

MIND Games

What can computer games tell us about the investment decision-making process? Plenty, say researchers

BY CYNTHIA HARRINGTON, CFA

The ultimate goal of the human decision making process is to achieve maximum satisfaction while expending the least effort. Researchers got a firsthand look at how this played out when they used PET (positron emission tomography) scans to study the brains of research participants who were playing the computer game Tetris.¹ At the start of the experiment, all of the participants were novices. When they started playing, their brains lit up in erratic patterns. As they gained expertise in the required spatial reasoning and hand-eye coordination needed to win the game, brain activity organized in regions specific to the task at hand.

Does experience have the same effect on investment professionals? In a 2002 study of traders, Andrew Lo and Dmitry Repin investigated this question.² Currency traders, wired for a variety of physical responses to market moves, went through their days on the trading desk. The more experienced traders barely lit up the monitors of heart rate, pulse, and skin valence, but the monitors attached to individuals with less experience sometimes indicated wild activity.

This finding helps explain why experience is valued in many sectors of the market. Anne Casscells, chief investment officer of the Stanford Management Company, used a rule of thumb of hiring managers with more than 10 years in the business. “I simply listened for the manager’s thought process. As he or she would list the reasons for limiting size of short positions or scaling in positions on the long side, I would know the manager either did or did not understand the vicissitudes of the markets,” says Casscells, now managing director of Aetos Capital and co-president and chief investment officer of absolute-return strategies for Aetos Capital.

Despite the value of seasoning, experienced professionals still succumb to suboptimal decisions. Emotions get in the way, and cognitive biases, such as confirmation bias and herding behavior, eat away at profits. Casscells,

who spent the first 10 years of her career in fixed income, saw how the greed for returns could skew the purchase behavior of institutional customers. “They’d ignore their fears and tell themselves stories to go on being greedy,” she says. “They’d justify a few extra basis points by saying the rating agency was not right on or that junk bonds are not high risk if diversified enough.”

A little background on how decisions get made reveals some important developments. The Tetris players and Lo’s wired traders very likely develop their expertise in slightly different ways. We know that the gamers just sat in the lab and played. Presumably, many of the more successful traders augmented their learning with some books or classes or at least read the newspaper. In other words, they sought external sources. This distinction between external sources, or description, and internal sources, or experience, sets up a framework to develop better methods for improving decisions.

A simple example is the contrast between buying cereal and choosing a route to go to work. The cereal choice is likely made while standing in the supermarket and reading the outside of the box for nutritional content. The route home might be chosen more from internal sources. We draw on previous memories and stored information to choose which turns to take and how the route needs to be altered to accommodate a stop for milk or to pick up a child after school.

Why is this difference important? Decisions from description, or external resources, focus attention on decision outcomes and probabilities. Decisions from experience, or internal resources, rely on a series of sequentially experienced outcomes, with the most recent experiences weighing more heavily on current decisions.

Consider how this distinction might be at play in the decisions of plan sponsors to allocate assets and choose managers. In a study of asset flows and post-flow per-

¹ “Regional Glucose Metabolic Changes After Learning a Complex Visuospatial/ Motor Task: a PET Study,” *Brain Research* 570:1–2. See also Camerer, Colin, George Loewenstein, and Drazen Prelec, “Neuroeconomics: How Neuroscience Can Inform Economics,” *Journal of Economic Literature* (March 2005).

² Lo, Andrew W., and Dmitry V. Repin, “The Psychophysiology of Real-Time Financial Risk Processing,” *Journal of Cognitive Neuroscience*, 14:323–339 (2002).

formance using data from the PSN investment manager database for the 1985–2006 period, researchers found that plan sponsors could have saved hundreds of billions of dollars by not making the decisions they did.³ A key finding is the overweighting of recent outcomes in decisions from experience. For example, after the equity market decline in 2000 and the interest rate decline that began the same year, outflows from domestic U.S. equities and domestic income spiked, but in 2001 and 2002, domestic fixed income drew a greater share of inflows than in other years during the period.

The results don't surprise study author Jeffrey Heisler, CFA, chief risk officer at Venus Capital Management in Boston. "Most professionals are aware of all the issues, yet all decisions have the human element," he says. "Personally, I don't see much difference between the professional and the individual investor in many decisions."

Decision Processes

Demand for improving human decision making is coming from even the most unlikely of investors, the quants. In *Challenges in Quantitative Equity Management*, authors postulated that a solution to the problems of automated decision tools would be to commingle models and judgment.⁴ Of course, the quantitative models proliferated partly to solve the problem of limited human decision-making abilities. Despite the massive amount of research documenting what needs to be changed, concrete proposals to improve decision making have been few.

Recent changes in the way we view how decisions are made may lead to better methods. Whereas different kinds of decisions, such as automatic versus deliberative or emotional versus cognitive, used to be viewed as competing forces, the new approach considers how the processes are integrated. The focus is on the process the brain uses to figure out how to accomplish its tasks with all the resources available.

This integrated approach tries to consider the interaction of the methods of reaching a decision, as opposed to the previous approach, which presumed the different systems were mutually exclusive and competed with one another. "We started to look at how unconscious needs actually impacted investment decisions," says Richard Taffler of the University of Edinburgh Business School.

"We need both cognitive and emotional; you can't look at one without the other."

Taffler's views are formed partly by his experience in writing the forthcoming book *Understanding Professional Investors: Human Nature and the Role of the Emotions* with his co-author David Tuckett, one of the leading psychoanalysts in the United Kingdom. To answer the question of how to help fund managers improve on the processes of thinking and judgment, more than 50 senior professionals from around the world were interviewed in depth. The interviews, combined with almost a decade of working in a field Taffler and Tuckett call "emotional finance," indicated that even professionals can be thrown into a "paranoid schizoid" or "divided" state of mind. In this state, people operate in a black-and-white world of split feelings. Good feelings are retained, and bad feelings are assigned to an "other." The person then feels persecuted by this other. "This state of mind can arise from the denial of the fact that we can't predict what is unpredictable," says Taffler. "The belief that we can fully control financial market markets and discount risk and uncertainty is like believing in magic."


In recent decades, the sense among investors that the markets had been tamed was pervasive. The uptrend since former U.S. Federal Reserve chief Paul Volcker wrestled inflation to the ground in 1982 was the sum of all experience for many managers, who had never operated in any other environment. Recessions occurred but were relatively mild. Volatility was relatively low, and the stable rate of inflation seemed to confirm the ultimate wisdom of monetary policy makers. "One bubble would burst, and there would be another cheap place for money to flow," says Casscells. "It's not surprising that the stability encouraged people to take a lot of risks."

The perceived lack of uncertainty was reflected in the low risk premiums—for almost every asset class. There seemed to be no danger in taking enormous risks, coupled with the feeling that rewards could be both immediate and enormous. The sense that times are so good that the premium is on the here and now washes out thoughts of the long term. "The ability to delay gratification depends on how people think about rewards," says Hal Ersner-Hershfield, who studies the role that time plays in decision-making and emotional experience at the Kellogg School of Business at Northwestern University. "Emotional, and often suboptimal, decisions are hard to delay, and the cold rational decisions with likely better long-term consequences are easier to delay."

The desire to eliminate emotion is one driving force behind quantitative strategies and decisions based on

³ "Absence of Value: An Analysis of Investment Allocation Decisions by Institutional Plan Sponsors," *Financial Analysts Journal* (Nov/Dec 2009). Available through www.cfapubs.org.

⁴ Fabozzi, Frank J., Sergio M. Focardi, and Caroline Jonas, *Challenges in Quantitative Equity Management*, Research Foundation of CFA Institute research monograph (July 2008). Available through www.cfapubs.org.



predictive models. Yet these solutions seem to have created errors in decisions. In a presentation at the Financial Stability Workshop in 2007 (sponsored by the International Monetary Fund, the Financial Stability Forum, and the Bank for International Settlements), Andrew Sheng, chief adviser for the China Banking Regulatory Commission, focused on investors' confidence in "the ability to quantify risks and create complex products in order to transfer such risks." Consequently, he explained, the market had begun to operate "under a technical illusion of precision" that was "based on many assumptions or disclaimers that turned out to be at best very shaky and at worst wrong."

"There are times when emotion can guide decisions," says Ersner-Hershfield. "By taking just the cold, cognitive viewpoint, one can sometimes not see the whole context and miss something."

Seeking Solutions

The investment profession has come to an interesting crossroads: We can no longer rely on models to generate accurate predictions, a staggering pile of research shows that human decision making is flawed, and we don't have proven methods to upgrade the decision-making process. Simply knowing the biases and human limitations has supported many improvements but has not been enough to provide a comprehensive solution.

An example of effective application of the understanding of how biases work played out at Stanford University's endowment in 1999, when Casscells held the position of chief investment officer. Casscells had been applying an asset allocation model based on asset class projections that put allocations out of step with the consensus favoring go-go growth stocks and resulted in a portfolio that was overweight in REITs, domestic value, international, and emerging markets. Casscells had been reading the research of Daniel Kahneman and Amos Tversky and the *Journal of Behavioral Finance* since 1996. "Talk about behavioral finance," says Casscells. "There was a lot of criticism around the university for being out of the sexy growth areas."

For 18 months, Casscells and members of the investment committee faced critics as the strategy underperformed. "We all felt the heat to change," she says. "But we had the courage of our convictions, and when the S&P 500 and Nasdaq came crashing down, we got the payoff."

Casscells reports that in addition to extensive research behind the allocation decisions, a clear and coordinated communication strategy supported committee members' courage to stay the course. Her experience

points to another finding of Taffler and Tuckett: the value of talking.

In Taffler and Tuckett's interviews with top fund managers, subjects were asked how they experienced the activity of investing, about the firms they were investing in, and about the anxieties of being in an environment of constant uncertainty. They also described how they related to others around them and how others were relating to them. "Everyone, almost without exception, talked openly, freely expressing their feelings," says Taffler. "The professional audience enjoyed doing this because they know what's in their experience and what's of value."

Subjects in the study reported how much better they felt simply to be able to talk about their feelings. Taffler suggests that part of what occurred was that participating fund managers began to develop the language needed to talk about their emotions and what was going on in their unconscious, which in turn gave them the tools to think about these aspects of their jobs. The authors' resulting recommendation to investment firms is to formally acknowledge that emotions, especially anxieties, are inherent to investing. "A supportive management structure recognizes that people need to talk about how they are feeling in an open way," he says. "Institutionally, those mechanisms have to be put in place."

Translating such insights into optimal decisions and behaviors is the final stage, and solutions are still elusive. Jeffrey Heisler has been at the task since he wrote his dissertation at New York University in 1994 on the disposition affect—how we tend to hold our losers and sell our winners. After 10 years of experience in teaching and numerous studies and scholarly papers on the subject and now in his position as chief risk officer of hedge fund Venus Capital, he reports that even when we are conscious of experiencing the unwanted behavior, our intuition to do the wrong thing is amazingly powerful. "It's even harder to make decisions with one's own money than with someone else's," says Heisler. "That's why I bounce my decisions off a close friend, a good thinker about the markets."

This sense of an "other" is the basis for research that might also yield practical solutions to improving decision making. In a paper presented at the November 2009 annual conference of the Society for Judgment and Decision Making, Ersner-Hershfield demonstrated an interesting correlation. The "other" in Ersner-Hershfield's work is a person's future self. "The implication in these findings is that if we think of our future self as being different [from] our current self, it's like thinking of the self as a different person," he says. "And the motivation

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to do good for this future self is no stronger than what we might feel toward a stranger.”

The potential implications for financial decision making are enormous—from improving savings habits to enhancing trading skills. The research relied on both brain imaging and participant surveys. First, participants answered a series of questions that elicited judgments about future selves while lying in an MRI scanner. Two weeks later, the participants returned to answer questions designed to reveal their ability to delay rewards, as well as their individual degree of temporal discounting of future rewards. “We determined each person’s temporal discount rate and then correlated it with the neural testing,” says Ersner-Hershfield. “We had high hopes for strong correlations, and miraculously, we found them.”

In short, neural differences that arise from thinking about the current self compared with the future self can predict discounting of future rewards. The researchers also found that despite the strong correlation between current self and future self for an individual participant, people exhibited wide variations. “Those with the greatest difference between the selves were the most likely to spend now rather than delay gratification,” he says.

Ersner-Hershfield and his colleagues are also working on applications for the research. One such application involves testing people’s propensity to save and offering interventions for those less likely to feel rewarded by long-term decisions. Last year, he presented a method to increase one’s connection with the future self to psychologists.

The notion of relationship with self expands on the usual discussion of delaying rewards as being either emotional (for immediate gratification) or cognitive (for a delayed reward, which is usually more optimal). The emotional state extends to how lenient we are with ourselves when we transgress from commitments to delay. For example, a hungry person is in the same “hot” emotional state when thinking about eating the chocolate

cookies the day before, despite a commitment not to eat sweets. Similarly, the hungry person empathizes with others who might have fallen off the wagon with the cookies. But from the cold space of cognitive thought, we are unforgiving of both ourselves and others. “This hot/cold empathy gap is well documented in psychological research,” says Ersner-Hershfield.

Regulating Change

The next wave of research is focusing on solutions to improve individual decision making, but internal sources are only half the equation. External sources, or the description side of the decision equation, are just as important. In his upcoming book *Running Money: Professional Portfolio Management*, Heisler and his co-authors discuss some needs for external sources. “Investors have to go the old-fashioned route and get involved qualitatively, talk to managers,” he says. “Fiduciary responsibility for getting adequate disclosure and demanding transparency is as important as accounting for the behavioral issues.”

From a psychoanalytic perspective, Taffler lays out the challenges to new regulations. According to his assessment, we still have the same underlying models in place and believe that they can be relied on to eliminate risk and uncertainty. “We’re still in this paranoid-schizoid state of mind,” he says. “We still think the party can go on forever in a complete denial of reality.”

Recognizing the state of mind we are operating in is a first step toward finding a solution. “Typically, people grow out of believing they can have what they want when they want it very early in life,” he says. “We need to recognize the current realities of the financial markets and not continue implicitly to promote such illusory beliefs.”

After the events of the past few years, many investment professionals may be feeling as though their brains have shifted into the erratic patterns of the novice Tetris players. An organized sense of experience and mastery of the players may take a while to develop. Those who are looking to upgrade the way they make decisions might expect improvements from external sources as new tools and analysis of market conditions become available. “It feels like people get over traumatic events in three years or so,” says Casscells. “It takes some super-duper trauma for society to remember for a generation or two. Maybe it takes that to permanently alter brain structures.”

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