

linear earnings; as their profits and share prices bounce around, our brains probably seek to interpret them as an alternating pattern. But alternation is hard for us to grasp. Huettel has shown that the anterior cingulate takes much longer to “make a representation” of an alternating pattern than a repeating one—about six iterations, as opposed to two. That may show why value stocks are so consistently underpriced: Because the path of their earnings growth is more erratic in the short run, your anterior cingulate struggles harder to predict what’s coming next. In fact, that short-term focus of our brains leads us to overlook the longer-term truth: Over the course of many years, the earnings growth rate of value stocks is barely lower than that of their growth counterparts and, in the long run, value investing is at least as lucrative as a growth-only strategy.

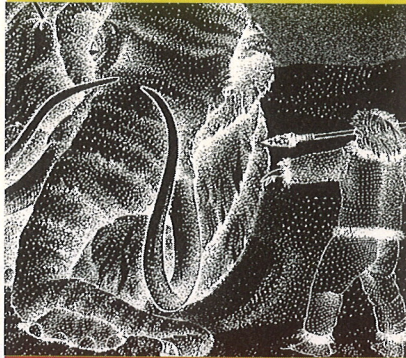
WHY DO YOU THINK THEY CALL IT DOPAMINE?

Wolfram Schultz, a neurophysiologist at the University of Cambridge in England, is so fastidious that he turns his office teacups upside-down on a towel when he’s not using them, lest they get dusty. Schultz has the right temperament for someone who explores the microstructure of the brain, monitoring the electrochemical activity of one neuron at a time. Schultz studies the workings of dopamine, the brain chemical that gives you a “natural high.” Dopamine is what makes you feel good when a stock you buy goes up, and neurons transmit that chemical to many parts of the brain, including the nucleus accumbens. The latest scientific discoveries about dopamine have huge implications for investing.

First, your brain loves long shots. The less likely or predictable a reward is, the more active your dopamine neurons become and the longer they fire—flooding your brain with a soft euphoria. “That positive reinforcement,” says Schultz, “creates a special kind of attention dedicated to rewards. Rewards are what keep you coming back for more.” That release of dopamine after an unexpected reward makes humans willing to take risks. Without

Charles Krupa/AP

PAYOFF THEN



THE BIG KILL

For ancient hunter-gatherers, life was short and food was scarce—so it paid to take big risks. Since one giant kill could yield a week’s worth of food, humans came to crave the thrill of the hunt. No wonder we play the lottery and lose money again and again in search of “the next Microsoft.”

NOW



it, explains Baylor’s Read Montague, our early ancestors might have starved to death cowering in caves, and we modern investors would keep all our money under our mattresses.

The dopamine rush we get from long shots is why we play lotto, invest in IPOs, keep too much money in too few stocks and invest with active portfolio managers instead of index funds. It’s why phrases like “the next Microsoft” or “the next Peter Lynch” make us whip out our wallets. Even if you’ve never experienced such a big score, you’re wired to want them. Dopamine makes winning big feel vastly better than just winning—and the prospect of its euphoric effect prevents us from focusing on how small the odds of winning big actually are.

The second dopamine discovery is reminiscent of Pavlov’s dogs. Russian physiologist Ivan Pavlov would ring a bell whenever his laboratory dogs were to be fed. After a while, they would drool at the mere sound of the bell, before the food even arrived. Dopamine works in a similar way. Once a gain becomes associated with a particular cue, your brain releases dopamine on that cue—before the gain occurs.

A team led by Harvard’s Hans Breiter found a “striking” similarity between the brains of people trying to predict financial rewards and the brains of cocaine addicts and morphine users. In effect, as investors, we get stoned on our own belief that we know what’s coming. As time passes, we may get more of a dopamine high from predicting a coming gain than from earning the gain itself. Thus back in the booming bull market of 1999, day-traders got a “buzz” just from sitting down in front of their computers if their previous trades had been profitable. (That dopamine buzz probably made their next trades even more aggressive.) And when Cisco had beaten Wall Street’s earnings forecasts for 25 quarters in a row, just the approach of its next earnings announcement made investors feel euphoric. (Perhaps that’s why Cisco’s price/earnings ratio hit an electrifying 196 times earnings by early 2000.)

The third major dopamine finding: Once you’ve learned which cues seem to predict a coming gain, something strange happens if that reward fails to materialize. Your neurons still flood your brain with dopamine when you encounter the cue, giving you that “prediction high.” But your dopamine dries up instantly if the gain fails to arrive when the cue suggested it would. It’s as if someone yanked away the needle just as an addict was about to get his fix. This wrenching swing from euphoria to depression—which can take place in less than two seconds—may help explain why the market so harshly overreacts to any short-term disappointment.

CHAIN YOUR BRAIN

Finally, let’s think about how you can use these new insights into the brain to make yourself a better investor. “You will be much more in control,” says Antonio

Damasio of the University of Iowa, “if you realize how much you are not in control.” Damasio’s point is both simple and profound: Since it’s impossible to change how your brain works, you must learn to make the most of its strengths and limitations alike. Whenever possible, you need to develop automated, irreversible investing habits that are tailor-made for neutralizing your brain’s worst liabilities while optimizing its greatest assets. Here’s how neuroscience leads to a new science of investing.

STRAP YOURSELF IN. Because the amygdala is an almost irresistible force, you must reduce your exposure to images that can provoke panic. Turn away from stock tickers; turn off the televised images of closing bells and yelling traders. And promise aloud or in writing, before a friend or family member who can hold you to it, that you won’t check the value of your accounts more than once a month. If you haven’t already, sign yourself up to dollar-cost average through an automatic investment plan that will electronically purchase shares in a mutual fund every month. That way, your investing commitment can never flag, even when you are full of fear.

STAY IN BALANCE. Geniuses like Warren Buffett can get away with putting all their money in a handful of holdings. The rest of us need to set limits on our prediction addiction. Give your broker a limit order that will automatically sell any stock that grows to more than 10% of your total. And if your long-term goal is to have, say, 75% of your assets in stocks, but they’ve shriveled to 49%, buy enough to get them back up to 75%. Make that kind of asset reallocation twice a year, every year—no more, no less—on equidistant, easily memorable dates like New Year’s Eve and July 4.

REDOUBLE YOUR RESEARCH. If a stock or fund goes straight up, don’t just enjoy the ride. The better an investment does for you, the more powerfully your brain will believe nothing can ever go wrong with it. Each time it rises, say, 50%, study it again more closely; ask what could go wrong; seek out negative opinions. The time to do the most homework is before bad news can catch your brain by surprise. There are no guarantees, but doing extra research just when

things are going well is the best way to prepare yourself in case something later goes wrong—or seems to. You’ll then have a better sense of whether it’s a false alarm or a real one.

USE DIFFERENT WALLETS. If you can’t stop chasing “the next Microsoft,” at least chase it with only part of your money. Just as prudent gamblers lock most of their cash in the hotel-room safe and go onto the casino floor with no more than they’re willing to lose, you should set up a “mad money” account. You can’t control your prediction addiction, but you can at least contain it—by putting into your mad-money account only what you can afford to lose. That way, you speculate with a fraction of your money, not with all of it.


BUILD AN EMOTIONAL REGISTRY. Remembering what you did is only one way to learn from your own experience. You also should remember how you felt after your decisions (and their results). “Regularly evaluating whether an outcome made you feel good or bad,” says University of Iowa’s Antoine Bechara, “will help you

learn from your behavior.” Keeping a written record of your feelings—what Bechara calls an emotional registry—is a good idea, particularly if you are a younger investor. Store these “feeling records” alongside your trading records.

LOOK AT THE LONG RUN. Remember that your brain perceives anything that repeats a couple of times as a trend—so never buy a stock or a fund because its short-term returns look hot. Check out the long run, and never assess performance in isolation; always compare a stock or fund to other similar choices.

FLEX YOUR CORTEX. Because your prefrontal cortex is responsible for evaluating the consequences of your actions, and because advancing age impairs that part of your brain, be on guard. If you (or members of your family) are elderly, simple reminders can help—like a note next to the phone that says, “No thanks to telemarketers” or a Post-It note on your PC that reads, “Never open unsolicited investing e-mail.”

DIVERSIFY, DIVERSIFY, DIVERSIFY. This grim bear market has revealed the biggest risk of all: underestimating your own tolerance for risk. Thinking you can tough it out then suddenly finding you can’t is a recipe for financial disaster. Diversification—making sure that you never keep all your money in one kind of investment—is the single most powerful way to prevent your brain from working against you. By always holding some cash, some bonds, some real estate, some U.S. and foreign stocks, you ensure that your prediction addiction can never force you into a single, sweeping bet on a “trend” that disappears. And by keeping your money in a broad basket of assets, you lower the odds that a meltdown in one investment will send your amygdala into overdrive.

Putting yourself on investing autopilot minimizes the opportunities for your brain to perceive trends that aren’t there, to overreact when apparent trends turn out to be illusions or to panic when fear is in the air. That frees up your brain to focus on the harder work of long-term financial planning. Above all, you should take enormous comfort from knowing that the latest scientific findings show just how newly valid the oldest truths of investing really are. 

BONE UP ON YOUR BRAIN

WEBSITES

- www.pbs.org/wnet/brain/
- www.vh.org/Providers/Textbooks/BrainAnatomy/TOC.html
- medstat.med.utah.edu/kw/hyperbrain/
- www.cid.ch/DAVID/head.html
- www.neuroguide.com

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- Paul W. Glimcher, *Decisions, Uncertainty, and the Brain: The Science of Neuroeconomics* (MIT Press, forthcoming in 2003)
- Joseph LeDoux, *The Emotional Brain: The Mysterious Underpinnings of Emotional Life* (Touchstone Books, 1998)