Shifting Paradigms

How the Popular Psychology Movement is Challenging Rationality

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What a piece of work is man!
How noble in Reason!
How infinite in faculties!

-Hamlet, Act II, Scene II

Ever since the ancient Greeks, these assumptions have revolved around a single theme: humans are rational… This simple idea underlies the philosophy of Plato and Descartes; it forms the foundation of modern economics; it drove decades of research in cognitive science. Over time, our rationality came to define us. It was, simply put, what made us human. There's only one problem with this assumption of human rationality: it's wrong.

-Jonah Lehrer, *How We Decide*

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Introduction

What Can Be Called Into Doubt: Shifting Paradigms

A decision theorist from Columbia University was struggling whether to accept an offer from a rival university or to stay. His colleague took him aside and said, "Just maximize your expected utility – you always write about doing this." Exasperated, the decision theorist responded, "Come on, this is serious."

-Gerd Gigerenzer, *Rationality of Mortals*

For me, this quote sums it up: even the highly educated aren't optimizers. As the decision theorist illustrates, we are animals that can reason but are certainly not rational animals. No matter our education or experience, all of us are bound by certain cognitive limitations that cause us to make the same mistakes over and over again; as Dan Ariely says, not only are we irrational, we are predictably irrational.

Throughout history, however, this was forgotten. From ancient Greece to the Enlightenment, humans have thought of themselves as either rational by nature or capable of becoming so through exposure to better education and informed experience. In either case, "man [is] malleable, educable, improvable, to that degree at least, rational" (Baumer, 1972, p. 367). Call this the "rationality paradigm;" it has informed Platonic and Cartesian philosophy, been a basis for modern economics, and influenced decades of research in cognitive science.

In contrast to the rationality paradigm, the cognitive sciences are suggesting an entirely new picture – what I will call the "unconscious paradigm". Some of us have heard this before: reason is actually constituted by emotion (Damasio, 1994); intuitive decisions are just as good if not better than rational ones (Klein, 2003; Gladwell, 2005); we are subjected to a series of cognitive biases and heuristics that cause us to act against self-interest (Kahneman, Slovic, & Tversky, 1982); our memories are highly unreliable (Neisser & Harsch, 1992); we are horrible predictors (Tetlock, 2005); even the experts make trivial mistakes (Freedman, 2010); our attention is severely limited (Chabris & Simons, 2010); and most thought takes place at the unconscious level (Wilson, 2002).

But some of us have not, and we have reached a point where it is impossible to ignore the data. True, we are the smartest beings on the planet – we are the only species

to use language, introspect, and think abstractly. However, it is simply incorrect and outdated to think that our talents and unique traits equate to us being rational.

The first goal of this paper will be to draw upon examples from popular psychology to suggest that we are in the beginning stages of a paradigm shift; one defined by the move from the rationality paradigm to the unconscious paradigm. This will be reserved for section II where I will define the five themes of the popular psychology movement.

Two Mistakes of the Rational Paradigm

Under the rational paradigm, two critical mistakes were made that still mislead our understanding and evaluation of human behavior and decision-making. First, it assumed that human nature actually is something and that it has a purpose. As psychologist Martin Seligman (2011) observes:

> Aristotle thought that all human action was to achieve happiness.
> Nietzsche thought that all human action was to get power.
> Freud thought that all human action was to avoid anxiety.

The truth is, human beings, their behaviors, decisions, and motivations, are too complicated to describe aphoristically. Remember that our brains are the single most complex entities in the known universe – constituted by some 100 billion neurons that form some 100 trillion synaptic connections. From Aristotle to Freud, those who have tried to sum up human nature were biting something that they couldn't chew; it's not that they got it wrong, it's that human nature is not something that someone can get right.

The second point follows from the first. By assuming that human nature is something, we have set up false standards that describe how people should act. This is a mistake for two reasons: First, people don't act according to normative models; and second, normative models mislead us into evaluating behavior in a certain way. When Ariely says that we are irrational he is only half correct because he retains the norm of rationality. The next step is to reevaluate the norms that we base our judgments off of.

As such, the second goal of this paper will be to discuss the consequences that the rationality-unconscious paradigm shift is having on how we understand and evaluate

human behavior. This will be reserved for section III.

The Popular Psychology Movement

The motivation for this paper comes from our world being engulfed by the popular psychology movement over the last few years. It is unclear when this movement started, perhaps with Malcolm Gladwell's *The Tipping Point* or Steven Levitt and Stephen Dubner's *Freakonomics*, or how it is defined (I will try to do this in section two), but it could be generally described by the public's growing interest in understanding people and events from a sociological, economical, psychological, or neurological point of view.

Over the last decade the New York Times bestseller list has seen a number of these books: Ariely's *Predictably Irrational* (2008) and *The Upside of Rationality* (2010), Gilbert's *Stumbling on Happiness* (2006), Haidt's *The Happiness Hypothesis* (2006), Lehrer's *How we Decide* (2009), and Thaler & Sunstein's *Nudge* (2008). What unites them is their attempt to "explore the hidden side of everything" (Levitt & Dubner, 2005, p. 1), by synthesizing numerous academic studies in a relatable way, drawing upon interesting real-world examples, and by providing appealing suggestions for how one can understand the world, and his or her decisions and behaviors within the world, better.

There is an additional motivation for this paper. As an academic I want to call attention to the gap between philosophy and economics, and psychology. That is, whereas psychology is mainly interested in describing and quantifying behavior, philosophers are interested in evaluating behavior and economists are interested in establishing normative models of behavior. However, evaluating and explaining behavior normatively *requires* empirical data that describes how people actually behave. The problem is that those who possess the data – psychologists - are not interested in evaluating and describing behavior normatively. As such, successful philosophies and economic models must reach out and consider the latest psychological data that describes how humans actually behave. I will advocate this point throughout.

Looking Forward

This paper is divided into three main sections: Section I will briefly contextualize the popular psychology movement with a short history of the cognitive revolution; section II will define the five themes of the popular psychology movement to illustrate the rationality-unconscious paradigm shift; and section III will show the consequences that this shift is having on the concept of rationality.

Along the way I will quote a number of popular psychology books. The purpose of this will be to give the reader a sense of how ubiquitous certain popular psychology themes are within the literature. It is also my hope that doing this will give life to an otherwise boring academic paper. Enjoy.

Section I: Psychological Groundwork

Origins

The popular psychology movement is the result of an enduring revolution that took place in 20th century psychology. Stemming from 19th century Pavlovian theories of conditioning, behaviorism was the first school of thought to dominate psychology. It lasted roughly from the 1920s to the 1960s and held that any action preformed by an organism should be regarded as a behavior. Behaviorists believed that behavior could be explained and understood through culture independent of biology, genetic makeup, or evolutionary history. B. F. Skinner was responsible for pushing behaviorism both in academia and in the public and like Pavlov, focused his research on how conditioning influenced human behavior.

Behaviorism was almost entirely replaced by the cognitive revolution during the second half of the 20th century. George A. Miller's 1956 "The Magical Number Seven, Plus or Minus Two," and Noam Chomsky's 1959 "Review of Verbal Behavior, by B. F. Skinner," were, among others, important publications that forced psychology to become increasingly cognitive. Behaviorists, as Steven Pinker (2002) notes, "got it backwards: it is the mind, not the behavior, that is lawful" (p. 39). Whereas they only considered the external, those involved in the cognitive revolution sought to explain behavior by studying the internal; the cause of behavior was therefore thought of as being dictated by

the brain and not the environment.

Biases and Heuristics

The cognitive revolution naturally gave rise to the cognitive sciences – neuroscience, linguistics, philosophy, artificial intelligence, and anthropology[1] – all of which began to study how human brains processed information. A big part of the revolution revolved around the work done by psychologists Daniel Kahneman and Amos Tversky. Kahneman and Tversky developed a cognitive bias and heuristic program in the early 1970s that changed the way human judgment was understood. The heuristics and biases program had two goals. First, it demonstrated that the mind has a series of mental shortcuts, or heuristics, that "provide subjectively compelling and often quite serviceable solutions to… judgmental problems" (Gilovich, Griffin, Kahneman, 2002, p. 4). And second, it suggested that underlying these heuristics were biases that "[departed from] normative rational theory" (Gilovich, Griffin, Kahneman, 2002, p. 3).

Kahneman and Tversky's work was vital because it questioned the notion that judgment was an extensive exercise based off of algorithmic processes. Instead, it suggested that people's decisions and behaviors are actually influenced by "simple and efficient… [and] highly sophisticated… computations that the mind had evolved to make."

Their work was complimented by Richard Nisbett and Lee Ross's 1980 book *Human Inference: Strategies and Shortcomings of Social Judgment*, which outlined how people's "attempts to understand, predict, and control events in their social sphere are seriously compromised by specific inferential shortcomings" (p. 4). From this, a list of "cognitive biases" began to accumulate. These included: attentional bias, confirmation bias, the endowment effect, status quo bias, gambler's fallacy, the primacy effect, and more (more on this in the first part of section II).

The Unconscious, Emotion, and Intuition

[1] Philosophy and anthropology had already existed. They are included in the cognitive science because they study how the brain processes information.

The cognitive biases and heuristic program was just one part of the cognitive revolution. The other equally important aspects came a bit later when psychologists began to empirically study how unconscious processing influenced behavior and conscious thought. These studies stemmed from the 1977 paper *Telling More Than We Can Know: Verbal Reports on Mental Processes,* by Richard Nisbett and Timothy Wilson. Nisbett and Wilson argued that, "there may be little or no direct introspective access to higher order cognitive processes," (p. 1) thereby introducing the idea that most cognition takes place automatically at the unconscious level.

Wilson continued his research in the 80s and 90s, eventually developing the concept of the "adaptive unconscious," a term he uses to describe our ability to "size up our environments, disambiguate them, interpret them, and initiate behavior quickly and nonconsciously" (2002, p. 23). He argued that the adaptive unconscious is an evolutionary adaptation used to navigate the world with a limited attention. This is why we are able to drive a car, type on a computer, or walk without having to think about it.

Complimenting Wilson was Yale psychologist Jon Bargh who significantly contributed to the study of how certain stimulus influenced people's implicit memory and behavior. In numerous experiments, Bargh demonstrated that people's decisions and behaviors are greatly influenced by how they are "primed". In one case, Bargh showed the people primed with rude words, such as "aggressively, bold, and, intrude," were on average about 4 minutes quicker to interrupt an experimenter than participants who were primed with the polite words such as "polite, yield, and sensitively" (1996).

Also in the 80s and 90s, neuroscientists began to understand the role of emotion in our decisions. In the 1995 book *Descartes Error,* Antonio Damasio explicates the "Somatic Markers Hypothesis" to suggest that, contrary to traditional western thought, a "reduction in emotion may constitute an equally important source of irrational behavior" (1993, 53). NYU professor Joseph LeDoux was also instrumental in studying emotions. Like Wilson, Nisbett, and Bargh, LeDoux advocated that an understanding of conscious emotional states required an understanding of "underlying emotional mechanisms" (1996, 302).

Along with emotion and the unconscious, intuition was another topic that was

heavily researched in the past few decades. It was identified and studied as a way of thinking and as a talent. As a way of thinking, intuition more or less corresponds to Wilson's adaptive unconscious; it is an evolutionary ability that helps people effortlessly and unconsciously disambiguate the world; i.e., the ability for people to easily distinguish males from females, their language from another, or danger from safety.

Intuition as a talent was found to be responsible for a number of remarkable human capabilities, most notably those of experts. As Malcolm Gladwell says in his 2005 best seller *Blink*, intuitive judgments, "don't logically and systemically compare all available options" (p. 107). Instead, they act off of gut feelings and first impressions that cannot be explained rationality. And most of the time, he continues, acting on these initial feelings is just as valuable as acting on more "thought out" feelings.

Consequences to the Rationality Paradigm

By the 1990s, when the "revolution in the theory of rationality… [was] in full development" (Piattelli-Palmarini, 1994, p. 4), the line between rational and irrational behavior became blurred as more and more studies made it difficult to determine what constituted rational behavior. One on hand, some (mainly economists) maintained rationality as the norm even though they knew that people deviated from it. On the other hand, individuals like Herbert Simon[2] argued that the standards for rational behavior should be grounded by ecological and evolutionary considerations. In either case though, rational choice theory was what was being argued. Because of this, the 1990s saw books such as Stuart Sutherland's *Irrationality* (1994), Massimo Piattelli-Palmarini's *Inevitable Illusions*: *How Mistakes of Reason Rule Our Mind* (1996), and Thomas Gilovich's *How We Know What Isn't: The Fallibility of Human Reason in Everyday Life* (1991). Each perpetuated that idea that behavior or decision-making was to be judged by a certain standard or norm (in this case, rational choice theory) as the titles imply.

However, when all of the facets of the cognitive revolution - cognitive biases and heuristics, the unconscious, emotion, and intuition – are considered, the rationality paradigm begins to look weak; this observation has heavily influenced the popular

[2] Simon actually made this claim in the 1950s

psychology movement. Pick up any popular psychology book and you will find Kahneman, Tversky, Nisbett, Wilson, Bargh, Damasio, Ledoux, and others heavily cited in arguments that run contrary to rational actor theory.

As the next section will show, each popular psychology author has something different to say: Dan Ariely pushes behavioral economics to argue that we are all predictably irrational; Damasio argues that reason requires emotion; Gladwell, David Myers, and Wilson suggest that mostly thought is unconscious and our intuitive abilities are just as valuable as our rational ones; Daniel Gilbert and Jonathan Haidt illustrate how our cognitive limitations affect our well-being; Barry Schwartz shows how too much choice can actually hurt us; and Jonah Lehrer draws upon neuroscience to show the relationship between emotion and reason in our decision making.

As a result of all these assertions, the human condition has become seriously complicated! In the following section I will outline five themes that have defined the popular psychology movement to show how this has happened. Along the way I will provide examples from several popular psychology books in an attempt to illustrate each theme *and* the movement as a whole. For the reader who has a particular interest in the popular psychology movement I have provided a list of the most entertaining and informative books at the beginning of each theme. Again, I will be suggesting that we are shifting from the rationality paradigm to the unconscious paradigm throughout.

Section II: The Five Themes of Popular Psychology

1) Cognitive Biases

Books:

- *Predictably Irrational,* Dan Ariely
- *The Upside of Irrationality,* Dan Ariely
- *Sway,* Ori & Rom Brafman
- *Nudge,* Richard Thaler & Cass Sunstein
- *How We Decide,* Jonah Lehrer
- *How We Know What Isn't So,* Thomas Gilovich
- *Irrationality,* Stuart Sutherland
- *Inevitable Illusions,* Massimo Piattelli-Palmarini

Introduction

As I described in the previous section, cognitive biases are patterns of mental deviations. More colloquially, they describe inaccurate judgments or illogical conclusions. Recall that for Kahneman and Tversky biases result in "severe and systematic errors," and are the byproduct of heuristics, which are mental strategies that "reduced… complex tasks of assessing probabilities and predicting values to simpler judgmental operations" (Gilovich, Griffin, & Kahneman, 2002, p. 1). As such, the brain was good at reducing complex problems into simple solutions, but seemed to be illogical or irrational in some cases. This created debate between old normative models of behavior and new empirical descriptions of behavior, which led many psychologists to study what "people of all ages *actually do* when they make personal, organizational, or political decisions" (Janis & Mann, 1997, p. 3), as opposed to what they *should* do.

Cognitive biases have become a vital aspect of the popular psychology movement, where they have been primarily used to show the flaws of rational actor theory. With the help of examples from Kahneman, Tversky, Dan Ariely, Richard Thaler and others, I will outline three popular cognitive biases – framing, anchoring, and the endowment effect – and briefly show how and where they are being used within popular psychology.

Framing

One of Kahneman and Tversky's most notable publications is the 1981 paper "The Framing of Decisions and the Psychology of Choice." In it, they presented participants the follow scenario asking them to pick either Program A or Program B.

> Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill ***600*** people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimate of the consequences of the programs are as follows:
>
> • Program A: 200 people will be saved

> • Program B: A 1/3 probability that 600 people will be saved, and 2/3 probability that no people will be saved

Kahneman and Tversky found that 72% chose program A and 28% chose program B. Curious as to how the "framing" of a question affected how it was preferred, they repeated the study with a slight variation. The second time they presented participants with the same scenario but different program options.

> • Program C: 400 people will die
>
> • Program D: A 1/3 probability that nobody will die, and a 2/3 probability that 600 people will die.

In the second scenario 22% chose program C while 78% chose program D. Rationally speaking, however, people should not prefer one over the other given that Program C is statistically identical to Program A. What explains the drastic difference in preference?

> The preference in problems 1 and 2 illustrate a common pattern: choice involving gains are often risk averse and choice involving losses are often risk taking. However, it is easy to see that the two problems are effectively identical. *The only difference between them is that the outcomes are describes in problem 1 by the number of lives saved and in problem 2 by the number of lives lost* (1974, p. 3, my emphasis).

Kahneman and Tversky realized that different contexts or "frames" could strongly change people's decisions and behaviors.[3]

To get a sense of the power of framing, consider Dan Ariely's example, which appears in the first chapter of *Predictably Irrational*. Below are three subscription plans offered by *Economist.com.* Which would you choose?

1) **Economist.com subscription** – US $59.00 One-year subscription to Economist.com. Includes online access to all articles from *The Economist* since 1997.
2) **Print subscription** – US $125.00 One-year subscription to the print edition of *The Economist.*
3) **Print & web subscription** – US $125.00 One-year subscription to the

[3] This relates to Kahneman and Tversky's *loss aversion* and Prospect Theory, which turned out to be cornerstone ideas in behavioral economics. Along with framing, they explain why people buy 85% lean instead of 15% fat, and why people opt for surgeries that have a 90% survival rate as opposed to surgeries that have a 10% fatality rate. I will bring up these examples later in this paper.

> print edition of *The Economist* and online access to all articles from *The Economist* since 1997.

If you read closely, something strange should have jumped out at you. Who would, as Ariely says, "want to buy the print option alone… when both the Internet and the print subscriptions were offered for the same price?" (2008, p. 2) At first it seems as if someone at *The Economist* may have made a mistake, after all, how could a one-year subscription have the same value as a one-year subscription and access to online articles since 1997? But after thinking for a second, you may realize that the people at *The Economist* are not all that stupid; they may in fact know a thing or two about human behavior.

To see just how influential the "framing" of the *Economist's* subscription plans are, Ariely conducted the following experiment. First, he presented his MIT Sloan School of Management students with the options as seen on *Economist.com* and had them choose a subscription. Here were the results.

1) Internet-only subscription for $59 – 16 students
2) Print-only subscription for $125 – 0 students
3) Print-and-Internet subscription for $125 – 84 students

It makes sense - who would choose option two given option three? But the question is: how much did option two influence the student's decision making? Ariely conducted a second experiment to find the answer. He gave the following subscription plan, this time *without* the second option, to a second group of students and had them pick one. Here were the results.

1) Internet-only subscription for $59 – 68 students
2) Print-and-Web subscription for $125 – 32 students

As you can see, by simply removing the second option the preference of the students shifted dramatically. Without the second option 68 students chose option one while only 32 students chose option two. How significant is this? Well let's say that instead of running this experiment with 100 graduate students, you did it with 10,000 customers in

the real world. And let's say that all 10,000 customers chose to sign up for a subscription. In scenario one, where three options are presented, 8,400 people would have chosen option three, 1,600 would have chosen option one, none would have chosen option two, and *The Economist* would have made $1,144,400 in revenue. Let's compare this to the second scenario; 6,800 chose option one, 3,200 chose option two, and *The Economist* would have made $801,200 in revenue. By simply placing a decoy option, *The Economist* has made $343,200 more.

Anchoring

Anchoring describes the tendency for people to base decisions off of an arbitrary piece of information. For example, in one Kahneman and Tversky experiment participants were asked whether or not the percentage of African countries in the United Nations was higher or lower than a randomly selected quantity between 0-100. After rigging the experiment so the quantity would always be 10 or 65 they found that "the median estimates of the percentage of African countries in the United Nations were 25 and 45 for groups that received 10 and 65, respectively, as starting points" (1974, p. 185). The "anchors," in this case, were 10 and 65 – two randomly chosen numbers that significantly influenced participant's decisions.

In *Predictably Irrational,* Dan Ariely explains an experiment he ran alongside MIT Sloan School of Management professor Drazen Prelec and Carnegie Mellon University professor George Loewenstein to illustrate how arbitrary starting points influence judgments. Ariely asked 55 students from Prelec's marketing class to "jot down the last two digits of their social security numbers" and indicate 1) if they would be willing pay this amount for certain products[4] and 2) the maximum amount they would be willing to bid for each product (p. 29). After analyzing the data, Ariely found that the students with the highest-ending social security digits were willing to bid and pay the most and the students with the lowest-ending social security digits were willing to bid and pay the least. Ariely explains that:

[4] A bottle of Cŏtes du Rhŏne, a bottle of Hermitage Jaboulet La Chapelle, a cordless trackball, a cordless keyboard and mouse, a design book, and a one-pound box of Belgium chocolates.

> The top 20 percent, for instance, had an average of $56 for the cordless keyboard; the bottom 20 percent bid an average of $16. In the end, we could see that students with social security numbers ending in the upper 20 percent placed bids that were 216 to 346 percent higher than those of the students with social security numbers ending in the lowest 20 percent (2008, p. 30).

The key to Ariely's experiment, and anchoring in general, is that the social security number was randomly chosen; there was *arbitrary coherence,* as Ariely says, between the student's willingness to bid and their social security numbers. The social security number severed as an *anchor* in the same way that the randomly chosen value did in Kahneman and Tversky's study.

Anchoring comes up in several popular psychology books. In *Nudge,* Thaler and Sunstein explain how people from Chicago tend to estimate the population of Milwaukee higher than people who live in Green Bay (the population of your city, it turns out, provides an anchor to which people assess the population of other cities) (p. 23), and in *Paradox of Choice* Barry Schwartz states that, "when we see outdoor gas grills on the market for $8,000, it seems quite reasonable to buy one for $1,200. When a wristwatch that is no more accurate than one you can buy for $50 sells for $20,000, it seems reasonable to buy one for $2,000" (p. 61-62).

Another key point to anchoring is that it illustrates our "inability to dismiss irrelevant information" (Lehrer, 2008, p. 157). If the subjects in Kahneman and Tversky's study, the MIT students, and those about to buy a outdoor gas grill were smart they would recognize that their choices were being influenced by an arbitrary anchor. However, they were unable to do so because the "brain isn't good at disregarding facts, even when it knows those facts are useless" (Lehrer, 2008, p. 157).[5]

Endowment Effect (The Hipster Effect)

The endowment effect is the tendency for people to overvalue an item or service that they own. Richard Thaler first theorized the effect in a 1980 article entitled, "Toward a Positive Theory of Consumer Choice." He considered the following scenarios:

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[5] Another great anchoring experiment asked people to write down the last four digits of their phone numbers and then estimate the amount of dentists in Manhattan.

> Example 1. Mr. R bought a case of good wine in the late '50's for about $5 a bottle. A few years later his wine merchant offered to buy the wine back for $100 a bottle. He refused, although he has never paid more than $35 for a bottle of wine.
>
> Example 2. Mr. H mows his own lawn. His neighbor's son would mow it for $8. He wouldn't mow his neighbor's same-sized lawn for $20.

Thaler concluded that "goods [which] are included in the individual's endowment will be more highly valued than those not held in the endowment, *ceteris paribus*" (1980).

Dan Ariely refers to the endowment effect as the, "The IKEA Effect" after personally assembling an IKEA toy chest and noticing how much more he valued it compared to others. In *The Upside of Irrationality*, Ariely, Michael Norton, and Daniel Mochon hit the college campus to test Thaler's theory. They set up a booth at the Harvard student center and offered students a chance to create an origami frog. They wanted to see if people who created an origami frog valued it higher than those who did not. To do this, they asked half the subjects make an origami frog and say how much they would be willing to bid on it. The other half were asked the same question but were not instructed to make an origami frog. Like Ariely's experience of putting together the toy chest, the subjects who made the origami frog valued it higher than the subjects who did not. In this case, people who made the origami frog were willing to bid 23 cents whereas people who did not were only willing to bid 5 cents.

The endowment effect can have numerous negative consequences. As Tom Gilovich says, "ownership creates an inertia that prevents people from completing many seemingly-beneficial economic transactions. What one side is willing to give up tends to loom larger to that side than to the side receiving it" (1991, p. 76). On the other hand, it creates a sense of ownership that is beneficial. If parents did not overvalue their sons or daughters for example, I do not think they would be good parents. Likewise with individuals; if people thought of themselves as above average[6] they may be motivated to do positive things. The key, I think, is to not take it too far in either direction.

Conclusion

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[6] Later I will show that this is overwhelmingly true.

The list of cognitive biases and heuristics that have come out of the cognitive revolution – many of which are attributed to Kahneman and Tversky – have revealed many shortcomings of human judgment. Dan Ariely has greatly contributed to the popular psychology movement by clearly, and often times humorously, explaining cognitive biases to the general audience.

The difficult part is qualifying these cognitive biases; while we know that we do not act according to rational choice theory, it does not necessary follow that we are acting "irrational." I believe Kahneman, Tversky, and many other psychologists recognize this; they prefer phrases such as "non-optimal" or "shortcoming" instead of irrational for example. I will reserve the third section of this paper to continue this conversation. For now, I simply wish to illustrate that cognitive biases have become an important theme to the popular psychology movement. If nothing else, they have shown that rational choice theory is flawed and that human judgment is poorly understood.

2) Emotion & Reason

Books:

- *How We Decide,* Jonah Lehrer
- *Descartes' Error,* Antonio Damasio
- *A Mind Of Its Own,* Cordelia Fine
- *Blink,* Malcolm Gladwell
- *The Happiness Hypothesis,* Jonathan Haidt
- *Superfreakonomics,* Steven Levitt & Stephen Dubner
- *The Social Animal,* David Brooks

Introduction

The dichotomy of reason and emotion has been one of the most enduring themes in Western thought. It has been manifested across cultures and throughout time since the ancient Greeks. In the *Phaedrus,* for example, Plato likens the mind to a charioteer who commands two horses; "with us men, in the first place, it is a pair of steeds that the charioteer controls" (Allen 1991, 247). The reasonable horse, according to Plato, "is noble and of good stock," while the emotional horse, "has the opposite character... he is

of ignorant breed... he has a short bull-neck, a pug nose, black skin, and bloodshot eyes" (Allen 1991, 247). As with all depictions, emotion is a deterrent to reason; it prevents us from making good judgment. In Plato's case, the charioteer must control the two horses to act rationality. The underlying assumption throughout the analogy is that reason allows us to make the good decision while emotion leads us astray.

Plato's depiction is indicative of most. The idea that reason exists in one realm and emotion in another is a concept that has influenced ancient and modern philosophy, psychology, and cognitive science research throughout the 20th century. However, the relationship between emotion and reason has, as of the last twenty years, been reversed. On empirical grounds, cognitive scientists have repeatedly demonstrated that it is emotion, and not reason that controls our decisions and behaviors.

Below I will offer a brief snapshot of the contemporary emotion-reason discussion within popular psychology. The three major themes: the necessity of emotion, emotion dictates reason, and emotions and morality.

The Necessity of Emotion

Virtually every book that has discussed the relationship between emotion and reason has analyzed work done by neuroscientist Antonio Damasio. Damasio is known for developing the "Iowa Gambling Task," in which a participant is presented with four decks of cards labeled A, B, C, and D, face down, along with $2,000 dollars of fake money. Each card holds a certain amount of money, positive or negative. The rules were simple: turn the cards over one at a time, and try and make as much money as possible.

However, Damasio had rigged the decks such that A and B had high gains, high losses, but an overall net loss while C and D had low gains, low losses, but an overall net gain. In other words, only choosing from A and B would quickly put you in debt while only choosing from C and D would slowly make you rich.

Normal participants began by sampling all four decks, searching for the most optimal gains. On average, it took them until the 30th card to realize that decks C and D were most beneficial. After the 30th card, participants exclusively drew from decks C and D until the experiment terminated on the 100th card. While the participants were running

the task Damasio was measuring their electrical conductance levels – how much they were sweating. Remarkably, he noted that by just the 10th card people began to sweat whenever they put their hands over decks A and B; well before people were conscious of it, their emotions had already developed a gut feeling that warned against the most dangerous decks. Damasio explains that:

> Bit by bit, they developed a hunch that some decks – namely, A and B – are more dangerous than others... I suspect that before and beneath the conscious hunch there is a nonconscious process gradually formulating a prediction for the outcome of each move, and gradually telling the mindful player... that punishment or reward is about to strike if a certain move is indeed carried out. (Damasio 1994, 213-214)

Damasio then ran the same experiment with patients who had damaged their frontal lobes – an area of the brain that helps maintain emotions in decision-making. One of the patients that Damasio tested was a man named Elliot. Elliot has a unique story; after his frontal lobe was damaged from a operation to removed a tumor, his life took a turn for the worse: layoffs, bankruptcy, divorce, etc. After months of study, Damasio was able to identify Elliot's deficiency by conducting a simple psyche experiment. He showed Elliot a series of fervent photographs – a naked woman and severed foot for example – and measured his electrical conductance levels. For normal participants who ran the experiment Damasio recorded immediate jumps in their electrical conductance levels, Elliot, on the other hand, seemed to be unaffected. No matter how disturbing the photographs were, his palms never got sweaty; essentially, Elliot was emotionless.

Damasio then had Elliot play the Iowa Gambling Task. Unlike normal participants, Elliot was unable to detect that decks A and B were harmful and decks C and D were helpful; no matter how many times Elliot played the game, he would favor decks A and B throughout and finish amassed in debt. Unlike normal participants, Elliot's electrical conductance levels never rose when he reached for decks A and B. Because he did not have a sense of fear or dread that normally accompanies loss and debt, he was never able to correct himself.

Elliott scored average or above average on virtually all other psyche tests. He was a man with a “normal intellect who was unable to decide properly, especially when the decision involved personal or social matters.” His performance “on conventional memory

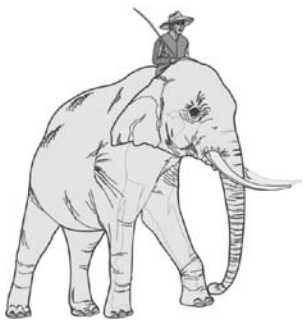
and intellect tests… contrasted sharply with the defective decision making he exhibited in real life" (Damasio 1994, 49). Whenever Elliot lost money during the gambling task he continued to choose from deck A and B. Why? His emotions were unable steer him in the right direction and foresee negative consequences because his emotions did not exist. Elliot's performance on the gambling task has led Damasio to a counter-intuitive conclusion: "reduction in emotion may constitute an equally important source of irrational behavior" (53). Without sentimental preferences and only rational preferences, Elliot simply could not plan future events or make simple decisions about what to do or not do to. Below is an account of Elliot's behavior when Damasio tried to schedule an appointment that should given you an idea of this:

> I [Damasio] suggested two alternative dates, both in the coming month and just a few days apart from each other. The patient pulled out his appointment book and began consulting the calendar. The behavior that ensued, which was witnessed by several investigators, was remarkable. For the better part of half hour, the patient enumerated reasons for and against each of the two dates: previous engagements, proximity to other engagements, possible meteorological conditions, virtually anything that one could reasonable think about concerning a simple date... He was now walking us through a tiresome cost-benefit analysis, and endless outlining and fruitless comparison of options and possible consequences. It took enormous discipline to listen to all of this without pounding on the table and telling him to stop. (Damasio 1994, 54)

It was from Elliot's performances in the Iowa gambling task and interactions like these that Damasio came to his conclusion. Though it sharply contrasts with the Platonic charioteer, the Cartesian mind, Freudian psychology, and the Aristotelian *nous,* all of which stress the rational mind over the emotional, Damasio is adamant in saying just the opposite; emotion is necessary for rationality.

Emotion Constitutes Reason

In the beginning of *The Happiness Hypothesis,* Jonathan Haidt introduces the metaphor of a rider who sits atop an elephant. The metaphor likens the conscious and rational mind to the rider and the automatic and implicit mind to the elephant. Throughout the book, Haidt suggests that all of our behaviors, thoughts, and decisions are manifested and controlled by the elephant but explained by the



rider.

The key to Haidt's metaphor is that the rider is unaware of how it is being influenced by the elephant. In other words, we feel like we are in control of our decisions and behaviors; we buy things because *we want them*, we go on vacation to places because *they are appealing*, and we hang out with our friends because *it is entertaining*. But the causes we attribute to our actions – desire, appeal, and entertainment – are less a reflection of us knowing what we want and more a consequence of our tendency to make sense of the world by decorating it with causes and effects. In other words, our elephant controls all the doing while the rider controls all the reasoning.

The consequence of this is that we tend to make up the reasons for our actions. This is known as the narrative fallacy, which, according to Nassim Taleb, "addresses our limited ability to look at sequences of facts without weaving an explanation into them, or, equivalently, forcing a logical link, an arrow of relationship, upon them" (2007, p. 63). In one study that illustrates concept this several women were asked to choose their favorite pair of nylon stockings from a group of twelve. Then, after they had made their selections, researchers asked them to explain their choices. Among the explanations, texture, feel, and color were the most popular. However, all of the stockings were in fact identical. The reasons that the women gave were examples of *post hoc explanations*, which highlight the defining feature of the narrative fallacy.

All of us do this; it is simply unavoidable and it is the main job of the rider. Whether it comes to explaining anything from world wars to our moods, we cannot help but look for causes in the world. However, when the rider assigns structure and cause to the past it develops the habit of thinking that the future is predictable. The problem with doing so, and this is Taleb's point, is that the most consequential events in history, like World War I or the discovery of penicillin, come as a complete surprise - they are, as he says, Black Swans.

Now, because the rider is so hard wired to see structure in the world it is surprised when it experiences a Black Swan. And since the rider hates being surprised, the problem is only perpetuated when it tweaks its world-view to accommodate a recent Black Swan. This is illustrated by our tendency to say things like, "it actually makes sense that this happened," or, "upon retrospect it is now clear what caused so and so to occur."

To be sure, there are certain cold hard facts that we know will be true: it will snow in Minneapolis next winter and that the sun will raise tomorrow. However, when we consider the narrative fallacy *and* the role of the rider, it becomes clear that, as I have suggested, our explanations of *why* these things happen are pragmatic and not matters of fact. In other words, our riders create cause so we can make sense of our self and our place in the world.

Finally, it is important to note that although Haidt's metaphor positions the reason-emotion debate dualistically, he is actually suggesting that the rider and the elephant work as one with the elephant (emotion) doing most of the work. That is, the ability to critically reason depends on "sophisticated emotionality… *it is only because our emotional brains work so well that our reasoning can work at all"* (2006, p. 13). This means that at the end of the day, though the rider feels in control and feels like it has a sense of the world, it is actually constituted by the elephant.

Emotions & Morality

The emotion-reason debate naturally lends itself to moral and altruistic questions. Is acting morally done from some emotional feeling of good will? Or is it an exercise of reason? From the time of the Ancient Greeks, philosophy has approached moral and ethical questions in search of objective answers. Philosophers have wanted to know what morality is, how it is attained, and what it means for someone to act or be moral. However, the emotion-reason debate within the popular psychology movement has brought the traditional notions of morality – that it is a rational enterprise - into question.

Consider the following scenario proposed by Jonathan Haidt. Julie and Mark are siblings who are vacationing together in France. One night after dinner and a few bottles of wine, they decide to have sex. Julie is on the pill and Mark uses a condom so there is virtually no chance that Julie will become pregnant. They enjoy it very much but decide never tell anyone or do it again. In the end, having sex brought them together and they are closer than ever. The question is, did Julie and Mark do anything wrong?

Most people would grimace with discomfort if they heard such a story and conclude that it was morally wrong. But when Haidt presents this scenario to undergrads

no one is ability to give an objective reason as to why this is so. Some may say that incest causes birth defects, or that Julie and Mark could have caused pain and awkwardness to friends and family, but birth control and secrecy insured that none of these would be a problem. In other words, their actions had virtually no consequences. Students who press the issue eventually run out of reasons and fall back on the notion of it "just being wrong."

The point of Haidt's hypothetical is to show that in our moral judgments, emotion comes first and reason second. As Jonah Lehrer says, "the emotional brain generates the verdict. It determines what is right and what is wrong… The rational brain, on the other hand, *explains* the verdict. It provides reason, but those reasons all come after the fact." (2009, 172). Haidt makes the same point; he equates moral judgments to aesthetic judgments, in either case, people instantly know if something is good or bad but it is difficult for them to explain why because "feelings come first and… reasons are invented on the fly" (2006, 13).

If emotions are the basis for our moral judgments, then perhaps the next question would be: what emotions are necessary for someone to be "moral," and are such emotions innate or gained through experience?

In the 1950s Harry Harlow ran a series of experiments on monkeys that would end up partially answering these two questions. As both Haidt and Lehrer explain in their books, Harlow found that the ability to "act reasonability" or socially acceptable is, in most cases, strongly related to the mother-child relationship. He came to this conclusion after noticing how monkeys who were raised without mothers grew up to be violent, self destructing, and unable to form social bonds. Harlow's experiment led Haidt to conclude that, "if you want your children to grow up to be healthy and independent, you should hold them, hug them, cuddle them, and love them" (2009, p. 192). Proper emotional development, as opposed to critical reasoning, seems to be much more important for someone to act rationally.

In *How We Decide,* Lehrer insightfully parallels Harlow's experiments with the Romanian orphan crisis of the late 1980s. In 1966, as Lehrer explains, Nicolae Ceausecu – then president of Romania – banned all forms of contraception. Consequently, skyrocketing orphan rates caused Romanian orphanages to be overstocked and under

funded. This forced thousands of Romanian orphans to grow up in dreadful environments that resembled those of the monkeys who grew up in empty cages. Lehrer describes the conditions:

> Babies were left in cribs with nothing but plastic bottles. Toddlers were tied to their beds and never touched… in some orphanages, more than 25 percent of children died before the age of five. The children that did manage to survive the Romanian orphanages were permanently scarred… they were hostile to strangers, abusive to one another, and incapable of even the most basic social interactions. (Lehrer 2009, 192).

The Romanian orphan crisis and Harlow's experiments play to the same point: the ability to act and think rationality requires proper emotional development. When we make claims such as "killing is wrong," or "stealing is wrong," we are 1) describing sentiments that were developed during childhood, 2) using reason to describe such sentiments as objective, and 3) proscribing normative models with the intention of either making the world a better place or providing the tools for an individual to live the best possible life.

In the last few decades, social psychology has empirically demonstrated that the latter two points, which more or less define the philosophy of ethics and morality, are completely unrealistic. And though this may be troublesome to philosophers, there is, I believe, an upside to this. It appears that many people act moral just because they feel it to be the right thing to do – no rational thinking seems to be required. For example, when people receive a Christmas card from a family they do not know, one study found, they usually send one back in return (Kunz, 2000). In the famous Ultimatum experiment, an individual is given $20 and the choice to either take all of it, split it $18/$2, or $10/$10 with another individual who is in the same room, most split it evenly (Guth, Schmittberg, Schwarze, 1982).

However, it is difficult to draw conclusions from such findings. In *Superfreakonomics*, Steven Levitt and Stephen Dubner explain that the Ultimatum experiment sparked an interest in behavioral economics, which lead people to conclude that, "human beings indeed seemed to be hardwired for altruism." But they go on to conclude that "people are people, and they respond to incentives. They can nearly always be manipulated – for good *or* ill if only you find the right levers" (p. 111). Cordelia Fine

makes this exact point in her book. She cites the famous Milgram obedience studies[7] to remind us that, "about two-thirds of ordinary men (and women) will obediently electrocute a fellow human being, all the way up to a highly dangerous 450 volts, because a scientist in a lab coat tells them to do so" (2006, p. 69-70).

That we now know that emotions seem to guide our moral judgments is an important finding, though not necessarily that helpful. It is still unclear why someone like Ted Kaczynski, who grew up with smart, encouraging, and loving parents, and went on to Harvard, would do what he did. Or why there are success stories of individuals growing up in poverty without parents who go on to act just as morally sound as anyone else.

Conclusion

Studies done by Damasio, Haidt, Lehrer, and others show three things: 1) a reduction in emotion constitutes and equal reduction in reason, 2) reason requires sophisticated emotion, 3) emotion comes first and reason second, (we feel *and then* we justify), and 4) moral behavior and decision-making is strongly influenced by our emotional development.

This being said, it is still unclear what the difference between emotion and reason is. From a neurological point of view, as Lehrer suggests, we can say that reasoning is what happens in the prefrontal cortex and emotion is what happens in the limbic system. However, such an explanation is overly general and unhelpful. At best, the emotion-reason discussion has led us to understand that our behaviors and decisions require emotional input and, as Hume says, "reason is the slave of passion."[8]

3) Intuition

Books:

[7] Brief description of the studies

[8] It is remarkable how many authors quote Hume to make a point about emotions: Lehrer, Haidt, Damasio, and Paul Bloom for example. It is also amazing how right Hume and other Scottish Enlightenment thinkers such as Adam Smith turned out to be. Unlike French Enlightenment thinkers, they understood that emotions constituted our rationality.

- *The Invisible Gorilla,* Christopher Chabris & Daniel Simons
- *On Being Certain,* Robert Burton
- *Blink,* Malcolm Gladwell
- *The Power of Intuition,* Gary Klein
- *Unconsciousness,* Gerd Gigerenzer
- *Intuition,* David G. Myers
- *Strangers To Ourselves,* Timothy D. Wilson
- *How We Know What Isn't So,* Thomas Gilovich

Introduction

Intuition is a concept with a long and contentious history. Philosophers have debated whether it is innate or acquired, material or non-material, what its purpose is and when it should be used. It is described as effortless, unconscious, rapid, and is often contrasted with reason, which is described as logical, conscious, and mediated.

It was not until that second half of the 20th century that psychologists began to empirically study intuition. Since this time there have been a plethora of empirical findings that have identified its strengths and weaknesses. Many of these findings have found their way into popular psychology books and have been used to illustrate the powers and shortcomings of human judgment and decision-making.

Poor intuition shows itself in a number of ways: how we perceive randomness, how we hear music, and how we remember. Good intuition, on the other hand, unconsciously navigates and organizes the world so we can participate in a number of activities – speaking, perceiving others, and assessing sensory information – without having to think about them deliberately.

Below I will outline several studies to illustrate these two sides: there are things and abilities that we know are real even though we cannot explain them (good intuition), and there are things and abilities we think are real which turn out to be a mere illusion (bad intuition). Let's begin with the latter.

1) Bad Intuition (Data > Intuition)

Gilovich's Hot Hand

The hot hand is a term used to describe a basketball player who has hit several shots in a row; it is what inspires TV announcers to shout, "he's heating up," or, "he's on fire." Implicit in the term is the idea that *because* a player has hit several shots in a row his chance of making a subsequent shot will be above his average.

To see if this is true, Cornell Psychologist Thomas Gilovich analyzed data from the 1980-81 Philadelphia 76ers season. He found that the chance a basketball player has of making a shot is actually unrelated to the outcome of his previous shot. In other words, "a player's performance on a given shot is independent of his performance on previous shots" (1991, p. 13).

Gilovich's conclusion, which is summarized in his 1985 paper "The Hot Hand in Basketball: On the Misperception of Random Sequences," comes as a surprise to most people. For some reason, our intuition tells us that a basketball player's field goal percentage *is* influenced by his previous shots. This is why we want a player who is shooting well to continue to shoot and vice versa.

Similar results have been found with baseball players and baseball teams. Michigan State University psychologist Gordon Wood demonstrated that the probability of an MLB team winning after a win, or losing after a loss, was fifty percent after analyzing the outcomes of all 1988 Major League Baseball games (26 teams & 160 games). Likewise, Indiana University statistician Christian Albright found similar results with batters: "The behavior of all players examined… does not differ significantly from what would be expected under a model of randomness" (Myers, 2002, p. 142-143). Like the outcome of a basketball shot, an MLB game and at bat were unaffected by past performance

None of these studies are denying that streaks exist – they certainly do. But they are saying that our intuition does a poor job of understanding and perceiving randomness.[9] Let's consider a few more examples to illustrate this point.

"Random" ipod Shuffle & The Gambler's Fallacy

When Apple first sold the ipod shuffle, users complained that it was not random

[9] This relates to the narrative fallacy. Instead of thinking that the world is dictated by chance our intuition creates patterns and streaks to help us make sense of it all.

enough. Though the engineers at Apple had programmed the ipod shuffles to be random people were convinced that they were not. The problem was that "the randomness didn't appear random, since some songs were occasionally repeated" (Lehrer, 2009, p. 65). I took to the Apple blogosphere to see if this was actually true and on the Google's first hit I found the following two posts:

> User 1: There are 2800 songs in my ipod, I found that the Shuffle Songs function is not random enough, it always picks up the songs which I had played in the last one or two days.
>
> User 2: It *is* random, which is why it's not paying attention to whether or not you've played the songs lately.

User 2 is right, the ipod shuffle is random making it entirely possible for a song to be played two days in a row, or two times in a row for that matter. The mistake, which is exemplified by User 1, is that people perceive streaks and patterns as indications that sequences are not random *even though random sequences inherently contain streaks and patterns*. [10]

Our tendency to misinterpret randomness is exemplified by the gambler's fallacy, which describes our intuition's habit of believing that the odds of something with a fixed probability are influenced by recent occurrences. For example, we think that the more times a coin lands on heads the more chances it has of landing on tails. In reality though, a coin could land on heads one hundred times in a row and still have a 50/50 chance of landing on heads the 101st time. When it comes to randomness, intuition mistakenly "sees" patterns and streaks that simply do not exist.[11]

Joshua Bell & The Invisible Gorilla: The Role of Context

Along with falsely perceiving streaks, our intuition does a poor job of considering the importance of context. In January of 2007 the *Washington Post* conducted a simple experiment that illustrates this. They asked Joshua Bell, a renowned violinist who usually

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[10] Complaints for the shuffle got so bad that Apple had to "make [the shuffle] less random to make it feel more random" (Lehrer, 2009, p.66)

[11] There are two great books that go into a detail on this, Taleb's *Fooled by Randomness* and Mlodinow's *The Drunkard's Walk*

performs in front of sold out concert halls across the globe, to put on street clothes and perform the 43-minute piece Bach piece "Sonatas and Partitas for Unaccompanied Violin," in the L'Enfant Plaza subway station – one of D.C.'s busiest subway stations – during the heart of rush hour. The results were unexpected: "Of the 1,097 people who walked by, hardly anyone stopped. One man listened for a few minutes, a couple of kids stared, and one woman, who happened to recognize the violinist, gaped in disbelief" (Brafman & Brafman, 2008, p. 49).

There are several explanations as to why people didn't notice Joshua Bell. In the 2008 New York Times Bestseller *Sway*, Ori and Rom Brafman argue that people did not notice Joshua Bell because of a psychological phenomenon called "value attribution." Value attribution is our tendency to attribute the value, goodness, or authenticity of something to its context instead of the thing itself. The morning commuters did not hear the world's best violinist because they wouldn't normally attribute world-renowned musicians to street performers who play for spare change. Value attribution also explains why people would not recognize a million dollar work of art if it was not in a world class museum or, conversely, why we would take a forgery to be authentic if it was placed in the MET. In both cases, our intuitions are telling us that according to a given context, something should or shouldn't be so.

One reason we don't understand how context influences our judgments is because our attention is severely limited. Consider the famous "Invisible Gorilla experiment," done by psychologists Christopher Chabris & Daniel Simons. In it, subjects viewed a 30 second clip of two teams of four, one dressed in white and the other in black, passing around basketballs. The task was simple: count how many passes the white team makes. Most people got it correct – 34 passes. However, this is not what Chabris and Simons were testing. While the two teams are passing basketballs to each other, a student dressed in a full gorilla suit walks into the middle of the scene, stops, faces the camera, thumps his chest a few times, and walks off. When subjects were asked if they noticed anything unusual, roughly half said nothing of the gorilla.

In a similar experiment, researchers approached pedestrians with a map asking for directions. While the pedestrians were busy looking at the map, two other researchers

carried a large painting between the researcher asking for directions and the pedestrian providing assistance. When they passed, the researcher asking for directions crouched behind the painting, only to be replaced by a researcher who was carrying the painting. Even though the replacement researchers were of different, age, height, and in some cases, gender and race, many of the pedestrians failed to notice anything different.

These two experiments suggest that "we experience far less of our visual world than we think we do" (Chabris & Simons, 2010, p. 7). They also help us understand why so many people did not notice Joshua Bell; they may have physically heard him and saw him but they did not perceive his music as world-renowned because we don't understand the role of context and our attention is very narrow. This is one of the main points of *Sway* and *The Invisible Gorilla*; the mind continually construct realities based on context, usually in a self-confirming way, and it sometimes fails to notice obvious changes as a result. We simply do not assess things as they are; rather, we assess things as they are relative to what surrounds them.

Although our intuition tells us that we are mostly aware of our place in the world, psychology continues to demonstrate that our worldview is severely limited. As Yogi Berra said, "you miss most things that you don't see."

Memory

When we intuit about the past, we usually do it poorly. This is because we have poor episodic memories (that is, memory of autobiographical events). Consider the famous study done by Ulric Neisser. The day after the *Challenger* disaster he asked Emory University undergrads to write a description of how they heard of the disaster – the time of day, what they were doing, how they felt about it, etc. Neisser then asked the same students the same set of question two and half years later and compared the two descriptions. He found three things. First, the memories of the students had dramatically changed: "twenty-five percent of the students' subsequent accounts were strikingly different than their original journal entries. More than half the people had lesser degrees of error, and less than ten percent had all the details correct" (Burton, 2008, p.10). Second, people were usually confident that the accounts they provided two and a half

years later were accurate. And third, "when confronted with their original reports, rather than suddenly realizing that they had misremembered, they often persisted in believing their current memory" (Burton, 2008, p.11).[12]

Similar studies have been conducted with similar results. In one report, Daniel Offer interviewed 73 people, once in 1962 and once in the 1990s, a series of social questions and compared their answers. He found that "nearly half believed they had said it was acceptable to start having sex during high school, though only 15 percent had given that answer. Only one in three now recalled receiving physical punishment, though as ninth-graders 82 percent said they had" (Myers, 2002, p.69).

Neisser and Offer have shown that our episodic memories omit large chunks of data and are often self-conforming to present ideologies as opposed to past ones. The source of our error is the false sense of certainty that our intuition gives us. As we have seen, it is so powerful that we go as far as denying personal accounts written in the past, which clearly show us to be wrong in the present.

We will return to the fallibility of memory in the positive psychology section with similar points.

2) Good Intuition (Data < Intuition)

Unconscious Thought

As psychologists run more and more experiments that study intuition, it has become apparent that an understanding of intuition requires an understanding of the difference between the unconscious and conscious mind. As I mentioned in the introduction the conscious mind is deliberate, slow and serial, and effortful, while the unconscious mind is automatic, rapid and parallel, and effortless; thinking intuitively is

[12] The study, which is now known as the *Challenger* study, has been replicated with several notable events such as 9/11 and the Kennedy assassination. Neisser also ran a similar experiment in the 1970s that compared John Dean's testimony before the Watergate Investigation Committee with the actual tape recordings. Although the press labeled Dean as the "human tape recorder" Neisser found that his memory was not nearly that accurate. His testimony did get the gist of the important conversations between him and Nixon but certainly not the details.

usually described with the later group while thinking rationality is usually described with the former.

Although the Western tradition has emphasized deliberate and conscious thought over automatic and unconscious thought, the later is responsible for processing enormous amounts of information.[13] Consider, for example, how much information your brain deals with during a conversation that goes unnoticed:

> Accessing memories relevant to what is being said... comprehending a stream of sound as being language... dividing it into distinctive phonetic features and segments... identifying phonemes, and grouping them into morphemes... assigning a structure to the sentence in accordance with the vast number of grammatical constructions in your native language... picking out words and giving them meanings appropriate to context... making semantic and pragmatic sense of the sentences as a whole... constructing mental images where relevant and inspecting them... anticipating where the conversation is going next... planning what to say in response. (Lakoff and Johnson 1999, 10-11)

Clearly the unconscious mind is important; it is a "giant computer that quickly and quietly processes a lot of data we need in order to keep functioning as human beings" (Gladwell 2005, p.11). But an important question remains: what is it?

The defining aspect of unconscious thought is its ability to shape conscious thought and our inability to retrieve its contents. As Timothy Wilson explains, "unconscious [thoughts are] mental processes that are inaccessible to consciousness but that influence judgments, feelings, or behavior" (p.23). No matter how hard we try, as Wilson goes onto say, we cannot access our "proprioception system or the way in which [our minds] transforms light rays that strike [the] retina into three-dimensional vision" (p.23). We do not have direct access to any "higher-order mental process" (p.23), such as the way we retrieve, transform, and act upon incoming information.

How is unconscious thought related to intuition? Unconscious thought allows us to make intuitive judgments and inferences that are often times just as good if not better

[13] As Timothy Wilson explains, “At any given moment, our five senses are taking in more than 11,000,000 pieces of information…. the most liberal estimate is that people can process consciously about 40 pieces of information per second. Think about: we take in 11,000,000 pieces of information a second but can process only about 40 of them consciously… fortunately, we do make use of a great deal of this information outside of conscious awareness” (Wilson 2002, 24).

than deliberate judgments and inferences. In other words, there are thoughts and feelings that "we know we know, but we don't know *how* we know them" (Myers, 2002, p.17), and they are responsible for the vast majority of our mental abilities. Lets turn to some example to illustrate this.

Professor Ratings & Thin-Slicing

In 1993 psychologists Nalini Ambady and Robert Rosenthal ran an experiment that asked participants to evaluate the effectiveness of a professor based off of three silent ten-second video clips. Ambady and Rosenthal then compared the ratings of the participants with those of students who had been enrolled with the same professor in a semester long class. As it turned out, the ratings of the participants were statistically consistent with the ratings of the students. After cutting the clips down to two seconds Ambady and Rosenthal found no changes in the ratings between the participants and the enrolled students; that is, a silent two-second video clip was all the participants needed in order to accurately judge the effectiveness of a professor.

In *Blink*, Malcolm Gladwell calls this ability "thin-slicing," and describes it as the tendency for "our unconscious to find patterns in situations and behavior based on very narrow slices of experience" (2005, p.23). In other words, thin-slicing is the "I just know" feeling that accompanies an intuitive insight someone may have towards somebody or something.

Experimental psychologist Gary Klein pioneered research on intuitive decision-making that has helped us understand thin-slicing. Klein developed the "naturalistic decision making" framework as a means to study how people make decisions during demanding situations that require a high level of cognition. As Klein sees it, intuition is not an innate mystical power; rather, it is the product of repetition and experience.

Consider one of Klein's first studies, which Gladwell describes in *Blink.* A fire commander enters a burning kitchen. Immediately he senses that something is wrong. Though him and his men are dousing the flames with water, the fire is still raging. He quickly orders all of his men out and moments later the floor that they had been standing on collapses. Later, during an interview, the firefighter told Klein that he did not know

why he ordered his men out – possibly ESP he believed – but he definitely sensed that it was the right thing to do. After questioning the commander more, it became clear to Klein why the commander quickly left the kitchen. Throughout his battle, the commander's unconscious mind picked up several unusual cues – the fire was too hot, it wasn't noisy enough, it wasn't burning like a normal kitchen fire – that forced his conscious mind to evacuate. As it turned out, the fire was in the basement and not the kitchen; how did he detect this without consciously knowing it?

In Klein's book *The Power of Intuition*, he explains that the commander was able to evacuate in time because he had wisely listened to his intuitive gut-reaction. Now, not everyone would have been able to sense what the commander sensed. The commander was an expert, and Klein explains that experts are prime examples of people who can "make decisions rapidly and without conscious awareness or effort," because they have the most experience in their particular field. Consider psychologist John Gottman who, after studying married couples for years, is able to tell if a couple will be together or divorced within 15 years with 90 percent accuracy, by watching a fifteen minute clip of them conversing. Or Vic Braden who, after playing and coaching tennis his whole life, was, in one case, able to predict whether or not a player will double-fault 16 of the 17 times during a match. Or how professional chicken sexers can look at newly hatched chicks and know if they are male or female with almost 100 percent accuracy, even though nearly all chicks are identical.

These examples illustrate the point Klein and Gladwell are making. It is the "power of thinking without thinking," or as Klein puts it, it is "the way we translate our experience into action" (2003, p.8) that constitutes our ability to accurately judge or act without having to think critically. Evolution helps explains our ability to "thin-slice." In the book *Intuition: Its Power and Perils*, David Myers suggests the following: "When meeting a stranger in the forest, one had to instantly assess whether that person was friend or foe. Those who could read a person accurately were more likely to survive and leave descendants, which helps explain why humans today can detect at a glance the facial expressions of anger, sadness, fear, or pleasure" (p.33). Timothy Wilson makes similar remarks in *Strangers to Ourselves*. He explains that the "unconscious is an older system designed to scan the environment quickly and detect patterns, especially ones that

might pose a danger to the organism" (p.44). The conscious, on the other hand, develops "more slowly and never catches up in some respects, such as in the area of pattern detection" (p.44).

The evolutionary explanations for our intuitive abilities make sense. We wouldn't have survived as a species if we had to think about whether or not running away from an oncoming lion was a good or bad thing. Instead, our brains gave us quick, unconscious, intuitive pushes that guided us towards survival. Remarkably, these pushes constitute most of our daily lives. From conversations to physical movement, our intuition takes care of most systems that are essential for our wellbeing.

Choking on Thought

Another take-a-way from intuition studies is that too much information can be a bad thing. Consider a study done by Gerd Gigerenzer and Daniel Goldstein, which exemplifies what they call the "Less-is-More Effect." They presented German and American students pairs of German and American cities and asked the two groups to select the larger of two cities; i.e., Milwaukee versus Detroit and Hamburg versus Berlin. They ran the experiment and found to their surprise that German and American students did worse with cities in their own country than with cities in the other country. Why? Gigerenzer explains that the students who were successful "intuitively [relied] on their ignorance as information" (2007, p.120). That is, whereas the American students struggled with Detroit versus Milwaukee, the German students did not because they did not know anything about Milwaukee – they simply went with what they had heard of before.

Jonah Lehrer tells a similar story in *How We Decide*. Back pains, he explains, are a medical epidemic. And when MRI machines were made available in the late 1980s, doctors thought that they would be able to diagnose and cure back pains much easier. However, even though MRIs produced clear, accurate, and remarkably detailed pictures of the interior of the body, they made the problem worse. The *New England Journal of Medicine* ran a simple experiment to demonstrate how this was so. They sent doctors MRIs of healthy patients and asked for a diagnosis. As Lehrer explains, "doctors reported

that two-thirds of the [healthy] patients," showed significant problems such as "bulging, protruding, or herniated discs" (2009, p.162). The *NEJM* concluded that the MRIs were so detailed that doctors diagnosed "normal parts of the aging process" (p.163) as back defects. Like Gigerenzer's study, the problem was that the doctors actually had too much information.

Intuition is also very useful for non-experts. In one experiment Ap Dijksterhuis and Timothy Wilson gave students five different art posters to chose from and then later surveyed them to see how satisfied they were with their selections. They found that students who were told to take time to consciously examine the posters were the least happiest with their selections while students who were told to go with their first preference were much more happy with their selection (Lehrer, 2009, p. 236-237).

So not only is "going with your gut" more beneficial when you make decisions, it is also widely accurate with everyday encounters. Consider, for example, people's ability to easily distinguish males from females. If you try asking someone to give reasons for why they think someone is male or female they will have a difficult time doing so. They may invent reasons, i.e., facial features, hair length, or clothing. But the fact is they just know - they don't have to think about it.

Clearly, intuition is a faculty that *does not* rely on the weighing of pros and cons. It is a system that quickly and unconsciously relays information to the brain telling it what to do or not do; there is very little analysis involved and intuitive feelings are judgments that come to mind without reflection. The subjects in Gigerenzer's study, chicken sexers, and those who chose posters after only briefly looking at them turned out to be better off. Though additional information can be useful, an intuitive feeling that is based off of a small amount of information can be greatly effective if acted upon.

Conclusion

Without a doubt, intuition has its "powers and perils." It does a poor job of understanding how patterns and randomness exist in reality, how context and attention affect perception, and how accurate our memories are. Conversely, it gives us the means to effortlessly accomplish every day tasks and it gives professionals the ability to make

split second decisions that can sometimes mean the difference between life and death.

There have been countless books written on intuition in the last decade; many have provided numerous accounts of its strengths and weaknesses, but none have been able to give a detailed account of what it actually is. Additionally, it is difficult to distinguish between intuition and emotion (I will leave these problems to the philosophers). At any rate, intuition is a hot topic that many psychologists are studying, and it has been an important aspect of the popular psychology movement.

4) Positive Psychology

Books:

- *The Happiness Hypothesis,* Jonathan Haidt
- *Stumbling on Happiness,* Daniel Gilbert
- *Authentic Happiness,* Martin Seligman
- *Flourish,* Martin Seligman
- *The Politics of Happiness,* Derek Bok
- *Happiness: A History,* Darrin McMahon
- *Flow,* Mihaly Csikszentmihalyi

Introduction

Until the turn of the 20th century most of psychology was focused on how individuals survived under conditions of adversity. It was largely a field that had a self-help stigma attached to it; rarely did it study the conditions in which normal individuals were happy or happiest. The 2000 paper, "Positive Psychology: An Introduction" by Martin E. P. Seligman and Mihaly Csikszentmihalyi, changed this. Seligman and Csikszentmihalyi called for psychology to shift its attention from "curing mental illness," to "making the lives of all people more productive and fulfilling" (2000, p.5). From this, positive psychology has come to study and understand the "valued subjective experiences… [of] well-being, contentment, and satisfaction (in the past); hope and optimism (for the future); and flow and happiness (in the present)" (2000, p.5). Along the way it has produced several books that have outlined its findings and pushed the popular psychology movement as a whole.

The positive psychology movement has taken off in the last 10 to 15 years. Among many other things, it has found that people have a poor understanding of what will make them happy or what will contribute to their overall wellbeing.[14] Below I will outline several empirical studies that explain why this is so. This includes examining the relationship between happiness and money, experience, and memory.

Buying Happiness

The relationship between money and happiness has been the source of great debate; some say money buys happy and others not. For the economists the answer is easy; of course money buys happiness! When we sell something on ebay we don't just settle for any price, we want the most we can get. And when we go shopping we try to find the cheapest items with the most quality; we don't just buy anything at any price. That we try to get the most from our sales and spend least on our purchases suggests that the more money people have the happier they will be.

It was not until recently that positive psychologists began to empirically study the money-happiness relationship. Not surprisingly, they have found that money indeed plays a significant role in one's happiness; the poor tend to be less happy than the middle class, and countries with higher average income tend to be happier than countries with lower average income (Bok, 2010, p.11 & Easterlin, 1974).

Contrary to popular belief, however, money experiences significant diminishing returns after a certain point, and a 2010 paper by economist Angus Deaton and psychologist Daniel Kahneman suggests that this point is $75,000. This means that when the rich get richer they do not necessarily getting happier, but when the poor get richer, they *do* get happier.

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[14] Interestingly, in almost all Indo-European languages the word for happiness is a cognate for fate, fortune, luck, etc. In French the word *Bonheur* comes from *bon* (good) and the Old French word *Heur* (fortune or luck). Similarly, the German word *Glück* means happiness and luck; the Spanish word *felicidad* derives from the Latin *felix* (luck, sometimes fate); and the Serbo-Croatian word *sreća* means happiness and luck and is found in the phrases 'fair chance' (sretna okolnost) and 'to happen upon' (imati sreće). Darrin M. McMahon explains that when the first Indo-European languages were created living conditions were so poor that happiness was something that only lucky people had; it was reserved for the chance few who managed to avoid a whole number of diseases or disasters that are not nearly as threatening in todays world. The Enlightenment changed this however; happiness went from being an ideal to being an entitlement – it was something that could be pursued, as Thomas Jefferson dually noted.

Why $75,000? There are two possible answers. First, consider that when people are asked if they would like to earn $50,000 in a world where everyone else earns $25,000 or earn $100,000 in a world where everyone else earns $150,000, most people chose the former even though they would make $50,000 less (Gilbert, 2006). When we compare ourselves to others we tend to think that having more will make us better off even if that means turning down a net gain. And with average personal income in the United States hovering around $40,000 we see why $75,000 seems to matter: it is an amount that positions people as financially above average, enabling them to "keep up with the Joneses."

Second, $75,000 is an amount that allows people to live comfortably without having to worry about basic needs. When people have to spend mental and physical energy worrying about whether or not they will be able to make ends meet, there is little time to be happy.

To Do or to Have? That is the Question

Another interesting finding regarding the relationship between money and happiness relates to how we spend our money. A 2003 study done by Leaf Van Boven and Thomas Gilovich found that spending money on experiences is more beneficial than spending money on possessions; a two-week vacation to the Bahamas, for example, makes people happier than a 42'' flat screen TV. Van Boven and Gilovich offer a couple of explanations of why this is so.

First, experiences are evaluated on their own terms whereas materials get compared. This is because vacations have subjective values while materials have objective values. And in a world where everyone always has a bigger TV, nicer car, faster computer, etc., comparing materials to materials will always result in a loss.

Second, we can glamorize or romanticize experiences but not materials. This is why we often recollect mediocre or bad experiences as wonderful. For example, a spoiled camping trip turns into a great time with friends and a disastrous trip to Disney World is a "good bonding experience" for the family. I suspect this has a lot to do with the fact that memory tends to favor the good and forget the bad (I will expand on this shortly).

Third, experiences are more central to ones identity. The money spent on experiences, either for a vacation or an afternoon hike through a park, serves as time in which character can be built. I think this also makes sense; students usually come back from a study abroad experience "changed" and religious people usually come back from a spiritual weekend retreat "enlightened."

Lastly, experiences have a greater "social value." That is, talking about experiences has more social benefit than talking about materials. Van Boven and Gilovich came to this conclusion after running a study in which they compared two subjects who could only talk about their materials versus two subjects who could only talk their experiences. Those who spoke about their experiences tended to enjoy their conversations and their talking partner more (Gilovich, Van Boven, 2003).

The Paradox of Choice

Alexis de Tocqueville's *Democracy in America* stands as a seminal work of the democratic system of the United States during the middle of the 19th century. While Tocqueville assessed the strengths and weaknesses of democratic institutions in the United States, he became critical of several defining characteristics of American culture. Chiefly among them was the observation that in a society that seemed to have everything, people still managed to want more:

> In American I have seen the freest and best educated of men in circumstances the happiest to be found in the world; yet it seemed to me that a cloud habitually hung on their brow, and they seemed serious and almost sad even in their pleasure. The chief reason for this is that… [they] never stop thinking of the good things they have not got (McMahon, 2006, p.334).

Tocqueville's observation still applies. In a society that is filled with options, it has become increasingly difficult for people to be satisfied with their choices. This is the subject of Barry Schwartz' *Paradox of Choice,* which outlines the "cost of having an overload of choice."

Through a series of studies and personal observations, Schwartz found that when there is an option for everything – Coke, Diet Coke, Coke with lime, Coke with Lemon,

Coke Zero, Diet Coke Caffiene Free – people actually suffer.

Schwartz identifies three reasons for why this so: 1) people actually have a harder time deciding when there too many options 2) people think that there is no reason why they should not be able to chose optimally given the abundance of options and 3) when people do not chose optimally, which is usually the case, they experience regret (2004). As Jonathan Haidt explains, "the more choices there are, the more you expect to find a perfect fit; yet, at the same time, the larger the array, the less likely it becomes that you picked the best item. You leave the store less confident in your choice, more likely to feel regret, and more likely to think about the options you didn't choose" (2006, p.102).

Schwartz' point plays to a similar trend that Kahneman, Gilovich, and Van Boven have identified: happiness requires some materials, some money, and some choice, but too much of any is actually harmful. The moral? Low expectations.

Environment & Genes

Most Americans believe that people who live in California are happier than those who don't. Yet research by D. A. Schkade and Daniel Kahneman (1998) shows Californians are no happier than anyone else – what has led to this misconception? California is home to a beautiful environment that includes both scenic beaches and gorgeous mountaintops. It has a climate that beats most and a wide variety of culture and interests that many are drawn to. California is also home to several negatives – traffic, earthquakes, and expensive housing – but these are usually forgotten. So one reason we believe that Californians are happier is because we only think of the good aspects of California. As Daniel Gilbert explains, "we think that Californians are happier than [others] because we imagine California with so few details – and we make no allowance for the fact that the details we are failing to imagine could drastically alter the conclusions we draw" (2006, p.114). So if climate does not have a correlation to happiness, what does?

Two big findings to come out of positive psychology are that happiness has a strong relation to genes and a weak relation to environment. This means that, "in the long run, it doesn't matter what happens to you. Good fortune or bad, you will always return to your

happiness set point – your brain's default level of happiness – which was determined largely by your genes" (Haidt, 2006, p.86).

These findings led Martin Seligman to develop the "happiness formula":

$$H = S + C + V$$

According to Seligman, happiness (H) is determined by your genes (S), plus the conditions of your life (C), plus the voluntary activities you do (V). While biologists study the role of genes (S), psychologists aim to understand how life conditions (C) and voluntary activities (V) relate to happiness. Jonathan Haidt identifies five life conditions (C) that typically deter us from happiness: variable or intermittent noise, long commutes, conflicts within relationships, lack of control, and shame (2006, p.87-88).

The first three conditions relate to our inability to adapt. Hiadt suggests that people should never live far away from work, near a noisy street corner, or prolong a fight between a roommate, co-worker, or spouse because people never get used to these things.

For lack of control, Haidt cites a well-known study done by Ellen Langer and Judith Rodin. In the study, Langer and Rodin went to a nursing home and created two groups, choosers and non-chooser. The choosers were given the responsibility to water plants and decide on when 'movie night' would be while the non-chooser were not given any responsibilities. They found that on average, the choosers lived significantly longer than the non-choosers.

Shame is a much more personal variable, and something that is difficult to live with. Erasing it, however, can make people much happier. Haidt points out that individuals who have had plastic surgery, breast enlargement or reduction for example, are generally happier after the operation.[15]

Giving and Doing

The last variable in Seligman's formula, voluntary activity (V), is manifested in a number of ways, two that I will discuss: giving and doing. According to a 2008 paper by

[15] I think Haidt's list is a good starting point but incomplete. It will be interested to see what other external conditions that make people worse off

Elizabeth Dunn, Lara Aknin, and Michael Norton, spending money on others as opposed to ourselves is much more beneficial for our well being. Their abstract explains that, "spending more of one's income on others predicted greater happiness both cross-sectionally (in a nationally representative survey study) and longitudinally (in a field study of windfall spending)" (2008). Haidt agrees, he says that "people who do volunteer work are happier and healthier than those who don't" (p.174), and cites a study done by Stephanie Brown of the University of Michigan to show that those who gave more help and support to their spouses, friends, and relatives lived longer and those who gave less.

In addition to giving, research also suggests that it is important to *do*. Thomas Gilovich calls this "embracing action," and makes two points about it. First, there is a strong negative correlation between happiness and time spent watching TV. In this case, TV could be a substitute for a number of things, being on the computer, eating, or any activity that requires little or no input from the individual. Whatever the medium, laziness causes a decrease in happiness over time. Second, to combat this it is important to do! Engage in activities of any kind, put yourself out there, and embrace opportunities in life. (Gilovich even found that participating in a sport has a strong correlation with self-esteem).

Flow

Another important element of positive psychology that relates to physical action is what Mihaly Csikszentmihalyi calls *flow*. Flow is a term that describes optimal experience - what most would call "being in the zone". There are several defining characteristic of flow: clear goals, a high degree of concentration, a loss of self-consciousness, distortion of time, balance between ability level and challenge, a feeling of reward, a loss of bodily needs, and complete absorption into an activity.

Flow is what happens when a person becomes totally immersed in what they are doing that "nothing else seems to matter… the activity becomes spontaneous, almost automatic" (Csikszentmihalyi, 1990, p.53). Csikszentmihalyi was the first psychologist to "discover" flow, even though it had been known, described, and experienced by cultures throughout time. His research is based on lengthy interviews, questionnaires, and data

that were collected over several decades, all which examined a wide range of people – both professionals and ordinary people, as well as people from Europe, North America, Korea, Japan, and Thailand – to try to find what made an experience enjoyable.

Csikszentmihalyi found that flow experiences were manifested by a wide range of activities but described in almost the same way - total immersion, loss of self-consciousness, enjoyable, etc. He identified three necessary conditions for flow: 1) the activity has to have a clear set of goals: completing a successful surgery, nailing a challenging solo, or finishing a painting, 2) the activity must be challenging but not impossible, if it is too difficult the individual will likely quit, and if it is too easy the individual will become bored and, 3) the activity must have immediate feedback. This makes it possible for the individual to adjust his or her performance to maintain a state of flow so she can enjoy it to the fullest (Csikszentmihalyi, 1990).

Finally, it is important to note that flow experiences are a necessary but not a sufficient condition for long-term happiness. Csikszentmihalyi notes that flow can sometimes be harmful, especially in cases in which people describe illegal activities as flow experiences. And he also explains several scenarios in which individuals experienced flow daily but did not live what most would describe as a good or successful life. Nonetheless, a better understanding of flow can be beneficial for individual happiness.

Memory and Happiness

So far I have primarily focused on research that examines the relationship between happiness and things in the world; i.e., money, objects, and experiences. However, when we evaluate what makes us happy, it is vital to also understand the role and influence of memory.

Though humans are able to remember large amounts of information,[16] we have a difficult time objectively assessing past experiences. This is because memory has a tendency to 1) only remember the good and 2) evaluate an entire experience off of its

[16] An Average human knows 20,000 words

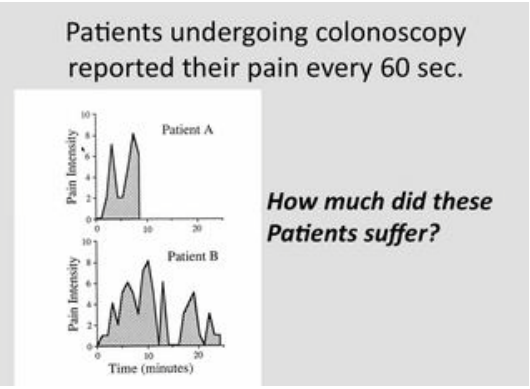
ending. These two mental traps contribute to our poor ability to assess what will make us happy.

I mentioned the first point already in the *How to Spend Money* section. If you recall, Gilovich and van Boven suggested that we often romanticize past experiences. I gave the example of a disastrous trip to Disney World being remembered as a fun family experience and a camping trip gone bad being remembered as a good time with friends.

The second point - that we judge past experiences by their endings - is well documented in psychology. As Daniel Gilbert explains, "whether we hear a series of sounds, read a series of letters, see a series of pictures, smell a series of odors, or meet a series of people, we show a pronounced tendency to recall the items at the end of the series far better than the items at the beginning or in the middle. As such, when we look back on the entire series, our impression is strongly influence by its final items" (2006, p.223). This is why we have the tendency to judge entire movies, books, or shows off of their endings and why women have the tendency to remember childbirth as less painful that it actually was.

According to a 2010 TedTalk by Daniel Kahneman, we tend to base entire events off of their endings because we have a difficult time distinguishing the experiencing self from the remembering self. He explains that the experiencing self is what exists in the present and reports current moods whereas the remembering self is what maintains an account of identity and reports the story of our lives.

To test the difference between the two "selves," Daniel Kahneman and Donald Redelmeier studied colonoscopy patients to see if there was a difference between how much pain they experienced and how much pain they thought they experienced. To do this Kahneman and Redelmeier asked patients to judge how painful the colonoscopy was *during and after* the procedure.



They found two things. First, during the procedure, as the graph illustrates, Patient A suffered less than Patient B. And Second, Patient A's report of the colonoscopy was much worse than Patient B's. This presented a paradox: Patient B suffered more but

remembered it as better than Patient A who suffered less but remembered it as worse. How is this so?

The inconsistency is explained by how the procedure ended. Whereas Patient A's colonoscopy was shorter but painful throughout, Patient B's colonoscopy was longer but not painful in the end. So, when Patient A assessed the procedure *after* it had happened she remembered it as being terrible because it ended terribly. Likewise, when Patient B assessed the procedure *after* it had happened she remembered it much better because its second half was much less intense. Clearly, what we experience is usually much different from what we remember we experienced, and how an experience ends greatly influences how it is remembered holistically.

Projecting Present Moods

Tagging along Kahneman and Redelmeier, Daniel Gilbert makes a complimentary point in his book *Stumbling on Happiness*, which explains how well brains imagine the future and "how well [they] can predict which of those futures it will most enjoy" (xvii). With the help of a deep body of empirical evidence, Gilbert concludes that in general, people are very bad at predicting what will make them happy. There are a number of reasons for this and one is that our assessments of the future are bounded by the present. Consider one study by Leaf Van Boven and George Loewenstein that Gilbert uses as an example.

Van Boven and Loewenstein sent researchers to a gym to ask people to rank how important food and water would be if they were stuck in the wilderness one night without any supplies. The researchers asked this question to two groups, one who had just worked out and another who were just about to work out. They found that people who had just worked out ranked water as much more important than those had were about to work out. Boven and Loewenstein concluded that, "people project their transient drive states when predicting how they themselves and how other people would feel in a situation that arouses drive states" (2003, p.1).

This should sound familiar and relatable. That we project present feelings into the future explains why we buy more when we shop hungry, say that we will never drink

again when we are hung over, or proclaim to never eat a certain kind of food after getting food poisoning from it. Of course, almost all people give in and go back to their normal habits, but in the moment, we can't help but project our present moods into the future.

Conclusion

I have reserved all of the positive psychology section for explaining general findings. These have included findings regarding money, the activities we get involved in, and memory. There are a number of other factors that have been studied - gender, religion, education, culture, and personality, for example. However, I have omitted them for the sake of time and space.

Although the empirical findings of positive psychology research help us understand what external factors correlate[17] with happiness, they do not provide a model or framework that could outline the necessary conditions for living a good life, or what Aristotle would call *eudaimonia.* For this, theory is required.

There have been several attempts to establish a theory of well-being that draws from positive psychology research. Martin Seligman, for example, developed the *Authentic Happiness* theory in the early 2000s and recently expanded on it in his 2011 book *Flourish.* Seligman's theories are a good start but incomplete. Remember that positive psychology is young and in need of several more years, if not decades, of research for more legitimate theories to emerge.

Until then, however, we can make a few conclusions that could help someone become happier: 1) avoid concluding that unhappiness is caused by physical environments, 2) hope for good genes, 3) avoid external conditions that negatively affect happiness most notably those outlined by Haidt, 4) volunteer, 5) embrace life by avoiding passiveness and participating in activities, 6) engage in flow activities, and 7) be aware of how memory and present moods affect how we assess the past and future.

Though all the positive psychology books warn against being self-help books, readers cannot help but read them as such; I think this is a good thing. Perhaps the more

[17] It is important to emphasis that the external factors are merely correlations and not causations. In other words, it is unclear if people are happy because they do volunteer work or they do volunteer work because they are happy.

aware we are of what correlates with happiness the more likely it is that we become happier. At any rate, these books are well written, motivational, entertaining, and have been vital to popular psychology movement as a result. I am sure that they will continue this trend in the future.

5) Mistakes Were Made

Books:

- *Mistakes Were Made (But Not By Me),* Carol Tavris & Elliot Aronson
- *Being Wrong,* Kathryn Schulz
- *Wrong,* David H. Freedman
- *Blind Spots,* Madeleine L. Van Hecke
- *Why We Make Mistakes,* Joe Hallinan
- *On Being Certain,* Robert Burton.

Introduction

Human beings are fundamentally fallible creatures. We are not optimizers who calculate the pros and cons, we are irrational animals primarily driven by emotions. We are prone to mistake and error, oversee the obvious, omit and misinterpret large amounts of information in our deliberations and thoughts, and are horrible predictors. Our faults manifest themselves in a numbers of ways: surgeons operating on the wrong patient, pilots ignoring air traffic controllers, and stock brokers loosing it all in the market.

It is also fundamentally human to be ignorant of personal fallibility. Most of the time our mistakes and erroneous beliefs go completely unnoticed because we are blind to them. As Kathryn Schulz says in her book *Being Wrong,* "whatever falsehoods each of us currently believes are necessarily invisibly to us" (2010, p.18).

Our ignornance of personal error sets us up for failure. If it is impossible for us to feel wrong about anything then we will conclude that we are right about everything. This helps us explain why "we accept fallibility as a universal phenomenon yet are constantly startled by our own mistakes" (Schultz, 2010, p.18-19). And when we do fess up to our errors, we usually incorporate a phony story to make our mistakes seem understandable; never are we flat out wrong - there is always an external cause.

The “Mistakes Were Made” section, as I have termed it, outlines how error-blindness, which is caused by a false sense of being right, causes individual and institutional error - sometimes at the catastrophic level. Relative to popular psychology, the “mistakes were made” books are of a slightly different breed. Journalists who use historical and contemporary examples, as opposed to scientific examples, primarily write them. Nonetheless, they explain the sources and consequences of human fallibility nicely.

The first section, “Accidents,” briefly explicates the worst aviation disaster in history to illustrate how even professionals are not immune to mistakes. The second section, “Experts,” explains how experts are terrible predictors. And the next three sections, “Confirmation Bias,” “The Feeling of Certainty” and, “Cognitive Dissonance,” provide a framework for understanding the cases put forth by the “Accidents,” and “Experts,” sections.

Accidents

On March 27, 1977 the deadliest disaster in aviation history took place on the Spanish island of Tenerife. In the midst of take off, going approximately 160 mph, KLM flight 4805 collided with Pan Am flight 1739 half way down the runway, killing 583 people. The KLM captain was Jacob Van Zanten, KLM’s chief flight instructor who had just returned from a six month safety course for commercial pilots. The subsequent investigation concluded that Van Zanten took off without clearance, thereby causing the crash. How could such a credited and experienced pilot make such a catastrophic mistake?

The events that preceded the accident were a recipe for disaster. A terrorist bomb had exploded at Gran Canaria International Airport, forcing several planes to divert to Tenerife, a small airport not used to handling large commercial jets. The control tower was understaffed, their English was weak, and a heavy fog had set it that prevented Van Zanten and his crew from seeing no more than 300 meters. All of these inputs contributed to Van Zanten making the fateful decision to takeoff without permission from the control tower.

The accident was also very preventable. Van Zanten could have doubled checked

with the control tower or waited for the fog to lift. However, his emotions got the best of him and his lack of patience cost him his life, and the lives of others. Excluding the severity of the death toll, this is a common story with the "mistakes were made" books: an expert with years of experience makes a rookie mistake and turns out to be flat out wrong. Why?

Ori and Rom Brafman explain that, "a growing body of research reveals that our behavior and decision making are influenced by an array of… psychological undercurrents and that they are much more powerful and pervasive than most of us realize" (2008, 16). This means that our cognitions, even those of experts, are prone to psychological underpinnings that cause us to make quick, rash, decisions that often turn out to be terrible mistakes.

"Experts"

Philip Tetlock is a psychologist from the University of Pennsylvania who spent 18 years gathering data to measure how good the "experts" are at predicting future events. This included academics, journalists, intelligence analysis, and think-tank members who appeared on television, got quoted in the paper, and advised governments and businesses. He asked them to rate the probability of something - an economic, political, or military event - increasing, decreasing, or remaining the same and measured their results.[18] Their results were no better than chance. As one *New Yorker* article put it, "human beings who spend their lives studying the state of the world… are poorer forecasters than dart-throwing monkeys, who would have distributed their picks evenly over the three choices" (Menand, 2005). Why? Put simply, we are horrible predictors.

However, there was more to Tetlock's study than data, which suggested that when it comes to long term economic, political, and military events, a cab driver has just as much predictive power as an economist, CEO, or government official. Tetlock was also after how his subjects responded to their error. In *The Black Swan,* Nassim Taleb explains three general ways the experts responded: 1) they tell themselves that they were playing a

[18] For example, one question was the "central-government debt will either hold between 35% and 40% of GDP or fall below or rise about that range."

different game, i.e., they did not know the Soviet Union was going to collapse because the Soviets were withholding important information, 2) they invoke the outlier, i.e., something was unpredictable or outside of the system so it could not have been known to anyone like weather, and 3) they give the "almost right" defense, i.e., "retrospectively, with the benefits of a revision of values and an informational framework, it is easy to feel that it was a close call" (Taleb, 2007, 152).

What's interesting is that the converse is not true. That is, when the experts *are* right, they accredit their accuracy to personal knowledge, skill, or expertise. This tendencies parallels Schulz' point; namely, "we attribute our successes to our skills, and our failures to external causes outside of our control, namely to randomness" (2010, p. 18).

ESPN baseball writer Jayson Stark is one of the few experts I have found to admit this. He begins his 2011 MLB preview column by saying that "after 11 years of writing this same, ill-fated column, I've finally figured out two things: (A) It's hopeless. And (B) it's for entertainment purposes only." He is right. Sports Illustrated, ESPN, and other sports outlets consistently get their predictions *very wrong*. This should not be a surprise. Seasons are filled with unpredictable injuries, random events, and bad officiating that can make or break championship runs. The same can be said of political campaigns, business ventures, and the economy – systems that are far more complex than a Major League Baseball season. In a globalized world where there are infinite inputs, long-term prediction is simply impossible.

Confirmation Bias

Recall the metaphor in Haidts' *The Happiness Hypothesis*; the mind is like a rider atop an elephant where the rider is the conscious and rational mind while the elephant is the automatic and implicit mind. Haidt calls the rider our "inner lawyer," and explains how its main purpose is to justify just about everything we take in - a tendency that psychologists call "confirmation bias." As the name indicates, confirmation bias is the tendency for people to favor information that conforms to their ideologies *regardless* of if it is true or not. It helps explain why most people think of themselves as above average

and why people have a bias towards professions and people that resemble their own name (Haidt explains that "Dennis or Denise are slightly more likely than people with other names to become dentists, a man named Lawrence and a woman named Laurie are more likely to become lawyers. [And] Louis and Louise are more likely to move to Louisiana or... to marry. (p. 28)).

Gilbert makes a similar point. He notes that our brains and eyes have a mutual contract, where the brain believes the eyes and the eyes look for what the brain wants:[19] "The brain and the eye may have a contractual relationship in which the brain has agreed to believe what the eye sees, but in return the eye has agreed to look for what the brain wants" (2006, p.183). This is possible because experiences, as Gilbert continues, are inherently ambiguous; they can be viewed in so many different ways that our brains cannot help but filter them so they conform to our beliefs.

After reading both Haidt's and Gilbert's books it becomes clear that our brains are self-assuring and self-justifying machines that only look for what confirms and ignores what contradicts. This is why democrats and republicans can look at the same newscast or read the same story and come to remarkably different conclusions, why scientists can disagree the consequences of global warming after looking at the same data, and why some people seem to "see" Mary or Jesus in food. It is also why people tend to make so many mistakes; when we only focus on what confirms to our beliefs we ignore the weaknesses of our beliefs and suffer as a result.

The Feeling of Certainty

A growing body of research suggests that the feeling of certainty is an unconscious mental sensation that stems from the most primitive areas of the brain. This is the subject of Robert Burtons book *On Being Certain*, which surveys a wide variety of contemporary

[19] Gilbert ultimately advises us to turn to others, people who have been through experiences that we are about to embark on, to help us ease into the future. This is important because self reflection and consultation usually just confirm already held beliefs and ignores conflicting ones even though they may be more helpful. This is a problem with the confirmation bias: it blinds us to what is best for us. This problem manifests itself all the time. We chose the girl that our friends say is crazy, we take a job even though others say it will be miserable, and we think we are still the best pitchers even after we have given up five runs in one inning.

neurological research to support this claim. According to Burton, when we say that something is “correct” or “true”, we are unconsciously interpreting neural inputs into matters of fact. What we tend to call knowledge is actually a rationalized feeling of certainty that arrives to us from “involuntary neurological roots” (Burton, 2008, p. xiv). Brains do not “discover,” as Plato would have suggested, objective facts about the world, they release chemicals that make us feel we have.

Burton’s point corresponds to eliminative materialism, a school of thought that has been advocated for by Paul and Patricia Churchland. Eliminative materialism holds that concepts such as belief, identify, and knowledge are mental constructs that are part of a “folk psychology” of the mind. The Churchland’s argue that the future of neurology will eventually *eliminate* the need for beliefs, desires, and emotional states in place of objective explanations of neurological activity.

If Burton and the Churchland’s are correct then we can better understand why people have such contrasting ideologies and worldviews. It is very difficult for someone to give up a belief that *feels* absolutely certain to them, especially when we consider that the feeling of certainly comes disguised; it gives us the sense that knowledge is in the world when it is actually in our heads.

Color is a great example of this. Although we think of it as being “out there”, color is what happens in the brain when light interacts with our retinas. The same goes for more abstract concepts like the economy. Like color, we think of the economy as having an objective existence in the world. But when people speak of the economy they are simply expressing a subjective perception.

If truth is the rationalization of a mental state, and concepts only exist in our heads, then what we call knowledge gets reduced to an “integral and inseparable feature of the most basic neural networks” that is used for “the recognition of letters, symbols, and phonemes” (Burton, 2008, p.121). And because everyone has unique neural networks, genes, and experiences, it is easy to see why people have disagreements; they are simply arguing definition versus definition and intuition versus intuition. The feeling of certainty has some obvious survival benefits, but when it comes to conceptions of knowledge or truth it is very deceiving.

Cognitive Dissonance

Cognitive dissonance describes a mental discomfort caused by conflicting ideas held simultaneously. It is a "state of tension that occurs whenever a person holds two cognitions that are psychologically inconsistent" (Tavris & Aronson, 2007, p.13). It was introduced in 1957 by Stanford professor of social psychology Leon Festinger after he infiltrated and studied a UFO cult that was convinced the world would end at midnight on December 21st, 1954. In his book *When Prophecy Fails*, Festinger recounts how after midnight came and went, cult members began to look for reasons for why the end of the world had not come. Eventually the leader of the cult, Marian Keech, explained to her members that she had received a message from automatic writing, which told her that the God of Earth decided to spare the planet from destruction. Relieved, the cult members continued to spread their doomsday ideology to the general audience.

Keech's behavior is indicative of cognitive dissonance. It illustrates how "the more committed we are to a belief, the harder it is to relinquish, even in the face of overwhelming contradictory evidence" (Burton, 2008, p.12). Smokers are another a good example of this; they know that smoking kills but continue to smoke. And after unsuccessfully quitting, they justify their failures by claiming that, "smoking isn't that bad" or that "it is worth the risk."

In a related case, one medical study examined the effects of placebo surgeries. Doctors preformed placebo surgeries on patients with osteoarthritis of the knee and "found that patients who had 'sham' arthroscopic surgery reported as much relief… as patients who actually underwent the procedure" (Burton, 2008, p.14). Remarkably, even after surgeons told patients that they had a sham surgery, many of them continued to report dramatic improvement. For these patients, *even knowledge of their placebo surgery didn't prevent them from believing that their knee felt better.*

Cognitive dissonance fits with the feeling of certainty and the confirmation bias well; we look for what matches our beliefs, ignore what contradicts our beliefs, equate knowledge with emotion-states, and have an extremely difficult time admitting wrongness and ignorance. These psychological findings help us understand why we have trouble admitting that we are wrong and why mistakes were made.

Conclusion

When we consider the effects of the confirmation bias, the feeling of certainty, and cognitive dissonance it becomes clear what caused the KLM accident. As Captain van Zanten lost patience, he began to "hear" a confirmation from the control tower, ignore his co-pilots, *feel* that he wasn't doing anything unsafe, justify any doubts he may have had, and become blind to the fact that he couldn't see 300 meters down the runway. They also help explain why the "experts" are so bad at predicting the future. They confuse experience with knowledge of the future, falsely believe that their ideas are privileged, and ignore otherwise important information.

The "mistakes were made" books fit well into the popular psychology movement. They make four general points that I will review: 1) everyone makes mistakes; error is a natural component to being human, as is error-blindness, 2) our "elephants" are in control and our "riders" make up stories regarding our behaviors, decisions, and actions, 3) knowledge and truth are mental states delivered from a feeling of certainty, and 4) we rationalized self-doubts to feel better about our actions and beliefs.

I would like to say that knowledge of these psychological inputs could help us avoid mistakes; however, this would miss the point. This section is meant to say that mistakes and error are unavoidable traits of the human conditions. Even a full conscious awareness of biases and tendencies in error will not prevent the rider from rationalizing. At best we can accept that error is inherent.

6) Conclusion

Final Thoughts: The Unconscious Paradigm Revisited

At the beginning of this paper I suggested that we are at the beginning stages of a shift from the "rational paradigm" to the "unconscious paradigm." It is my hope that by now, you understand what I mean by the unconscious paradigm. However, I will nonetheless review and clarify the ideas behind this term.

We are bound by a series of cognitive biases and heuristics that cause us to act against self-interest. Recall that Kahneman and Tversky's cognitive biases and heuristics program had a negative and positive side. On the positive side, it showed that the brain uses mental short cuts – heuristics – to simplify complex problems with incomplete information. On the negative side, built into these heuristics are sets of cognitive biases, which demonstrate flaws in rational actor theory. I mentioned three of these biases, framing, anchoring, and the endowment effect, and provided examples of them from Dan Ariely and Richard Thaler. Ultimately, the cognitive biases section told us that our rationality is inherently limited and faulty.

Reason is actually constituted by emotion. Contrary to the traditional Western notion, a reduction in emotion causes an equal reduction in rationality. This is because, as Antonio Damasio has demonstrated, reason requires sophisticated emotion for it to function properly. Haidt uses the elephant and the rider metaphor to illustrate this relationship. In addition, we learned that emotion guides our moral theories and deliberations, and that a proper upbringing, as opposed to proper philosophical training, is much more important for moral behavior and moral reasoning. Ultimately, the emotion and reason section told us that our emotions constitute our reasons.

Intuition has its powers and perils. Among its perils are its tendency to misinterpret randomness, misunderstand how context influences judgment, and trust inaccurate memories. Among its powers are its ability to "thin-slice," relegate most sensory information to the automatic level, and to complete daily tasks such as walking, talking, and driving, without having to think about them. Ultimately, the intuition section told us that most thought takes place at the unconscious level in ways that are both helpful and harmful.

We are bad at knowing what is best for well being. The positive psychology movement has repeatedly demonstrated that we greatly misunderstand the relationship between happiness and a whole number of things including money, memory, and choice. Additionally, it shows that we consistently make decisions that go against our wellbeing, and misunderstand the difference between the "experience self" and the "remembering self." Ultimately, the positive psychology section told us that happiness and well being are difficult to obtain because our brains have a difficult time knowing what is or is not in

our self-interest.

We are mistake-prone. Drawing from psychological effects including confirmation bias, the feeling of certainty, and cognitive dissonance we learned that truth and objectivety are illusions that cause us to be error-blind. This helped us explain why "experts" are so bad at predicting, and why even professionals can make rookie mistakes. We also learned that people are very reluctant to admit their errors but tend to easily take credit for their successes. Ultimately, the mistakes were made section told us that because we are "error-blind," we will always make mistakes

So why have I called it the unconscious paradigm? In short, the word unconscious is meant to convey the idea that all of our behaviors and decisions are manifested by unconscious cognition. What's more, and I explained this in the intuition section, is that we do not have access to this type of cognition. This means our thoughts, ideas, deliberations, and actions are constituted by forces that we are ignorant to and cannot access.

This is why NFL and NHL teams that wear black uniforms are penalized significantly more than average; why people who are primed with words such as "old, "Florida," and "lonely," walk slower than people who are not; why a $10 wine with a $90 label tasted like a $90 wine; why men shopping in stores that are scented with "male" fragrances spend more than stores scented with "female" fragrances; and why people tend to buy more items that are placed at eye level (Hallinan, 2009). In all of these examples, people were greatly influenced by things that they were unaware of – this is the essence of the unconscious paradigm.

This has serious consequences to rationality. Let's explore this next.

Section III: Consequences to Rationality

Introduction

Historically, there have been many descriptions of rational behavior and reason *per se*. Plato held that to act rationally one must find harmony between desire, spirit, and

reason; Aristotle developed first order logic, which gave structure and formal rules for reasoning; Descartes believed that reason was the only reliable method of attaining knowledge, arguing that the "substance of thought" was non-material and unaffected by the physical laws; and neoclassic economics defines rational behavior as behavior that seeks the most cost-effective means to achieving subjective goals.

In the previous section, I suggested that the popular psychology movement has painted such a complicated picture of the human condition that it would be a mistake to even begin to evaluate behavior as rational or not. This is why the "unconscious paradigm" is not about redefining or reevaluating rationality; it is about throwing both notions out entirely. In the next section will try and convince you of this.

In the first part I will run through the consequences of the paradigm shift for the economic concept of rationality. To do this I will briefly explain the relationship between behavioral economics and neoclassical economics to suggest that as economists begin to realize the value and implications of the popular psychology movement data, neoclassical economics will be replaced by behavioral economics.

In the second part I will explain the consequences of the paradigm shift for the general concept of rationality. I will begin by arguing that rationality is a concept that was invented to justify the distribution of inequality when humans shifted from hunter-gatherer societies to agrarian societies. Next, I will argue that cognitive biases and heuristics are helpful tools that allow us to understand the world, and because of this, they should be thought of as attributes instead of detriments. Finally, since the popular psychology movement has shown how our reasoning continually leads us to "epistemic distortions and poor decisions," I will conclude that reason is actually a tool for argumentation and persuasion and not knowledge and truth.

In the third part I will offer some concluding remarks before summarizing my final thoughts.

1) Consequences in Economics

Self-Interest & Rationality

The concept of economic rationality has had a relatively short history. It originated with Adam Smith, who argued that society would most benefit from a system of perfect liberty in which actors could pursue their self-interest: “It is not from the benevolence of the butcher, the brewer, or the baker that we expect our dinner, but from their regard to their own interest.” By allowing individuals to pursue their own interests, Smith believed that the highest output of wealth could be generated, thereby improving the conditions of a given society holistically.

In the 19th century, economics began to incorporate mathematics to develop models of human behavior. This laid the groundwork for Lionel Robbins’ Rational Choice Theory, which came to define economics in the second half of the 20th century. This contemporary concept of economic rationality is the idea that humans are rational actors who strive to fulfill their subjectively defined self-interests to obtain the highest degree of well being.

Economic rationality helps explain why people respond to changes in the market; when the price of an elastic good increases, people buy less, and when the price of an elastic good decreases, people buy more. Economic rationality also helps explain why people in Florida buy T-shirts and sun tan lotion while people in Minnesota buy jackets and snow mobiles; we do not just buy things for the sake of it - we are motivated by price and necessity.

Explaining economic behavior through rational choice theory can only go so far; people buy season passes to the opera but only go to a few shows, they place bets on their favorite teams even though their teams are notoriously bad, and they consume goods that are harmful to their health. Someone dedicated to rational choice theory would have a hard time explaining these behaviors. If we were really *homo economicus* then why would do we do so many things that seem to go against our self-interest?

One problem with rational choice theory is that it always fails when it is applied absolutely. For example, it would seem dubious for an economist to assign a value to snobbery or laziness to explain why a season pass holder skipped the opera. If the economist is free to describe any behavior as behavior that pursues self-interest, and defines rational behavior as behavior that pursues self-interest, he runs the risk of defining rational behavior tautologically.

There are two ways to avoid this. First, self-interest could be defined more narrowly. However, as I mentioned in the introduction of this section, one of the main purposes of examining the popular psychology movement is to illustrate how complex human behavior is. Considering this, a definition of self-interest would be overly simplistic and unhelpful. Humans are motivated by such a wide and complicated array of inputs that it would be impossible to summarize or explain our behavior with such a brief phrase or idea.

Second, we could study behavior to see what people actually do as opposed to what they should do. It would be naïve to say that anyone could explain consumer behavior absolutely, but the findings of the popular psychology movement could help a little bit. Taking this point, we could then say that individuals respond to changes in the market not because they are rational or driven by self-interest, but because they are motivated by intuitions, emotions, and biases that we are largely ignorant of, but willing to study and eventually understand.

This is the role of behavioral economics: it assumes that people are not perfect calculating machines and attempts to understand their motivations through psychology. I will briefly explain its significance, history, and relation to neoclassical economics next.

Behavioral Economics

Behavioral economics is a disciple that studies the role of cognition and emotion to understand the economic behavior of individuals and institutions. Whereas neoclassical economics relies on formulas, algorithms, deviations and the assumption that individuals act rationality to maximize self-interest, behavioral economics draws from psychological experiments to show how people actually make decisions. In general, behavioral economists are more interested in describing *how* people behave instead of describing how people *should* behave.

For most, including Dan Ariely, behavioral economics complements traditional economics, which is still seen as an extremely useful tool for many theoretical problems. Though behavioral economists have demonstrated clear flaws in traditional economic theory, as the cognitive biases section illustrated, most have not discarded rational choice

theory altogether. Instead, they modify and improve rational choice theory by pointing to experiments that demonstrate how people act irrationally. Ariely would agree that people sometimes act according to rational choice theory, but certainly not always.

Others, such as Simon Herbert, have proposed different frameworks altogether. As early as the late 1940s, Simon developed the theory of "bounded rationality," which argued that the rationality of individuals is limited by cognitive restrictions, finite information, and finite time. It emerged at a time when *rationality as optimization* dominated research across many disciplines. Contrasting this view, Simon saw individuals as *satisfiers* who adopted rules of thumbs, or heuristics, to compensate for cognitive faults. Traditional economists largely ignored Simon's work at the time, and many were unhappy with his 1978 Noble prize. Nonetheless, his work provided a necessary framework for future behavioral economic studies to build off of.

Daniel Kahneman and Amos Tversky were responsible for a handful of these subsequent studies - many of which illustrated how commonplace non-optimal behavior was. Their breakthrough paper, "Prospect Theory: An Analysis of Decision under Risk," demonstrated that people evaluate potential gains and losses differently and went on to be one of the most widely cited papers in behavioral academics. In contrast to expected utility theory, which measured gains and losses absolutely, prospect theory describes the tendency for people to be affected more by a loss than an equivalent gain. This is why people are more likely buy meat that is labeled 85% lean but not 15% fat, and why people are more fearful of a disease that has a 10% fatality rate as opposed to a 90% survival rate.

Richard Thaler was also an important proponent for incorporating psychological findings into economics. His 1981 pioneering paper, "Toward a Positive Theory of Consumer Choice," which I mentioned in the cognitive biases section, clearly showed that emotion plays a significant role in how we value goods and services.

The behavioral work done by Kahneman and Tversky and Thaler was fairly repugnant to most economists during the 1980s. It was not until the 1990s that it became more widely accepted, and the 2000s when it became popular. Today, their work is used in several different ways. The cognitive biases program, for example, has been primarily used to demonstrate irrational behavior, or, behavior that goes against rational choice

theory. Their other works, such as prospect theory, have been incorporated into traditional economics to help model how people assess loss.

Overall, behavioral economics does not know its place or role in traditional economics yet; it is an area of study that is very young. Behavioral economists such as Ariely, Thaler, and Kahneman and Tversky have separated themselves from traditional economics by describing real-life choices rather than optimal decisions. They avoid describing humans as "self-interested" or "rational", and instead pursue empirical data to show how people act as opposed to theorizing how people should act. Although their work makes it tempting to "throw the baby out with the bath water," i.e., completely ditch neoclassical models of economic behavior, the success of rational choice theory should stop us from doing so, at least in the short term.

Ariely's Dilemma: The Problem with Prediction

In the last decade, economic papers, books, and textbooks have incorporated more and more behavioral studies, and there is no reason to think that this will not continue to happen. The question is: what will happen to the future of traditional economics given the findings of behavioral economics?

If traditional economic models are ever completely replaced, they will need to demonstrate an inability to accurately describe economic behavior on both the individual and institutional level. Many people argue that this has already happen, pointing to the economic crisis of 2008 as evidence. Others, like Paul Krugman, maintain that avoiding economic recessions requires changes from within the system, but not changes with the system as a whole. However, as psychological literature continues to demonstrate that humans are extremely bad at making good decisions, especially ones that involve money, Krugman's critique begins to look like it is missing the point.

This is Nassim Tabel's point. In his book *The Black Swan,* he shows that the most influential events in history, such as September 11th and the 2008 recession, have been highly improbable and unpredictable. This is because when it comes to something like the stock market, the global economy, or international relations, humans simply do not have the capacities that are necessary to understand such complex entities. Our brains are

not built for understanding statistics and randomness (as Gilovich demonstrated). Rather, they are built for telling narratives and surviving on the savannah; this is why we like to explain enormously complex interactions with such simple concepts like “self-interest,” or “rationality.”

We are largely ignorant of this tendency, and that is the problem. The reason we are ignorant goes back to Haidt’s point. The “rider” loves telling simple stories of complex events, thereby giving us the impression that we actually know why things happen. In reality, though, it is impossible to model a global economy given its infinite complexity.

Ariely exists on the border of past and future economics; he wants to describe *how* people behave and maintain a commitment to economic models that describe how people *should* behave; this is his dilemma, *he is aware of the elephant, but still thinks the rider is in control*. Eventually, as behavioral economics continues to incorporate itself into traditional economics, he will realize the true nature of the “elephant.”

In many ways the relationship between traditional economics and behavioral economics resembles the relationship between Newtonian physics and quantum physics. Traditional economics and Newtonian physics work most of the time, but fall apart when they are tested to the extreme. However, as psychology continues to study behavior, I believe that, unlike Newtonian physics, traditional economics will not be a valuable tool for understanding individual economic behavior or the behavior of global markets. Eventually, it will be replaced by an economics that uses psychology to describe how people behave. This will only happen once people realize that they are all riders atop an elephant that they cannot control.

2) The Creation of Rationality

Origins

There is a great deal of debate amongst anthropologists and evolutionary biologists over how human beings evolved. All agree that the last 150,000 to 100,000 years witnessed several key cognitive developments, most notably our ability to use written and spoken language and reason abstractly, but few agree on how this played out. Jared

Diamond argues that around 50,000 years ago *Homo sapiens* made a "Great Leap Forward," when they began to use things like stone tools, jewelry, and clothing that accelerated our technologies over a relatively short period of time. Others, such as Stephen Oppenheimer, claim that no single technological or cognitive revolution took place. Rather, changes in human behavior and advancements in technology were the result of a gradual accumulation of knowledge and skill.

What's more is that there is further disagreement over how genetics have changed in the last hundred thousand years or so. According to John Skoyles and Dorion Sagan in their 2002 book *Up From Dragons*, our current genetic makeup is indistinguishable from that of hunter-gathers that lived in sub-Sahara Africa. On the other hand, in the 2009 book *The 10,000 Year Explosion*, Gregory Cochran and Henry Harpending argue that the development of agriculture nearly 10,000 years ago accelerated the rate of physical, biochemical, and cognitive evolution such that our genetics are significantly different from hunter-gathers.

These two debates exist for a number of reasons. First, a lack of evidence makes human evolutionary studies notoriously difficult. And though scientists have found a great deal of human remains, some which are millions of years old, it is difficult to draw specific conclusions from them. Second, genetics are still poorly understood. Recall that the human genome was not mapped until less than a decade ago. Additionally, there is a wave of new studies, highlighted by a few excellent books such as David Shenk's *The Genius in All of Us*, Daniel Coyle's *The Talent Code*, and Malcolm Gladwell's, *Outliers*, which suggest that our intellectual and physical abilities are explained more by nurture rather than by nature. As such, claiming that genetics has or has not changed significantly since hunter-gatherer days could be misguided.

At any rate, we find ourselves in the 21st century surrounded by amazing technologies that would have astonished most human societies existing at any point in the past – even as early as ten years ago. And somewhere along the way, and this is what's relevant to this paper, we have come to think of ourselves as rational: how did this happen?

It difficult to say, but there may be some helpful explanations. To begin, although I do not think that humans have an objective teleology, we nonetheless have an

evolutionary purpose, and that is to pass genes from one generation to the next. As such, we can say that brains evolved with two primary things in mind - survival and sex. Additionally, we do know that our brains did not evolve for thinking or introspecting; if they did, "[our] counterfactual, introspective, and hard-thinking ancestors would have been eaten by a lion while [our] nonthinking but faster-reacting cousin would have run for cover" (Taleb, 2007, p.xxvi).

This is an important point. All the species that preceded *Homo sapiens* spent "more than a hundred million years as nonthinking mammals" (Taleb, 2007, p.xxvi). This means that our ability to think abstractly, introspect, simulate the future, and recall and analyze the past are, relatively speaking, incredibly recent developments. Put differently, if the history of Earth was squished into 24 hours, modern humans would have arrived in the last few seconds. What's more is that the onset of things like the global economy or modern civilizations, even more recent phenomena, would have arrived in only the last few tenths of a second. The point is, although humans have the most complex and advanced brains on the plant, the parts that intellectually separate us from other species are brand new; and like any first generation technology, they are prone to several systematic errors. As Jonah Lehrer says, "when it comes to the new parts of the brain, evolution just hasn't had time to work out the kinks" (2009, p.24).

In *The Black Swan*, Taleb makes similar remarks. He explains that our brains evolved "to do" and not "to know." This is why "in the blip in our history during which we have used our brain, we have used it on subjects too peripheral to matter… evidence shows that we do much less thinking than we believe we do – except, of course, when we think about" (Taleb, 2007, p.xxvi). Or, put differently, "it's not that intuition is a tool that a rational creature often employs; it's rather… that reason is a tool that a basically instinctual creature often employs to accomplish certain ends. For the most parts, the intuitive system sets the agenda" (Haybron, 2008, p.246).

Yet given this, people across time and cultures have repeatedly reversed this dichotomy, claiming that we are rational beings first and intuitive or passionate animals second; from Plato to neoclassical economists, we have had a strong tendency to describe ourselves as rational.

The first purpose of this paper was to use contemporary empirical evidence to

demonstrate how this is not true, and I hope that I was convincing in doing just that. However, it is equally important to explain *why* this mistake was made in the first place. Why is it, in other words, that what Taleb and Lehrer are saying comes as a surprise?

Food & Inequality

About 10,000 years ago humans underwent an agricultural revolution that drastically changed the way we organized ourselves. Again, there is plenty of disagreement amongst anthropologists over the exact dates, locations, and movements of the agricultural revolution. However, there is sufficient evidence that has led scientists to believe that by about 3,500BC, the first civilizations appeared in the fertile crescent – an arching piece of land that stretches from present day northern Egypt, through Iraq, and into eastern Iran.

The agriculture revolution was defined by a number of things. Most notably, however, was the domestication of wild crops and animals, which influenced a number of things. Primarily, as opposed to hunter-gatherer societies that relied on following food from one place to another, societies that domesticated food could remain in one spot for extended periods of time. In turn, things like governmental organizations, divisions of labor, and new technologies could develop, which allowed for denser populations to form.

Perhaps most importantly, food surplus caused the formation of social hierarchies. This is because, as Diamond explains, "once food can be stockpiled, a political elite can gain control of food produced by others, assert the right of taxation, escape the need to feed itself, and engage full-time in political activities" (1999, p.90). In other words, those who controlled the food surpluses also controlled the communities that were supported by the food surpluses. This set the stage for simple social hierarchies that later evolved into complex governments.

Although our 21st century mindset looks at the Neolithic Revolution favorability, it is important to consider that compared to the average agrarian work day, which lasts between 12 and 16 hours, and the 9-5 work day that defines many citizens of today's world, hunter-gatherer societies worked about five to six hours a day. As Anthropologist

Peter Farb says, “primitive hunters and collectors of wild food… are among the most leisured people on earth.”

So given the *increase* in work and *decrease* in leisure, why is it that we moved from non-hierarchical egalitarian hunter-gatherer societies to the hierarchical agrarian societies? It is not exactly known. Some, such as Diamond, have argued that the shift was caused by a decline in the availability of wild foods and animals while others have pointed to over population. What *is* known is that food surpluses could support larger armies, and this gave agrarian societies a huge power advantage over hunter-gatherer societies. As such, overpowering resource-rich agrarian societies eventually beat out hunter-gatherer societies.

However, in order to support large armies, social elites have to impose taxation on their citizens. For the most part, this makes sense and is true in today’s world; in return for security, protection, and general welfare, citizens pay a certain amount of money to the social elites. However, problems arise when citizens feel that their money is either being wasted or not used efficiently (also true for today’s world). And in order to defuse this sentiment, social elites have to create ways to justify their expenditures.

What’s more is that because social elites relied on taxation and the production of food and goods from their citizens, they needed to keep track of who owned what, how much was owned, and how much was owed. In return, citizens required a guarantee that their tax and material contributions to the state where protected and recognized by the state. Resulting from the need to control economic transactions between the citizens and the elite was private property and laws to protect private property.

The introduction of private property perpetuated the distribution of inequality, which caused some people to have more than others. As Karl Marx noted, “the history of of all hitherto existing society is the history of class struggles.” As such, it was up to the social elite to justify expenditures *and* the distribution of inequality if they wanted to remain in power. As revolutions and coup d'état’s throughout time have shown, the populace will overthrow those in power if those in power cannot provide legitimate reasons for why they should remain in power. And when we consider the dramatic change from the hunter-gatherer lifestyle to the agrarian lifestyle, it becomes clear that this was a serious issue for the first social elites.

The Philosophers & Rationality

There were a number of justifications that elites developed to explain the distribution of inequality. Among the most popular, of course, were religious justifications. This is why it is not a coincidence that priests, imams, and other religious figure heads where amongst the best fed and most cared for individuals – it was there job to convince the populace why those in power should remain in power.

This was also the job of philosophers, and no text exemplifies this better than Plato's *Republic.* In this Socratic dialogue, Plato discusses the meaning of justice and concludes that philosopher kings should rule the city-state since they are the only people who have access to the Forms. Recall that Plato's Forms transcended time and space, represented the only genuine sources of knowledge, and could only be accessed through exercising one's reason. Not coincidently, Plato also held that philosophers, or those who loved wisdom as he defined them, had superior rationality.

So he sets up *The Republic* such that those who have superior rationality are the only ones with knowledge of the Forms, claims that philosophers are the only ones with the ability to be rational, and concludes that philosophers should rule the city-state given these two premises. And when we consider that Aristotle held slaves, women, and non-Greeks as emotional and less than persons, it becomes clear that Plato invented the idea that Greek males were the only rational beings in order to justify the tremendous distribution of inequality that existed in Ancient Greece. It did not, conversely, conclude that Greek males were rational through an empirical study.

However, there *is not a matter of the fact* over whether or not humans are rational. As I have suggested, rationality was a tool that the social elite have used to justify the distribution of inequality. Before agrarian societies, humans did not think of themselves as either rational or irrational because inequalities did not exist. Hunter-gatherer societies tended to exist in non-hierarchical egalitarian societies that lacked bureaucrats, full-time leaders, and many of the social inequalities that exist today. As such, it is clear that rationality is just an idea that came with changing times.

What Reason is For

Once the philosophers, or more generally, those who were educated, developed the idea that humans are rational, an interesting thing happened: reasoning began to be "seen as a means to improve knowledge and make better decisions" (Mercier & Sperber, 2010, p.57). Pick up any philosophical text from ancient Greece to the 21st century and you will find that this idea is implicit throughout. When we say, "be reasonable," or accuse someone of being "irrational," we are conveying this general idea; better reasoning equals better decisions, increased wisdom, and a more accurate picture of the world. However, as this paper has shown, our reasoning is inherently flawed in a number of ways; we distort reality, repeatedly make poor decisions, and the forces that control our behaviors are greatly out of our control. In short, the cognitive revolution has shown that reason makes multiple, "epistemic distortions and poor decisions" (Mercier & Sperber, 2010, p.57).

This is only true, however, if reasoning is seen as tool for obtaining knowledge and improving decision-making. But what if instead of objective knowledge, reason was actually built for subjective knowledge. If this were true, would biases still be held in a negative light? The next section addresses this question. Mainly, I will suggest that if we consider how biases help us understand the world, rethink the purpose of reason as a tool for argumentation and persuasion as opposed to a means to truth and knowledge, and see that cognitive biases and heuristics are not deviations from the norms but norms themselves, then biases and heuristics actually become attributes.

Biases That Shape Our Worldview

The biases mentioned in the cognitive bias section - framing, anchoring, and the endowment effect - describe specific deviations that are reserved for specific cases. There are other biases such as the narrative fallacy, confirmation bias, and hindsight bias that describe something much more general – the forces that shape our worldview.

We have already discussed two of these; first was the narrative fallacy. Recall that the narrative fallacy describes our "limited ability to look at sequences of facts without

weaving an explanation into them, or, equivalently, forcing a logical link, and arrow of relationship, upon them" (Taleb, 2007, p.63-64). I used the nylon study as an example. Remember that the reasons the women gave were examples of *post hoc explanations,* which highlight people's tendency to find past causes to explain present happenings.

Second was confirmation bias, which is the tendency for people to favor information that conforms to their ideologies *regardless* of if the information is true or not. It explains why democrats would prefer to listen to Bill Clinton over Ronald Reagan, why proponents of gun control are not NRA members, and why individuals who are pro-choice only listen to or read sources that are also pro-choice; and why "95% of professors report that they are above average teachers, 96% of college students say that they have above average social skills…[and why] 19% of Americans say that they are in the top 10% of earners" ("David Brooks: The Social Animal"). When it comes to our skills, talents, and place in society, we usually do a good job of confirming them to be above average.

Finally, hindsight bias describes our tendency to see past events as more predictable than they were before they occurred. In other words, knowing how things turned out profoundly influences the way we perceive and remember the past. There are numerous cases of this, the best being our explanations of historical events. When we learn about World War I, for example, we like to tell a story that seems to make a lot of sense, i.e., a rise in militarism, alliances turning Europe into a powder keg, and the assassination of Archduke Franz Ferdinand. The key to hindsight bias is that things like World War I *were not* obvious at the time. If they were, they probably would not have happened.

I bring up the narrative fallacy, confirmation bias, and hindsight bias to explain biases that are much bigger than framing, anchoring, and the endowment effect. The former three tendencies describe the ways in which we form our perceptions of the world. When we weave explanations and causes into the past, only look for what confirms, and think that past events were more predictable than they actually were, we are giving structure to the world so it makes sense to us. If we did not do these things the world would seem chaotic, random, disordered and our ability to understand it would be much harder.

Let's consider two more examples, the availability and representativeness

heuristics.

The Availability and Representativeness Heuristics

The availability heuristic describes the tendency for people to rely upon readily available information rather than examining different alternatives or procedures. In the words of Kahneman and Tversky, it is the propensity for "people [to] assess the frequency of a class or the probability of an event by the ease with which instances or occurrences can be brought to mind" (2002, p.103).

For example, when people are asked to estimate the proportion of words that begin with the letters "R" or "K" versus words that have third letters that are "R" or "K," most people believe that words that begin with "R" or "K" are more common. This is because it is much easier for people to think of words that begin with "R" or "K" than words that have "R" or "K" as the third letter. In reality though, there are just as many words that begin with "R" and "K" than there are words where "R" and "K" are the third letters. In fact, there are three times as many words where "K" is the third letter than words where "K" is the first letter.

Availability also explains a lot of our everyday deliberations. For example, when we assess the risk of heart attacks for middle aged men, we usually look for cases amongst our acquaintances. Likewise, we may argue that cigarette smoking is not unhealthy because we know someone who smoked their whole life and lived until he was 100. In these cases, availability is a "useful clue for assessing frequency or probability, because instances of large classes are usually reached better and faster than instances of less frequent classes" (1982, p.11).

The representativeness heuristic describes our tendency to categorize an event or idea based on a limited pattern or sample. For example, if you met three people who are polite and cordial and worked for company X you might assume that company X is also polite and cordial. Likewise, say you met a man named Brent who majored in economics, frequently pushed energy saving programs in college, and is motivated by environmental issues. Which would you say is more likely?

- Brent is a banker
- Brent is a banker and active in recycling programs

Most people chose the second option even though the first option is statistically much more likely; there are simply more bankers in the world than there are bankers who are active in recycling programs.

Representativeness should sound familiar because it relates to the gambler's fallacy, which we discussed earlier. Recall that the gambler's fallacy describes our inclination to base our forecasts of random events off of previous experiences. For example, if there has been a long run of red on the roulette wheel people begin to believe that black is "due" when in fact the chances of it hitting black remain the same.

Relative to the rationality paradigm, heuristics are detrimental because they are *satificers* and not optimizers. But as section II illustrated, human beings lacked the cognitive capacities to maximize; we do a poor job of understanding probability, have weak and unreliable memories, and only look for what confirms to our personal dogmas. As such, a more realistic understanding of reason shows heuristics to be attributes instead of deviations or biases because they allow us to understand and make sense of the world by organizing large amounts of information quickly and efficiently. In short, heuristics like availability and representativeness are attributes because they simplify a naturally complex world.

As I mentioned in the previous section, these claims are only true if reason is seen not as a means to obtain knowledge or truth but as a tool for persuasion and argumentation. In the next section I will continue to suggest this by showing how biases are not deviations from the norm, but the norm themselves.

The Reality of Biases: Socrates' Dilemma

Unlike modern and contemporary philosophers, the Ancient Greeks were well aware of their inferential shortcomings. Pick up any Platonic text and you will find an exhaustive dialog between Socrates and his peers that attempts to establish near perfect lines of reasoning regarding epistemology, metaphysics, ethics, and the like. They knew that their reasons were never perfect, but they believed that through introspection and

discourse they one day could be. This is why the Oracle at Delphi told Socrates' that the key to wisdom and the good life is to "Know Thyself," and why Socrates' stressed that the unexamined life is not worth living. In both cases there existed a belief that a proper critique of one's reasoning would eventually produce objective truth.

Socrates' would have been fascinated and enlightened by the work of Kahneman and Tversky. Here is a list of cognitive shortcomings, he may have said, that must be overcome! His mistake however, would have been the assumption that knowledge of cognitive biases would allow him to overcome cognitive biases. Consider what Ariely explains at the end of *Predictably Irrational:*

> If I were to distill one main lesson from the research described in this book, it is that we are pawns in a game whose forces we largely fail to comprehend… These [forces] have an effect on us not because we lack knowledge, lack practice, or are weak-minded. On the contrary, they repeatedly affect experts as well as novices in systemic and predictable ways. The resulting mistakes are simply how we go about our lives, how we do business. *They are part of us* (2008, p.321, my emphasis).

This is a vitally important point. One of the main takeaways from the work done by Kahneman, Tversky, and their contemporaries is that many of our inferential hiccups are unavoidable because, as Ariely says, they are part of us. This means that knowledge of framing, anchoring, the endowment effect, confirmation bias, and the narrative fallacy does not equate to having the ability to overcome them (I am sure that Kahneman and Tversky still make the very mistakes that their research has demonstrated). Lets run a few tests to see if this is true.

Pretend that you have been diagnosed with a deadly form of cancer and the doctor comes in and presents you with the following two options. Which would you choose?

- Operation I, which has a 90% survival rate or,
- Operation II, which has a 10% fatality rate

If you learned anything from the cognitive biases section you should notice that both are statistically identical and as such it does not matter what you choose. However, even though you are now aware of this, doesn't operation I still sound much better?

Here is another example. Lets say you are walking down the meat section at the

grocery store looking for some burgers. You come across the following two options. Again, which would you choose?

- 85% lean
- 15% fat

Unless you are feeling extra generous to your intestines I suspect that option one looks more appealing. And though you *know* that the only difference between the two is that they are "framed" differently, you still *feel* like option one is better.

Ok let test out confirmation bias. Of the following two options, which sounds better to you?

1) You are a great friend, son, and uncle who has always been like
2) You are a bad friend, son, and uncle who has never been trusted

Answer one right? Again, the point is that even though you can try and assess these two options objectively the first just *feels* much better – it confirms your belief that you are a good friend.

How about the narrative fallacy:

1) World War II was caused by a rise Nazi dictatorship, problems with the Treaty of Versailles, the second Sino-Japanese War, Pearl Harbor, and the German invasion of Poland
2) World War II was caused by a series of random, chaotic, and completely unpredictable events.

Doesn't number one make so much more sense? It does, but thats the point – that is feels more accurate shows that we prefer the world to be organized. Socrates' dilemma then, is that a full knowledge of cognitive biases, if there is such a thing, may make him better with his reasons and reasoning but it certainly would not make him foolproof. Our cognitive abilities have limitations; there are some things that they just cannot overcome.

These four examples suggest two things. First, knowledge of cognitive biases does not give you immunity to cognitive biases because they are, as Ariely says, part of us. And second, *given the ubiquity of cognitive biases, and our inability to overcome them, it seems that the problem is not our cognition but the norms we are evaluating our behavior off of.* As such, the next step is to rethink the norms. When we do this we begin to see why reason is meant for argumentation and not knowledge.

Rethinking the Norms

There are as many theories of human nature as there are people. From the dawn of civilization to the present day there has been an overwhelmingly strong tendency for humans to summarize their nature in a few short words i.e., we are rational, we are savages, or we are born free. As I noted in the introduction, however, there are two problems with this. First, our brains are not big enough to understand something as complex as the human body. And second, human nature is not actually a thing *per se;* it is merely an idea. This being said, we cannot help but make assumptions about the nature of *sapiens*. So there seems to be a dichotomy; we know that we lack the cognitive power to understand ourselves, and we know that human nature is not actually a thing *per se*, but we cannot help but to try and understand ourselves and think that human beings have natures that can be understood.

As such, it is wrong to say that someone has acted irrationality because it assumes that humans are a certain way – rational. Put differently, "although the heuristics-and-biases program disagrees with rational theories on whether or not people follow some norm of rationality, it does not question the norms themselves" (Gigerenzer, 2008, p.3).

German psychologist Gerd Gigerenzer, whom I mentioned in the intuition section, has taken one step to overcome this issue. Based off of Herbert Simon's work, Gigerenzer thinks that rationality should be evaluated ecologically. This means that instead of examining the relationship between mind and logic we should examine "the relationship between mind and environment" (2008, p.7).

Under the ecological paradigm, rational behavior is not about somebody being optimal; it is about how well a behavior or decision adapts to an environment. Because of

this, the standards for rational behavior are not ideals, but are guidelines dictated by the environment of a given situation. So when we rethink the norms on these terms, "violations of logical reasoning [which] were previously interpreted as cognitive fallacies… can be seen as adaptive behavior" (Gigerenzer, 2008, p.7).

Gigerenzer is correct to say that behavior should not be evaluated relative to "content-blind norms," and to define the rationality of heuristics independent of logic and optimization "by the degree to which they are adapted to environments" (2008, p.19). But his mistake is that he still maintains the notion that rationality is something. This is implicit when he proclaims that, "we need a better understanding of human rationality" (2008, p.19). So Gigerenzer is right to rethink the norms but fails to drop the idea of norms all together. In this sense, he is still committed to the idea that humans have a nature, and that it can be understood.

The Reason we Reason

In the last few sections, I have claimed that reason should be thought off as a tool for argument and persuasion as opposed to knowledge and truth. I will now explain what this means, hoping that my comments leading up to this point have provided the proper groundwork.

When I say the reason should be thought of as a tool for argument and persuasion, I mean the following: given the empirical data that has come out of the cognitive revolution, which shows our reasoning to be heavily error prone, and given that even a knowledge of this data *does not* improve our reasoning, it appears that reasoning was not built with knowledge in mind. Instead, when we add up all the data that has come out of the cognitive revolution and made its way into the popular psychology movement it appears that we have misunderstood the function of reasoning. Since there is a glut of empirical data that has shown our reasoning to mislead our decisions and to be self-confirming, it is clear that the purpose of reason is actually argumentative.

A recent study by Hugo Mercier and Dan Sperber summarizes this exact argument. They explain the following:

> Reasoning is generally seen as a means to improve knowledge and make better decisions. Much evidence, however, shows that reasoning often leads to epistemic distortions and poor decisions. This suggests rethinking the function of reasoning. Our hypothesis is that the function of reasoning is argumentative. It is to devise and evaluate arguments intended to persuade. (2010, p.1)

Viewed with this lens, a whole lot of things begin to make sense. Take confirmation bias for example. Under the reason-for-knowledge paradigm, confirmation bias is hugely counterproductive; it "is the sort of mental mistake that seems ripe for fixing by natural selection, since it always leads to erroneous beliefs and faulty causal theories" (Lehrer, 2011). Imagine how smart we would be if we did not only look for information that confirms to what we already think is true. If we actually listened to opposing opinions and considered how they may be better than ours we would surely be a lot better off knowledge wise. In other words, if the goal of reasoning was really to improve our decisions and beliefs, then there should be no reason for confirmations biases to exist. Under the reason-for-argument paradigm, however, confirmation bias makes much more sense. It explains that we ignore so much information that contradicts our beliefs because such information would be inherently useless and counterproductive. Put differently, since reason was built for pushing personal ideologies and persuasion, then it makes perfect sense that confirmation bias exists.

The reason-for-argument paradigm also explains why we have such a hard time getting over cognitive biases, *even when we know that they exist*. Remember all the examples I provided a few sections ago? And recall how you still preferred certain options even though you were aware of the tricks that your cognition was playing on you? Under the reason-for-knowledge paradigm, the tension we feel in those scenarios does not make any sense. If reason was built for knowledge, then grocers would not have to worry about how to label their meat products because people would *know* that 85% lean and 15% fat are the same thing. Likewise, for the anchoring and the endowment effect, each of these biases influences us to ignore a great deal of information. However, under the reason-for-argument paradigm it makes sense why these biases exist; they give us a sense of correctness and paint a picture of reality that makes sense to us. Without having a bias it would be much more difficult for people to choose – this was the problem

with Damasio's patient Elliot, because he did not have sentimental biases he couldn't decide.

The same can be said for the availability and representativeness heuristics. Again, under the reason-for-knowledge paradigm these heuristics are incredibly counterproductive. Instead of assessing large amounts of information and thoroughly analyzing the facts, they influence us to do just the opposite - overvalue small non-indicative data points. On the other hand, they are great examples of why the reason-for-argument makes more sense. Think about the "R" and "K" and "Brent the banker" examples. In these cases the heuristics gave people quick bits of information that could be readily used to argue a given point.

Mercier and Sperber's theory highlights the main problem with our understanding of reason – that it has to do with rationality. As I argued in the previous section, the idea the humans are rational is *not* a matter of fact; it comes from the need to justify the distribution of inequality. I want to expand on this idea with a few more thoughts on the relationship between reason and rationality in the conclusion.

Section IV: Conclusion

Perspective

It is easy to look at the technology that surrounds us and conclude that human beings are rational. But it is even easier to forget that the genes of hunter-gatherers "were, for all practical purposes, the same as ours… [and that] between 90 and 99 percent of [human history]… has taken place within hunter-gatherer societies" (Haybron, 2010, p.243). Skoyles and Sagan sum this up with the following:

> Your genes, which happen to take the form of a 21st century citizen, could just as easily have belonged to one of those first hunter-gatherers. Take a time machine with 100,000 BC on the dial and transport a modern baby into the hands of one of the first human hunter-gatherer mothers, and she would raise it to be like any other hunter-gatherer. By the same token, adopt one of their infants into a modern family, and he or she would grow up like any other present-day kid… our genes prepare us equally well for both modern and ancient life. (2002, p.23)

I brought up this point earlier, along with the contrasting opinion of Gregory Cochran and Henry Harpending, who argue that; “human evolution has accelerated in the past 10,000 years, rather than slowing or stopping, and is now happening about 100 times faster than its long-term average over 6 million years of our existence” (2009, p.1).

In either case, however, human beings are not rational creatures. This is not because genetics have evolution in one way or another; it is because rationality is an idea. And like any idea, it can be bent, stretched, and redefined over and over again. Evolution gave us such a large prefrontal cortex that we are able to think about abstract conceptions like rationality, but it did not give us rationality *per se*. At the end of the day, Skoyles, Sagan, Cochran, and Harpending would all agree than human beings are animals who can reason but not rational animals.

Logic & Light Beer

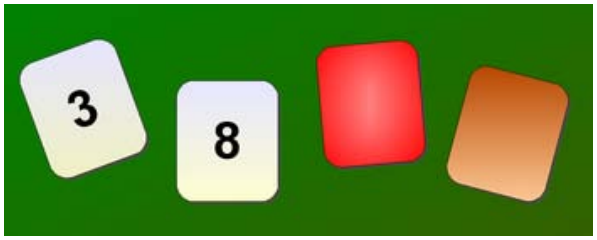
Consider this: A few years ago Yale psychologist Laurie Santos trained a group of capuchin monkeys so she could compare their economic behavior with the economic behavior of humans. To do this, Santos and her team give them silver tokens that could be exchanged for grapes so that they could understand the concept of money.

For the most part the monkeys acted like humans do; they used their tokens to get the most grapes, the best grapes, and they only “did business” with the most reliable researchers. In other words, they acted rationality. As Santos explains, “when we collaborated with economists… [the monkey’s data] matched not just qualitatively, but quantitatively with what we [see] humans doing in the real market so much so that if you saw the monkey’s numbers you couldn’t tell whether they came from a monkey or a human in the same market” (Santos: A Monkey Economy).

Next, Santos put the monkeys through several Kahneman and Tversky like scenarios to see if they showed the same biases that humans do. She found that like humans, monkeys make the same irrational behaviors in almost the exact same scenarios. Santos concluded that the biases of monkeys and humans “are due to the very nature of our evolutionary history” (Santos: A Monkey Economy). This suggests that the more primitive parts of the brain constitute our economic decisions whereas the newest parts of

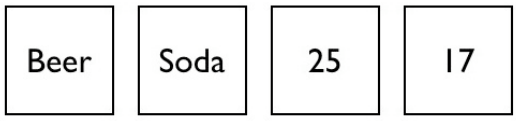
our brains - the prefrontal cortex - constitute the capacities that distinguish us from monkeys; i.e., language, abstract thought, and critical reasoning. And, as Lehrer and Taleb have pointed out, relative to our entire evolutionary history, these abilities are like a first generation piece of technology; it is full of bugs, underdeveloped, but nonetheless incredibly useful.

This is why logic is not a strength of ours – it is performed in the newest part of the brain. Consider the following logic problem, which was first devised by Peter Wason in 1966. Imagine that you are presented with the following four cards, each of which has a number on one side and a color on the other side. The question is this: which cards should be turned over to test the proposition that if a card shows an even number on one face then its opposite face is red?



If you are like 90% of people, you will choose the three card and the red card. However, the correct answer is the eight card and the brown card. The mistake that most people make is thinking that turning the three card or the red card over will invalidate the rule. However, the truth of the proposition can only be verified if the brown card is turned over to show an even number or the eight card is turned over to show red.

Lets run the same test but this time with a twist. Image that you are a bartender and your boss strictly prohibits underage drinking. If you even get caught serving a minor he will certainly fire you. Now imagine that the cards below have information about four people sitting at your bar and that each card represents a person. One side of the card represents their age and one side represents what they are drinking. The question is: what cards do you need to turn over to see if anyone is breaking the law?



This should come much easier. The answer of course is the cards with beer and 17 on them. But what is remarkable is that these two problems are logically identical. Why is it that people have such an easier time with the second one?

Leda Cosmides and John Tooby – the experimenters who developed the second task back in 1992 – have indicted that the problem is easier because it is presented in a context of social relations. This suggests that as opposed to Mr. Spock and what Socrates' aspired to be, we are social animals with brains evolved to form social bonds. Put differently, our brains evolved to persuade, argue, reason, and to do but not to know, to optimize, to do logic, or to be rational. The latter came as a byproduct. And the mistake we are making, which I have attempted to outline, is in thinking that knowledge, optimization, logic, and rationality are primary.

Final Remarks

Leda Cosmides and John Tooby conclude their paper with the following remark: "The result of the experiment… undermines the proposition that the evolved architecture of the human mind contains a single 'reasoning faculty' that is function-general and content-free…[and] supports the contrary contention that human reasoning is governed by a diverse collection of evolved mechanism" (1992, p.220-221). Their sentiment reflects an important point that I have been advocating throughout this paper: the human brain is so complex that is it would be delusional to summarize ourselves as rational. At the same time it makes sense that we do this; compared to our automatic, intuitive, unconscious systems our conscious reasoning is so underpowered and ignorant that we cannot help but to describe ourselves so simplistically.

Finally, there are four points that I want the reader to walk away with. First, the rationality paradigm is wrong on multiple counts: we are prone to cognitive biases,

constituted by emotions, intuitive beings, do a poor job of assessing our well being, and are mistake prone. Second, in place of the rationality paradigm the unconscious paradigm, which is illustrated by the popular psychology movement, is describing a much more accurate picture of human behavior. Third, rationality is an idea that was created to justify the distribution of inequality. And fourth, evaluating behavior as irrational makes the same mistake as evaluating behavior as rational because rationality is retained as the norm in both cases. Additionally, implicit in any evaluation of behavior is the assumption that human beings have a nature or norm, and that their behavior is deviating from this nature or norm. However, as I have stressed, our brains are not big enough to understand human behavior and our tendency to summarize it so simplistically is a reflection of this. If we truly were rational we would realize how irrational we were. But we would also realize that describing ourselves as rational or irrational misunderstands human behavior and its complexities.

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