught in the behavioral sciences.

High school is actually better suited for teaching concepts from these fields than college is because class discussion is invaluable for showing the utility of the concepts in everyday life, and the smaller classes characteristic of high school provide an opportunity for lots of discussion. I’ve found it to be extremely helpful to ask students to bring to class examples of the use of various concepts in their daily lives. Such examples can have greater impact than anything the students read in their texts. (And they also have the effect of enhancing *my* education!)

In addition, I’ve become convinced that a lot of the principles teachers present informally in class, along with anecdotes showing their relevance, constitute an important part of teaching. Decades after high school, I’m frequently reminded of things teachers said that I regarded as mere asides, not necessarily directly related to the topic of the day, and definitely not to be expected on the test. Some of those comments affect the way I live my life today.

A high school math teacher once casually remarked that rather than plow through a boring chore you hate to do, it’s sometimes more economical to work a little harder at something you like and earn enough money to pay someone else to do the hated chore. I later learned that this is an example of a much more general concept that economists call *opportunity cost*. If I do a boring task, I give up the opportunity to do something of more value to me.

Here are some examples of the principles that teachers can use to expand concepts presented in formal course material. These principles don’t have to be taught in the context of any particular class.

It’s an empirical question. This is a comment that ought to terminate many more conversations than

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it does. For many of the questions and issues we discuss, there is an answer available. Look it up and see. There's no point in discussing the merits of taking multivitamins when there are several sources that can provide a definite answer to that question. If you can't find an answer, think about what kind of research could provide an answer. That thought experiment may teach you something about the issue in question—if only that you're not going to get an answer worth paying attention to without doing a great deal of work.

Beware the “man who” statistic, as in, “I know a man who . . .” The fact that your friend's baby had the measles/mumps/rubella vaccination and subsequently was found to be autistic does not count as evidence that compels, or even really supports, anyone's belief that vaccinations cause autism.

Experts are the worst people to trust—except for all those other people you might consult. If there's a consensus among the people who deserve to be called experts, the rest of us don't have much choice but to accept their view. And the key word here is consensus, which doesn't mean unanimity. You can find a stray PhD here and there who will say anything.

Done is better than perfect. Google employees are constantly reminding one another of this maxim. There comes a point when a project has to wrap up. That's when the likely costs of improvement outweigh the likely benefits.

And speaking of costs and benefits, *important decisions for society, for your business, and for yourself should be based on a cost/benefit analysis.* Decision theorists since Benjamin Franklin say that you'll make a better decision if you explicitly list the positive and negative aspects of each alternative and give them weight according to their importance and the probability that they will happen. This practice can result in getting a better

refrigerator—and in getting a better life.

Sleep on it. Psychologists are discovering that, in some respects, the unconscious mind is a better decision maker than the conscious mind. For one thing, the conscious mind puts too much weight on aspects of the decision that can be described verbally. The unconscious mind takes murkier, harder-to-articulate but nevertheless relevant aspects into consideration.

Teachers should give themselves permission to pass along to their students principles for clear thinking and wise choosing that they themselves have found beneficial. When these principles can be tied to concepts in the courses they teach, so much the better.

Thinking that Improves Lives

Schools cannot claim to prepare students for life unless they help students learn to reason effectively and to make choices that will improve their lives and the lives of others. To accomplish this, add courses to the curriculum that promote critical thinking, teaching reasoning that will stand students in good stead for decades after they leave school. Turn abstract principles into punchy slogans, while bringing trenchant examples to the classroom and encouraging students to do the same. And finally, treat your students to your own favorite rules for making wise judgments and sensible decisions. **EL**

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