

Your Money & Your Brain

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Neuroeconomics

- p.1 Neuroeconomics combines neuroscience, economics and psychology
- p.3 Investors are habitually their own worst enemy
Major theme: our investing brains drive us to do things that make no logical sense
- p.4 Ref. to Harry Markowitz, father of Modern Portfolio Theory, personal investment portfolio is split 50/50 between stocks/bonds
- p.5 Book is organized around succession of emotions that most people pass through on the psychological roller coaster of investing
Kahneman: "Financial decision-making is not necessarily about money; It's also about intangible motives like avoiding regret or achieving pride
Best results are achieved when you harness emotions, not ignore them
- p.7 Learning how to invest better is really about learning to understand ourselves better

"Thinking" and "Feeling"

- p.10 Intuition can create wonderful judgements, but only under the right conditions-when the rules for reaching a good decision are simple and stable
- p.11 "anchoring and adjustment": make intuitive decision based on an anchored image, but then readjust once our analytical process catches up
- p.12 Anchoring: establishing an initial reference (a baseline) that future circumstances will be compare to (i.e. a real estate agent first shows you an expensive house so that the ensuing homes look cheap)
- p.13 Most financial decisions are a tug-of-war between our reflexive (intuitive) system and our reflective (analytical) system
- p.14 Reflexive system is the first system to react, the reflective system requires much more time and energy to operate
Reflexive system takes in sights, sounds and smells, evaluates them, and turns them into emotions like fear or pleasure which motivates our body to take action
- p.15 Multitasking produces a falloff in the level of awareness that we can devote to each new task which leads to reduced efficiency
- p.16 The reflexive brain quickly assesses change and makes rapid--but sloppy--decisions
- p.17 Reflective brain intervenes when the reflexive brain encounters situations that it cannot solve on its own
- p.20 When a problem is too hard to solve, the reflective brain may hand the problem back to the reflexive brain
The most reliable way to determine whether something is true is to try proving that it is not false
- p.23 Psychologist Paul Andreassen (artificial stock market experiment): participants looked at one of two signals: price changes or price levels
 - 1) Investors that fixated on price changes traded too often
 - 2) Investors focused on price levels were content to hold for the long-term
- p.22 Jelly Bean Syndrome (denominator blindness): we pay attention to small changes that fluctuate wildly while ignoring the larger values that change slowly
- p.24 Both reflexive and reflective systems have strengths and weaknesses, the challenge is to make them work better together

- p.28 Benjamin Graham: "People don't need extraordinary insight or intelligence. What they need most is the character to adopt simple rules and stick to them."
- p.29 Reflexive system is tuned to respond to the current situation. Mood effects momentary behavior, but may have long lasting consequences--don't make important decisions without sleeping on it
- p.32 It's not uncommon for a stock's price to change as often as a thousand times a day, but in the real world the value of a business hardly changes on any given day

Greed

- p.35 Our brain treats investment profits as part of a broad set of rewards (i.e. food, drink, shelter, music, sex, drugs, etc.)
The anticipation of financial gain puts our reflexive brain to work
- p.36 Anticipation feels better than receiving the actual reward (Mark Twain example)
- p.39 We experience reward in two ways:
1) the anticipation of a reward
2) actual receipt of the reward
Most of the euphoria we experience comes from the anticipation, not the actual receipt
- p.40 Anticipation study using rats by Taketoshi Ono
- p.41 "Money doesn't buy happiness. After all, it forever feels as if it should."
- p.43 We form strong memories of things associated with potential rewards
- p.45 Once we become aware that rewards may be offered, our attention is riveted not only by a gain or the signal that a gain may be coming--but even by a hint that the signal itself may be coming (anticipation of anticipation)
- p.46 Our investing brain is better at asking "how big" rather than "how likely", our reflexive brain is more responsive to variations in a reward than the probability of receiving a reward (i.e. lotteries)
-Anticipation is processed reflexively while probability is processed reflectively
- p.47 We assess potential outcomes not just against what happened, but also what might have happened. The chance that we could have lost money makes earning money even sweeter.
- p.49 We care more about what can happen than what does happen

Prediction

- p.54 Factual accounts of failed predictions
- p.55 Three reasons why investors who do the most research don't necessarily come out on top
1) The market is usually right
2) It takes money to move money (fees and expenses kill returns)
3) Randomness rules (anything can and will happen)
- p.58 We tend to seek patterns in data, even when it is random and no pattern exists
- p.60 A module in the left hemisphere of the human brain (the interpreter) makes us believe we can find patterns in random data where none exist
-Rats and pigeons don't do this, they see things statistically
- p.61 Basic realities of pattern recognition in our brains
-It leaps to conclusions
-It is unconscious
-It is automatic
-It is uncontrollable

- p.62 Most of our brain developed in the stone age to facilitate basic survival skills (hunting, gathering, etc.).
Our brains learned to make the most out of small samples of data
- p.63 Brain has not evolved to the point of understanding long-term trends, when events are truly random, or focusing on multiple factors
- p.64 Dopamine and reward
- 1) Getting an expected reward produces no dopamine kick
 - 2) Dopamine is triggered more by novel stimuli than familiar
 - 3) Dopamine dries up when an expected reward fails to materialize
- p.65 The compulsion to make predictions about unpredictable things originates in dopamine centers of the reflexive brain
- p.66 Animals (including humans) without dopamine circuits are incapable of taking the actions necessary to reap rewards
Brain scan similarities between cocaine addicts and financial gamblers are almost identical
- p.68 Experiment in MRI with Kool-Aid
- p.69 We're unaware of most dopamine release
- p.70 Our brain forms expectations about patterns, because events in nature follow patterns
Dopamine pushes us to take action
- p.72 In unpredictable circumstances our brain needs a way of figuring out the expected outcome, and dopamine neurons rely on a running average of past predictions and actual outcomes, but give more weight to recent prediction error
-Recency bias: humans tend to estimate probabilities not based on long-term experience, but on a handful of the latest outcomes
- p.74 Most of the predictions that we make about future rewards come from the more emotional, reflexive parts of the brain

Confidence

- p.85 Drivers that were hospitalized after auto accidents rate themselves as being excellent drivers
- p.86 Overconfidence is the tendency to favor ourselves or think more highly of ourselves with respect to the broader population
Kahneman: overconfidence can be good. If we were always realistic about our chances we would never take any risk
- p.87 Positive thinking is useful, but extreme optimism is dangerous
-Home bias (choosing what is familiar)
-Illusion of control (overstate our true power)
-Hindsight bias (mislead ourselves into thinking we saw what was coming)
-Generally terrible at admitting what we don't know
"The single biggest step you can take to improve your investing results is to stare long and honestly into a mirror to see whether you really are the investor you think you are."
- p.88 Investors expect that their personal portfolios will perform 1.5% better than the market
- p.89 "to evaluate ourselves is to lie to ourselves, especially when the evaluation requires us to compare ourselves to the average person."
The only people who do not consistently believe they are above average are those who are clinically depressed
- p.91 "the single greatest challenge you face as an investor is handling the truth about yourself"

- p.92 Home bias: the tendency to think that the most familiar investments are the best
-Our ancestors learned to avoid dangers outside their immediate home ground for survival
- p.94 The more we are exposed to something the greater our positive perception of that thing is
- p.95 "Being in the presence of familiar things (even when we are unaware of them) simply makes us feel better."
- p.96 "...investors plunk money into brand-name stocks--precisely because the brand name makes them feel good."
- p.98 Home country bias: keeping our money close to home generates an automatic feeling of comfort
- p.100 the illusion of control is the feeling that we can exert some authority over random chance with our physical actions
-We tend to confuse correlation with causation
- p.103 Commitment, actually putting money behind our picks, raises confidence even when the odds of winning don't budge
- p.105 Imagining you are in control of a situation--even when it's entirely out of your hands--can reduce neural activity in areas of your brain that process pain, anxiety and conflict (illusion of control creates comfort)
- p.107 An early run of success makes people feel they suddenly have power over a purely random process. Chance becomes "luck"
- p.108 Humans become "addicted" to gains (the prediction addiction)
- p.111 Hindsight bias: our mind tricks us into believing that the past was more predictable than it really was
- p.113 Video of college students in black and white shirts with gorilla
(<http://viscog.beckman.uiuc.edu/grafs/demos/15.html>)
- p.117 "The harder a task is and the closer the odds of success come to 50/50, the more inclined we are to be over confident about our chances."
- p.118 Warren Buffett: "What counts for most people in investing is not how much they know, but rather how realistically they define what they don't know. An investor needs to do very few things right as long as he or she avoids big mistakes."

Risk

- p.129 Risk questionnaires
1) Assume you already know how much risk you are comfortable with
2) They are inconsistent, and seldom return similar results
- p.130 How much risk you take depends on your mood, our risk tolerance is not fixed
- p.132 For our ancestors, under-reacting to real risks could be fatal while overreacting to risks that turned out to be imaginary was harmless. We developed a "better safe than sorry" reflex
- p.134 Framing: context can change the way we perceive something
- p.138 Interaction between thinking and feeling creates frames in our brains
When something is framed in a positive manner it can be evaluated at a low cognitive cost, situations framed in a negative manner make the brain "work harder"
- p.140 Reflexive thinking (performed by the amygdala) responds like a blunt instrument, and only to the crude difference between "keeping" and "losing."
Reflective brain (prefrontal cortex) is required to process the subtleties
- p.143 Hail Mary: "the sad fact is that those who can least afford to lose the little money they have are the most prone to put it at high risk."

p.144 "public information" is the spread of cues about risk and reward--a basic technique living things use to increase their chance of survival

Fear

p.155 "Much of the world's misfortune is caused not by the things we are afraid of, but by being afraid."

p.156 More recent events are more "available" in our minds, and the more probable it will seem to happen again

p.157 The fear of certain consequences tends to overwhelm us and we ignore the probabilities (i.e. we're more likely to die in a car crash than a plane crash, but we're scared to death of flying)
Presence of risk makes other unrelated things seem riskier too

p.158 Dread and knowability

"We underestimate the likelihood and severity of common risks, and we overestimate the likelihood and severity of rare risks"

p.160 The amygdala processes fear and our response to fear

p.161 "As it helped our remote ancestors survive, the fear reflex remains a vital survival tool in daily life today: It makes you look both ways before you cross the street and reminds you to hold the railing on high balconies. However, when a potential threat is financial instead of physical, reflexive fear will put you in danger more often than it will get you out of it."

p.167 Animals in groups are more sensitive to risk than they are in isolation

Social isolation activates some of the same areas of the brain that are triggered by physical pain

We follow the herd not because we consciously choose to, but because it hurts not to

p.168 Ellsberg Paradox

p.171 Ambiguity and Factor tilting

Surprise

p.176 We are finely attuned to detect novelty, without this ability we would likely continue to make mistakes

p.177 Brain activation declines as we become more familiar with something

"So it's important to figure out how to limit the number of unexpected shocks you fall prey to, and how to minimize your own sense of panic when something does catch you unaware."

p.181 The mistakes we care most about and the ones we try hardest to avoid are the ones with an important negative consequence

"The intensity of your surprise depends largely on how unexpected the surprise is."

p.182 Growth stocks more vulnerable to a negative surprise than value stocks

Regret

p.192 The "endowment effect": we think more highly of the things we own than the things we do not own

Employers matching employee 401(k) contributions, but match automatically goes into company stock

p.193 Attachment to our own investments: "Once you make an investment, you can't help regarding it as yours. You have invested part of yourself in it."

p.196 "A mistake that stems from an action hurts worse than a mistake that results from inaction."

p.199 Unexpected windfalls (i.e. winning the lottery) make us more eager to spend rather than save

p.200 "How good a windfall feels depends on whether you control it or it controls you."

p.201 While we like the idea of a lot of choices, too many creates "choice overload" and a large number of potential regrets

- p.202 Counterfactual thinking: we imagine what might have been rather than what actually happened. "If I had..." or "If only I hadn't..."
- p.205 Regretting our mistakes keep us from hastening to act in the same way in the future
- p.206 "The higher you think the odds are of making money, the more regret you will feel if you don't."
- p.209 Murphy's law: "Whatever can go wrong will go wrong", Murphy's law of investing refers to mean reversion
- p.212 Poor investment decisions become more painful when we hear others bragging about their success
- p.213 The insula is the region of the brain responsible for processing negative emotions like pain, disgust, guilt, and the loss of money
- p.215 The anticipation of something bad happening feels the same as experiencing the actual pain
- p.216 The insula helps provoke the greatest feeling of regret when it makes us feel disgusted about our past mistakes
This "disgusted" feeling makes us more loss averse, causing us to want to be as far away as possible from the assets that produced the loss
- p.219 There are two types of investing mistakes:
1) instantaneous and infuriating: you buy and the price tanks or you sell and the price soars
2) not obvious at first: results from carelessness, forgetfulness or commitment to a choice that we were never happy about, and after the fact there is no mistaking our bad choice as it hurts badly
"The more an outcome appears to be the result of your own choice and the more readily you can imagine having done something different, the more painful your regret is likely to be."
To help eliminate regret around our finances do as little as possible whenever possible. Follow policies and procedures. Automate savings and investment decisions

Happiness

- p.228 "...no matter how much or how little money you have, you can use it to lead a happier life if you understand the limits of what it can do for you and the power you can exert over it with self-control."
- p.230 Being rich doesn't make people happier. Compares happiness of the Forbes 400, Maasai of Africa, Inuit, and Amish
- p.235 When we imagine our future selves, we exaggerate how intense our emotions will be and how long they will last
We end up desiring possessions or experiences that we think will make us happy, but turn out not to
- p.238 Memories are not just recollections, but reconstructions. As a result we tend to learn less than we probably could from our own experiences
"While the money you spend on acquisitions tends to feel more and more like a mistake as time passes, the money you spend on experiences is apt to grow in value as your memories grow warmer."
- p.241 Pursuing wealth for the sake of wealth can have toxic effects on our happiness
- p.242 Envy: "How good your money makes you feel depends partly on how much money the people around you have."
- p.243 Small amounts of envy can be beneficial as it helps motivate us, gives hope for the future, and prevents us from living a staid, boring life
- p.252 We choose immediate rewards over larger delayed rewards because the immediate reward gives us a jolt of dopamine that we don't get from the delayed reward
- p.255 We learn through accumulated experience as we age to focus on the things that bring us pleasure and forget about past disappointments