

## **The Global Financial Crisis—caused by Greed, Moral Meltdown and Public Policy Disasters**

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### **The Millennium's First Global Financial Crisis**

Financial markets around the world experienced profound losses beginning in 2007 and continuing through early 2009 as a result of the Worldwide credit crisis. The crisis was caused by the collapse of the markets for what were termed Collateralized Debt Obligations ('CDO's'). These CDO's were bonds backed by mortgages on houses in the U.S. but the bonds were bought not only by U.S. banks but also by many municipalities and by European banks. The attractiveness of these bonds was that they paid higher interest rates than U.S. Treasuries or Corporate Bonds. When the CDO markets collapsed - due to massive defaults on the underlying mortgages -the CDO's became worthless and the banks holding large numbers of them became insolvent. In order to avoid the collapse of the entire U.S. financial system, the U.S. Government has already given \$350 Billion in federal bailout money to over 200 banks and financial institutions and governments similarly rescued many other banks in Europe.

World stock markets reflected the crisis. Beginning in the summer of 2007 and continuing all throughout the year 2008, the US S&P 500 Index sank 37.1%. It was the index's second-worst loss since its founding in 1923 and its worst since a decline of 43.1% during the Great Depression. The Dow Jones Industrial Average also had its third-worst loss in its 113-year history. The global pain was even sharper - the MSCI All Country World Index excluding USA dropped 47.0%. About \$7 trillion of shareholders' wealth on the U.S. stock markets—the gains of the last six years—was wiped out in a year of violent market downswings.

All of these factors contributed to the worst U.S. recession since the Great Depression. The U.S. unemployment rate rose from 4.9% in 2007 to over 9% by mid 2009, representing over 6 million lost jobs. The current recession began in December, 2007, and is expected to continue to the end of 2009, with low employment levels expected to continue into 2011.

Journalists and academics will analyze the causes of the New Millennium's first global financial crisis for years to come and one of the most-discussed topics will be the alleged 'irrational behavior of sophisticated investors' (Zweig 2007). We hypothesize that this 'irrational behavior' occurred because the originators of the Collateralized Debt Obligations ('CDO's')—investment banks, commercial banks and mortgage companies acted with complete disregard to the risks attached to these investment vehicles. Further, they falsely marketed these bonds to their customers by promoting them as 'risk-free' investments. Similarly, the purchasers of the CDO's—banks, investment funds, municipalities and individuals also acted with disregard to the risks attached to these bonds.

The answer to how this happened cannot be found in economics or business textbooks. It was the result of greed, overconfidence and the willingness to ignore risks. *The Economist* agrees with this conclusion:

“It should be obvious by now that in banking and finance the twin evils of excessive risk and excessive reward can poison capitalism and ravage the economy. Yet the price of saving finance has been to create a system that is more vulnerable and more dangerous than ever before.

“In an ideal world any government would vow that, next time, it will let the devil take the hindmost. But promises to leave finance to fail tomorrow are undermined by today’s vast rescue. Because the market has seen the state step in when the worst happens, it will again let financiers take on too much risk. Because taxpayers will by subsidizing banks’ funding costs, they will also be subsidizing the dividends of their shareholders and the bonuses of their staff.” (*Economist* 16May09).

We contend that a neuroeconomic analysis of the reward and loss systems of human investors will give us deep insight into the decision failings of the human investors in this crisis.

### **The Human Brain and Risk**

To better understand how the investors involved in the global financial meltdown made such disastrous decisions, we will need to understand in depth the decision-making processes of the human brain. Since the time of Aristotle in ancient Greece, scientists and philosophers have loosely hypothesized the existence of two major brain systems that are fundamental to almost all human behavior—the ‘reward/approach’ system (pleasure seeking) and the ‘loss/avoid’ system (pain-avoidance) (Peterson 2005). Please see figure 1

(Figure 1 General View of Brain identifying Limbic System, PFC, OFC & ACC)

## A Society of Minds

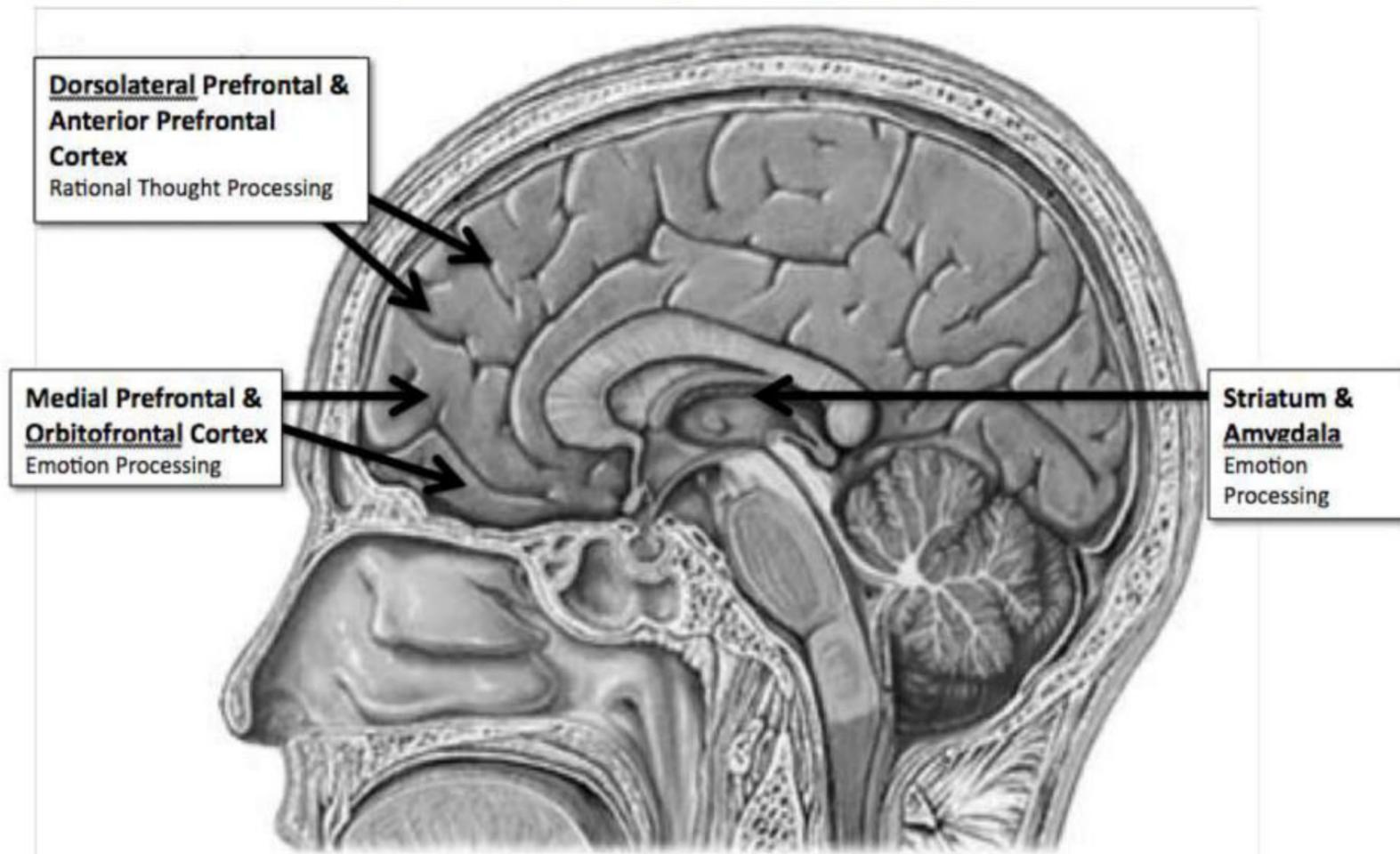


Fig. 4 Areas of the human brain critically associated with decision making. We have delineated above the areas associated with higher level cognitive processing and those associated with emotional processing.

The human midbrain—the location of the mammalian reward and loss systems—is quite similar to that of reptiles and is the heart of the ‘limbic system’, the seat of animal instincts and human habits and emotions. The area that differentiates us most from other primates is a larger Prefrontal Cortex (‘PFC’). The prefrontal cortex estimates the probability of future rewards, aids in planning for the future, is good at following rules, directs our focus and attention, does the executive decision-making and is the seat of self control and conscience. Parts of the PFC are further specialized. The Orbitofrontal Cortex (‘OFC’) integrates reason and emotion and the Anterior Cingulate Cortex (‘ACC’) resolves conflicts between two alternative courses of action and prioritizes emotional information as either relevant or unimportant (O’Doherty et al. 2001). All of these areas are involved in financial decision-making (Peterson 2007).

### “Greed is good”...Gordon Gekko in “Wall Street”

“Greed and fear, greed and fear, greed and fear”. This is the mantra that appears overwhelmingly in descriptions and news accounts of investors’ erratic actions in the first financial crisis of the New Millennium. In support of this assertion, *The Economist* titled its special report on the future of finance, “Greed—and Fear”. In this report, *The Economist* points out that modern

finance is supposed to be all about measuring risks using sophisticated computer programs. However, the massive purchases of mortgage-backed securities ('CDO's') were "just a leap in the dark". (*Economist* 24Jan09).

Despite the warnings in the Bible, Koran, and other timeless sources, the human tendency to be greedy continues, especially in the financial world. However, Paul Krugman, the Princeton Nobel Laureate economist, opines, "Greed is bad...a system that lavishly rewards executives for success tempts those executives, who control much of the information available to outsiders, to fabricate the appearance of success—aggressive accounting, fictitious transactions that inflate sales, whatever it takes" (Krugman 4Jun02).

In investing, greed results in overtrading and inadequate due diligence, and unfortunately, it partners with overconfidence. Conversely, fear leads to risk aversion and inactivity. These emotions and actions lead to significantly underperforming returns. Lo and Steenbarger studied stock market day traders over five weeks (Lo 2005). These researchers monitored their emotional levels via psychosomatic instruments and then correlated emotional arousal with profitability.

"Our results are consistent with the current neuroscientific evidence that automatic emotional responses such as greed and fear (for example, responses mediated by the amygdala) often trump more controlled or 'higher level' responses (for example, responses mediated by the pre-frontal cortex. To the extent that emotional reactions 'short-circuit' more complex decision-making faculties (for example, those involved in the active management of securities) it should come as no surprise that the result is poorer performance" (Lo and Steenbarger 2005 p. 358).

Camerer et al. posit that this emotional, intuitive, decision-making is our 'default mode' and that our controlled processes only activate in an 'interrupt' or 'override' mode, due to an encounter with unexpected events, strong visceral sensations or novel problems (Camerer et al. 2005).

### **Risk and Reward**

There is significant research supporting the view that when making decisions, people emotionally value losses as much as twice as much as they value an equivalent gain when compared to the status quo (Tversky and Kahneman 1992). For example, people typically reject a 50/50 chance of losing money they already have unless the chance of gain is about twice as much as they might lose. In this classic example of 'Prospect Theory', Amos Tversky and Nobel Laureate Daniel Kahneman explain humans' tendency toward risk aversion.

Investment decisions such as buying stocks, bonds or opaque financial derivatives involve evaluating the expected reward versus the risk of possible expected loss. In the financial sector, professionals frequently employ the language of 'balancing reward vs. risk' in their activities. These financial parameters of reward and risk generate the positive and negative emotions, respectively, in humans of greed and fear. It is important to note that Wall Street wisdom states that "Fear always trumps greed". That is, when there is negative news or significant uncertainty in the markets, the stock indexes decline. This is another confirmation of

‘Prospect Theory’, showing that humans feel a loss significantly more than an equivalent financial gain (Tversky and Kahneman 1992).

The assessment and comparison of expected reward and expected risk is the essential survival task of organisms. The brains of all living creatures contain a reward seeking system and loss avoidance system to perform this survival task and it is this intuitive system that is most often used by investors. We can present the consilience of the various disciplines’ studies of these two systems in the chart below.

<b>Field of Study</b>	<b>Positive Valence</b>	<b>Negative Valence</b>
Financial Field	Reward	Risk
Psychological Science	Greed	Fear
Neuroscience	Reward Seeking System	Loss Aversion System

### **Homeostasis of Body and Brain Systems**

To help us see how these systems work, it is critical to understand that the Reward/Loss System is a homeostatic system. It always seeks to be in balance. Our bodies contain many homeostatic systems. Some can be lethal if out of balance, such as oxygen levels in the blood, blood sugar levels or internal body temperature. When these systems are out of balance or out of ‘homeostasis’, there are internal cascading hormonal and chemical signals that cause physical changes to return the particular bodily system to homeostasis (for example, a rapid heart-beat and fast breathing). The human reward/loss system does have a similar homeostasis. It is in balance and endeavors to return to homeostasis when disturbed. The body’s reward/loss system has a non-lethal homeostasis that is akin to the ‘fight or flight’ fear system. The flight or fight system elevates under stress but returns to balance when the danger has passed. However, under chronic stress, an imbalanced fight or flight human system can become lethal (McEwen 2002; Ming et al. 2004).

Paulus supports this description of the entire decision-making system of individuals is a homeostatic system, and he receives widespread agreement on this model from the scientific community (Paulus 2007; Shermer 2008; Camerer et al. 2005; Oswald 1997; Schultz 2000).

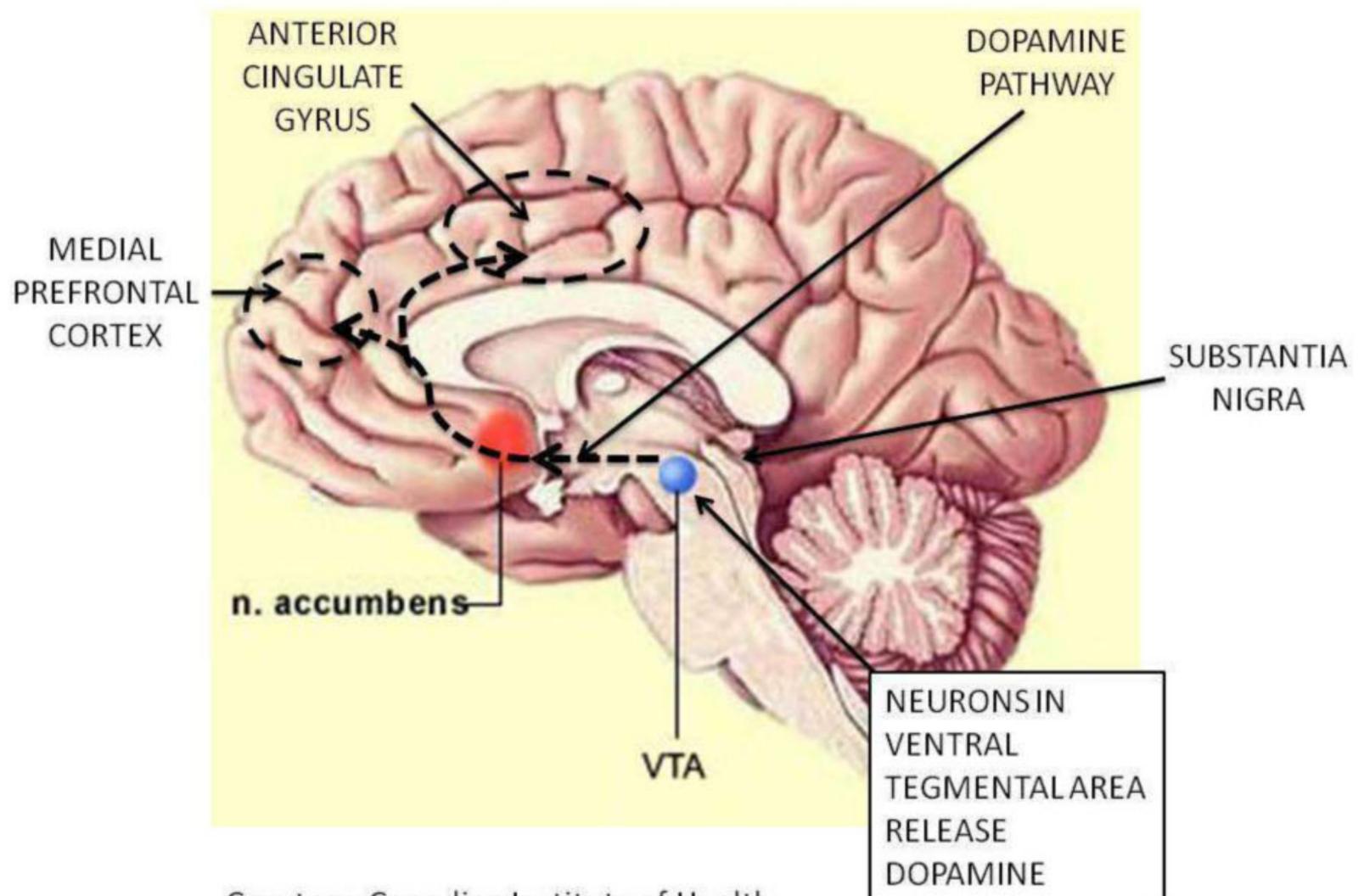
According to Paulus:

Homeostasis can be defined as a dynamic physiological, cognitive and affective state that integrates multiple bottom-up sensory afferents and top-down cognitive and affective control processes, resulting in dynamic stability (i.e., resistance to

internal and external perturbations). Decisions maintain or bring individuals into a new homeostatic state. (Paulus 2007, p. 602).

Studies of the reward/loss system in mammals and primates (including humans) show the simultaneous activation of both the expected reward and expected loss neural networks until a threshold is exceeded and the individual chooses the approach or avoidance action (Daw et al. 2006; DeMartino et al. 2006; Koob & Moal 1997; O'Dougherty et al. 2004; Rietveld 2008). This characterization of decision-making as a homeostatic system also receives support from studies showing that individuals with generalized anxiety disorder exhibit intolerance of risk – their loss avoidance system is over-active. Contrariwise, fMRI investigations show that subjects 'at risk' for substance abuse have higher levels of activation in the Nucleus Accumbens ('NAcc') and exhibit high risk-taking and impulsivity (Paulus 2007). The NAcc is an important part of the brain's expected reward system and is excited by the neurotransmitter dopamine when the brain sees an expected reward. It is what causes us to 'want' something. Further, it is located in the deep midbrain which is an emotionally primitive part of the brain we share with reptiles and mammals. Please see Figure 2.

Figure 2  
THE BRAIN'S REWARD SYSTEM



Courtesy: Canadian Institute of Health

In further support of the reward/risk system's homeostasis, Kuhnan and Knutson state that their results indicate that above and beyond contributing to rational choice, anticipatory

neural activation can also promote irrational choice. “Thus, financial decision-making may require a delicate balance – recruitment of distinct circuits may be necessary for taking or avoiding risks, but the excessive activation of one mechanism or the other may lead to mistakes” (Kuhnan and Knutson 2005 p. 767).

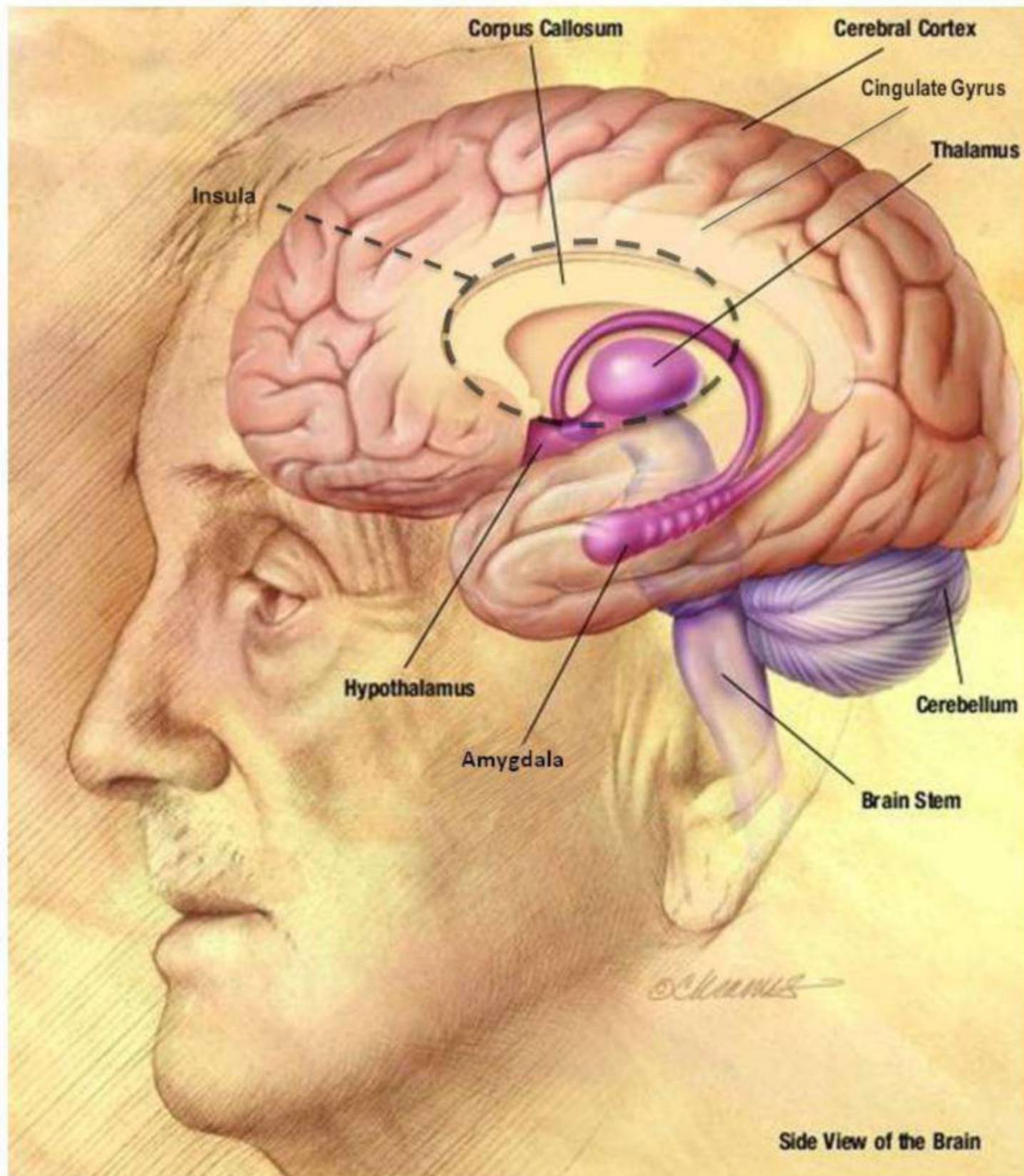
Camerer, Lowenstein and Prelec also characterize the reward/loss system as a homeostatic system. “The actions taken by humans (‘revealed preference’ in standard economic theory) are only part of a complex system of internal and external cues, affects, feelings, unconscious motivations and actions” (Camerer et al. 2005). When the body or the brain moves off a ‘set-point’, the internal systems make us feel a ‘wanting’ and then pleasure when the bodily system again achieves homeostasis. Pleasure is only a ‘homeostatic cue’ or ‘informational signal’ that we are moving in the right direction to achieving the dual goals listed above.

An important homeostatic feature of the reward/loss system, according to Camerer et al., is its sensitivity not to the *absolute levels* of homeostasis but to *changes* from those levels. That is, a constant reinforcement reward of juice to a monkey for a specific action causes a ‘strike’ when the juice is removed. Similarly, humans feel acutely a *change in the level* of investment returns, income or wealth in relation to their ‘set-point’, whether that set point is \$60,000 per year or \$600,000 per year (Camerer et al., 2005). Another way to frame this is that *violations of expectations trigger extremely powerful emotional responses*. Then, depending on the genetic make-up of the individual, these emotional responses can be profound feelings of loss or depression following monetary losses or can result in a mal-adaptive alternative action - excessive risk-taking to recover those losses.

The anterior insula is tasked with evaluating expected risk and in loss aversion, Peterson reports that patients who had lesions to their insula took monumentally higher risks than control subjects (Peterson 2007). These lab experiments involved betting on a coin toss. The subject was given \$20 and could bet \$1 on each toss. If the subject did not bet, he did not lose anything. If the subject bet, he either lost \$1 for betting wrong or gained \$2.50 for betting correctly. According to probability theory, the expected gain for each ‘investment’ of \$1 on a toss was \$1.25 vs. keeping the \$1 for each ‘pass’. Therefore, a purely rational investor should always bet on each toss, as the simple laws of probability ensure that he will come out ahead.

However, the control subjects only invested in 57.6% of the total rounds and, after a loss in a round, only 40.7 % bet on the subsequent round, showing their loss aversion. On the other hand, the patients with insula damage bet on 91.3% of all rounds and 96.8% of the rounds following a loss. Bechara et al. and Chang report similar behavior in their lab experiments (Bechara et al. 1994; Chang 2005).

Figure 3  
THE BRAIN'S LOSS AVOIDANCE SYSTEM



Courtesy: National Institute on Aging

Our main hypothesis concerning the world financial crisis is that from the viewpoint of neuroeconomics the homeostasis of the reward/loss systems of the individuals involved was thrown out of balance. In the recent financial meltdown, all *perception* of risk was removed and

therefore untrammelled greed took control of the system with no consideration of the concomitant risk. This greed brought on what was, in effect, a ‘moral meltdown’. The homeostatic balance of the brain’s reward/loss system was not brought into play. The originators of the Collateralized Debt Obligations perceived no risk because they passed the risk of mortgage defaults onto the purchasers of the CDO’s. The purchasers of the CDO’s perceived no risk because the CDO’s were given a superior credit rating by the bond credit rating agencies (Moody’s and Standard & Poor’s) and were insured by Credit Default Insurance from AIG Insurance Company. When there is all reward and no risk in a decision, the brain’s reward system becomes overactive. As a result of its bets on the CDO’s, AIG became insolvent and was effectively nationalized by the U.S. government.

Other studies show an even further division of the brain’s functions in economic decisions. The nucleus accumbens (‘NAcc’), the expected reward center of the brain, strongly activates in response to the relative size of a potential monetary reward (Lerner and Lowenstein 2004; Kuhnen and Knutsen 2005; Peterson 2005). However, the probability of actually receiving that that reward—which is a more rational calculation—is evaluated or ‘encoded’ by the Medial Prefrontal Cortex (‘MPFC’) (McClure et al. 2004). The MPFC is located at the front of the brain behind the forehead and is the main locus of the executive function of the brain, that is, the decision to take or not take an action. We discuss the functionality of the MPFC in detail later in this chapter. Furthermore, the dopamine release in the NAcc is scaled to the size of the monetary reward—the larger the reward, the greater the NAcc activation—but the MPFC activation or excitation does not change unless the probability of actually receiving the receiving the reward changes. This is the reason why when a lottery jackpot reaches a huge amount, say \$10,000,000, there is a rush to buy tickets, even though the actual chance of winning is reduced by each additional ticket purchased. By way of illustration, if tickets are \$1 each and 50% of the money taken in goes to the jackpot and 50% to the lottery organization, the probability of winning if the jackpot is \$1,000,000 is 1 out of 2,000,000. However, the probability of winning if the jackpot is \$10,000,000 is 1 out of 20,000,000.

As a further refinement of their experimental work on financial risk-taking (often termed ‘behavioral finance’) Kuhnen and Knutson have shown the separate and coordinated activation of both the nucleus accumbens (‘NAcc’) and the anterior insula (‘insula’) in decisions involving both risk and reward. These brain regions respectively elicit the emotions of ‘greed & fear’ (Kuhnen and Knutson 2005). The financial risk experiments involved rounds of choosing a bond, a riskless but lower return, versus a stock—a risky but higher return, while the subjects were being scanned using an fMRI imaging machine. The results show that NAcc activated more prior to the choice of the risky investment while the insula activated more prior to the riskless—or ‘loss aversive’—investment. As further confirmation of function, excessive activation in the NAcc preceded an investment error of taking on too much risk, while excessive activation in the insula preceded an investment error of taking on too little risk. These last two actions taken were suboptimal from the standpoint of a rational investor. That is, since the subjects were provided with both the returns of the investments and their probabilities, a simple calculated probability analysis would have indicated the correct choice.

Fear is the emotion that balances greed in the normal investor's brain. The loss aversion system, as we said above, involves the amygdala, which encodes fear and records long-term fearful memories, the hippocampus, which is the memory processing center of the brain and the anterior insula, which processes expectation of losses (See Figure 3). This loss-avoidance system is in homeostatic balance with the brain's reward system and together, the relative balance of the two results in approach/avoid, invest/not invest or fight/flight behavior. For Wall Street investors, as the stock market climbs to new highs, the adage is that the market 'climbs a wall of worry' (Peterson 2007). That is, the higher the market goes, the more fearful Wall Street traders are that it will soon crash. This is a good example of how the two systems always work in tandem.

There is an important consequence of the bifurcation of the brain systems of reward and loss. Research in the current decade has shown that because expected reward and expected loss are processed in totally different areas of the brain, that humans react to them in qualitatively different ways (O'Doherty et al. 2001; O'Dougherty et al. 2004; Xue et al. 2008; Taylor et al. 2006; Kuhnen and Knutson 2005).

In a further refinement of our understanding of the brain's reward/loss system, Xue et al. contend that whereas the NAcc is sensitive to both risk and reward, the MPFC differentiates strongly between risk and reward by processing them in different brain areas. This means that both ventral and dorsal MPFC signals are predictive of risk-taking behavior. A strong reward signal in the ventral MPFC likely leads to risk-taking behavior, whereas a strong signal in the dorsal MPFC acts as a warning signal in more risk-averse individuals. This study further shows that these sensitivities are independent of one another (Xue et al. 2008).

These results suggest that the two competing forces that contend with each other in making decisions under uncertainty and risk—greed for the gain and fear of the loss—have strong neural correlates in the MPFC. It appears that these two regions of the MPFC determine whether the risk will be taken or avoided. As we stated above, scientific evidence shows that there is a balance or homeostasis in this reward/loss system. On the other hand, imbalances in these forces, and the accompanying unbalanced MPFC signals, will lead to excessive reward seeking—including thrill seeking, gambling or addiction—or excessive risk aversion, the risk aversion of bankers or *in extremis* anxiety disorders and phobias.

### **Public Policy Disasters and the Global Financial Crisis**

George W. Bush, at the encouragement of the then-Chairman of the Federal Reserve Bank, Alan Greenspan, presided over a period of extensive deregulation of markets. None of the deregulations was so disastrous, however, as the deregulation and/or *laissez-faire* treatment of the U.S. Financial Markets by the Securities and Exchange Commission ('SEC') and by The Federal Reserve Bank ('The Fed') under the Chairmanship of Alan Greenspan.

On April 28, 2004, the five members of the Securities and Exchange Commission met to consider an urgent appeal by the big independent investment banks. The discussions in this unpublicized meeting and the results of the SEC vote were recently reported in an article in *The New York Times* (Labaton 2008). The big Wall Street investment banks wanted an exemption for their stock brokerage units. They wanted the SEC to remove all regulations on their brokerage

units that limited the amount of debt they could take on. If approved, this would free billions of dollars of reserves that were required to be held in escrow by their brokerage units for possible investment losses. The five largest investment banks led the request, including Goldman Sachs, led by Henry Paulson, who later became Secretary of the Treasury.

The yes vote was unanimous, although SEC Commissioner Goldschmid stated, “We’ve said these are the big guys, but that means if anything goes wrong, its going to be an awfully big mess.” Subsequently, Bear Stearns accelerated their borrowing and raised its debt to equity ratio from 25 to 1 to 33 to 1. All the other investment banks also borrowed heavily. Their major motivation for lobbying for the 2004 decision was so that they could plunge into the extremely lucrative field of packaging and selling Collateralized Debt Obligations secured by bundles of home mortgages. Of course, as we said above, it was these CDO’s that bankrupted the firms when this market collapsed.

Another fateful decision at the SEC meeting was to allow these banks to police themselves as to the level risk each was taking on. The Commission essentially outsourced its regulatory duties by allowing these investment banks to rely on their own computer models for risk management. Further, in the podcasts of the meeting that are available on *The New York Times* website, the Commission assigned seven employees to monitor the banks, whose combined assets were \$4 trillion. Despite optimistic staff assurances in the meeting, the inspections were few and the reports ignored.

The regulatory failures at the SEC were further exacerbated by Bush’s appointment of Christopher Cox as its Chairman. Cox was a very conservative member of the U.S. House of Representatives and at the SEC he pursued a laissez-faire agenda. He dismantled a risk management office created by his predecessor and significantly reduced the role of the SEC in regulating markets.

At the end of September, 2008, after all the big investment banks either went bankrupt or were rescued by capital injections from U.S. Taxpayer money and were merged or reconstituted as regulated commercial banks, the 2004 decision was revoked by the SEC. On that day, Christopher Cox admitted, “The last six months have made it abundantly clear that voluntary regulation does not work” (Labaton 2008).

### **Adam Smith, Milton Friedman and Deregulated Markets**

As we stated above, the financial markets in the United States underwent significant deregulation during this past decade under the Bush administration. This was primarily due to the ideological commitment of George W. Bush and his political appointees, especially Alan Greenspan at the Federal Reserve and John Snow and thereafter Henry Paulson at Treasury. Their ideological position was a firm belief in the ability of free markets to self-regulate, and Alan Greenspan was the champion of this idea.

The ultimate economic basis for this belief is Adam Smith’s *Wealth of Nations*, which is the classical model that has dominated economic policy thinking (Smith 1776). Adam Smith is famous for his ‘invisible hand’ assertion—that rational economic actors, each pursuing his own economic interest, actually advances the interests of society as a whole.

...And by directing that industry in such a manner as its produce may be of the greatest value, he intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention. Nor is it always the worse for the society that it was no part of. By pursuing his own interest, he frequently promotes that of the society more effectually than when he really intends to promote it. I have never known much good done by those who affected to trade for the public good. (Smith 1776, p. 572).

Both liberal and conservative thinkers have used Adam Smith's invisible hand to support their arguments, more often than not taken out of context and selectively quoted. In actual fact, in both the *Wealth of Nations* and in *The Theory of Moral Sentiments*, Smith asserted that commerce must be performed only in a society that is balanced by justice and morality.

No society can be flourishing and happy, of which the far greater part of the members are poor and miserable. It is but equity, besides, that they who feed, clothe and lodge the whole body of the people, should have such a share of the produce as to be themselves tolerably well fed, clothed and lodged. (Smith 1776, p. 110-111).

Smith goes even further in *The Theory of Moral Sentiments*, maintaining that Universal Benevolence is the highest of virtues and that this virtue normally comes naturally to mankind.

“Though our effectual good offices can very seldom be extended to any wider society than that of our own country, our good will is circumscribed by no boundary, but may embrace the immensity of the universe. We cannot form the idea of any innocent and sensible being whose happiness we should not desire, or to whose misery, when distinctly brought home to the imagination, we should not have some degree of aversion...The wise and virtuous man is at all times willing that his own private interest should be sacrificed to the public interest of his own particular order or society” (Smith 1759, p. 345-346).

Neuroeconomists take special interest in the fact that Adam Smith is much more important as an advocate of competitive equilibrium in society and the father of behavioral economics rather than as the creator of the phrase ‘the invisible hand’.

Alan Krueger, in his introduction to a 2003 re-printing of *The Wealth of Nations*, points out that Smith warned against non-competitive market power and also advocated the intervention of government to achieve a fair and competitive society when markets failed to do so (Smith 1776, p. xxiii). As to his behavioral economics, Krueger shows that Smith saw the nature of people's actions as generally rational, although they were sometimes seduced by their ‘romantic hopes’ to ignore the risks and dangers inherent in their decisions.

Milton Friedman, the Nobel Laureate economist, set forth what he perceived as Adam Smith's free-market views in a seminal article in the *New York Times Magazine* entitled, “The Social Responsibility of Business is to Increase Its Profits”. Friedman stated that the current crop of businessmen who claim that businesses should have a social conscience—that they have a responsibility for providing employment, eliminating discrimination, avoiding pollution, etc. – are “preaching pure and unadulterated socialism....Businessmen who talk this way are unwitting

puppets of the intellectual forces that have been undermining the basis of a free society for decades” (Friedman 1970).

Thus, Friedman argues that the doctrine of ‘social responsibility’ accepts the view of socialist economics that political institutions and not market mechanisms are the optimal way to solve the fundamental economic problem—the allocation of scarce resources among unlimited wants. He further worried that this doctrine would extend the scope of the political mechanism to every human activity and therefore it is a ‘fundamentally subversive doctrine’ in a free society.

However, as with Adam Smith, Friedman has been quoted both out of context and selectively to advance a libertarian conservative agenda. Most importantly, Milton Friedman’s actual oft-quoted words are that in a free society, “There is one and only one social responsibility of business – to use its resources and to engage in activities to increase its profits *so long as it stays within the rules of the game, which is to say, engages in open and free competition without deception or fraud*” [emphasis added]. This means, according to this Nobel Laureate, to maximize profits, *subject to free and voluntary competitive markets and the ethical and moral constraints of society*. This is precisely the doctrine of Adam Smith. It is therefore hard to conceive of an economist or businessperson who could disagree with this doctrine in its correct contextual moral framework. Yet, Friedman’s doctrines and those of Adam Smith have been utilized as an ideological cloak to justify all manner of deregulation of markets and monopolistic practices.

Friedman took on the role of preacher of libertarianism in his book, *Capitalism and Freedom*, which promoted large reductions of the role of big government (Friedman 1962). He also promoted his free market ideas as an economic advisor to the presidential campaign of Republican Senator Barry Goldwater who was soundly beaten by Lyndon Johnson in 1964. Goldwater’s economic platform included deregulation of the energy, telephone and airline industries and the dismantling of the Social Security System and the national parks (Goodman 2008).

In a 1976 essay, Milton Friedman declared that “the Great Depression was caused by government mismanagement” and thereafter Friedman became the father of the credo that prosperity springs from markets left free of government interference. Five years later, Ronald Reagan became the U.S. President, the Republicans gained control of Congress and Friedman’s free-market, laissez faire philosophy became the dogma of the U.S. Government (Goodman 2008).

Both Milton Friedman’s and Ronald Reagan’s libertarianism had the underlying assumption that economic freedom and political freedom were identical (Friedman 1979). This thinking was both a product of and an inspiration for the Cold War ideological battle that America was waging with Russia. Of course, when the U.S.S.R. fell during Reagan’s administration, free market libertarians felt vindicated in their views of the triumph of capitalism over socialism and of freedom over authoritarianism.

Another disciple of Milton Friedman’s was Alan Greenspan. (Greenspan was also an avid disciple of Ayn Rand, the proponent of the philosophy of selfish individualism.) As Chairman of the Federal Reserve for eighteen years, Greenspan lobbied for increased deregulation in financial

markets and espoused the belief that free markets would self-regulate. With the advent of the global financial crisis that began in late 2007 and will likely continue through the end of 2009 and perhaps beyond, most economists and serious thinkers have concluded that the Friedman and Greenspan doctrine is now proven wrong. As a matter of fact, Alan Greenspan himself testified at the end of October, 2008, before a Congressional Committee investigating the financial crisis. He admitted that there was a ‘flaw’ in his economic philosophy. He went on to say that the worldwide financial crisis had left him “in a state of shocked disbelief... I made a mistake”, he said, in assuming “that the self-interest of organizations, specifically banks” would keep them from taking on excessive risk (*The Week* 7Nov08).

On October 24, 2005, President Bush nominated Ben Bernanke, a protégé of Greenspan’s, to be the fourteenth Chairman of the Fed. In his acceptance speech, Bernanke pledged that his first priority would be to “maintain continuity with the policies and policy strategies established during the Greenspan years” (Cassidy 2008). Until the global credit crisis, Bernanke generally adhered to his predecessor’s laissez-faire policy. Later, in the midst of the bailout and the crisis, Bernanke has also admitted he made big mistakes in his decisions: “I and others were mistaken early on in saying that the subprime crisis would be contained. The causal relationship between the housing problems and the broad financial system was very complex and difficult to predict” (Cassidy 2008).

In light of their contention that Adam Smith was a real world behavioral economist, Ashraf, Camerer and Lowenstein would likely agree that Adam Smith could have predicted the catastrophic results of the massive deregulation of the Greenspan/Bush era:

Adam Smith’s actors in *The Theory of Moral Sentiments* are driven by an internal struggle between their impulsive, fickle and indispensable passions, and the impartial spectator. They weigh out-of-pocket costs more than opportunity costs, have self-control problems and are overconfident. They display erratic patterns of sympathy, but are consistently concerned about fairness and justice. They are motivated more by ego than by any kind of direct pleasure from consumption and, though they don’t anticipate it, ultimately derive little pleasure from either. In short, Adam Smith’s world is not inhabited by dispassionate rational purely self-interested agents, but rather by multidimensional and realistic human beings. (Ashraf et al. 2005).

Adam Smith would contend that the self-interested behavior of individuals, when not imbedded in and moderated by the social and moral structure of society, wreaks economic and moral havoc. The global financial crisis is proof of that.

Given our statements that Adam Smith and Milton Friedman have been frequently quoted out of context to support total deregulation of markets, we feel it is useful to ask the question, “Why is this so?” Jonathan Haidt answers that studies of everyday reasoning demonstrate that humans generally begin reasoning by setting out to confirm their initial hypothesis, which they intuit unconsciously (Haidt 2007). Individuals rarely seek evidence that disproves their intuitive beliefs and are very good at finding evidence for whatever they want to believe. Haidt and Graham show that this is especially true for conservative personalities in moral intuition (Haidt and Graham 2007). Kunda confirms this for everyday reasoning (Kunda 1990). Further, there is

growing evidence that political participation and political affiliation has a significant genetic component to it (Oxley et al. 2008)

Ashraf, Camerer and Loewenstein expand on the role of Smith as the father of behavioral economics in their paper, “Adam Smith, Behavioral Economist” (Ashraf et al. 2005). Camerer, arguably the pre-eminent behavioral economist in America, along with his fellow authors, argues that Adam Smith viewed behavior as controlled by the passions. However, according to these authors, Smith also believed that an individual could override emotion-driven behavior by stepping outside of himself and looking at his own actions from the point of view of an impartial moral spectator who would pass ethical judgment on those actions.

As a result of his belief in the primacy of emotions in economic behavior, Smith dealt with many of the primary areas of research in contemporary behavioral economics. These include what behavioral economists now term loss aversion, intertemporal choice bias and overconfidence but also, on the positive side, altruism and fairness and how this moral behavior creates trust in market exchanges (Ashraf 2005).

### **Investor Overconfidence**

Another of our hypotheses about the causes of the global financial crisis is that over-optimism (“Housing prices will never decline.”) and over-confidence (‘hubris’) played a very large part. Decisional errors of all types, but especially investment decisions, are often caused by over optimism, which can be magnified by overconfidence. Studies have shown that students, psychologists, CIA agents, engineers, stock analysts, financial analysts, investment bankers, investors and many other categories of people tend toward irrational over-confidence in the accuracy of their decisions. Moreover, entrepreneurs, investors, stock analysts and others who have had success in their chosen fields tend to develop a sense of invulnerability, ignoring the role good fortune had played in their success and attributing the gains solely to their own skill (Prentice 2007).

We hypothesize that a bias of untrammelled greed, overconfidence and an ignoring of risk by the individual investors making the investment decisions in the injured financial institutions contributed greatly to the global financial crisis.

This bias is perfectly described by Adam Smith in *The Wealth of Nations*:

The over-weening conceit which the greater part of man have of their own abilities is an ancient evil remarked by the philosophers and moralists of all ages. Their absurd presumption in their own good fortune, has been less taken notice of. It is, however, if possible, more universal. There is no man living who, when in tolerable good health and spirits, has not some share of it. The chance of gain is by every man more or less overvalued, and the chance of loss is by most men undervalued, and by scarce any man, who is in tolerable health and spirits, valued more than it is worth. (Smith 1776 [2003], Book I, Ch. X, Part 1, p. 149):

We may translate Adam Smith’s ‘conceit’ into modern language as the observed and documented ‘hubris’ of today’s CEO’s that causes the ultimate failure of so many mini- and

mega- mergers and other business failures (Roll 1986; Camerer and Lovallo 1999). This hubris is a deeply ingrained instinct from our evolutionary past (Waldman 1994; Postlewaite and Comte 2005). Furthermore, it has a neurological basis in the disproportionate positive affect of *expected utility* (as encoded by the *nucleus accumbens*—‘NAcc’) over *actual utility* (as encoded by the *Medial Prefrontal Cortex*—‘MPFC’). That is, ‘wanting’ something feels so much better than ‘getting’ the object of our desire.

What causes overconfidence? Richard Peterson is a psychiatrist, neuroeconomist and stock market trader. In his book, *Inside the Investor’s Brain*, Peterson states that one of the worst of these biases is ‘overconfidence’, also known as *hubris* or in the case of corporate managers, ‘CEO disease’. It is observed in the tendency of CEO’s to underperform after achieving the top position in their firm. Similar behavior is seen in ‘Nobel Prize Disease’ – the subsequent intellectual sterility of Nobel Prize winners – and ‘Victory Disease’ – the tendency of military commanders, after a series of battlefield triumphs, to subsequently show poor judgment.

Hubris is found among successful individuals who see external goals as their primary metric of success. Anywhere acclaim is awarded according to some extrinsic metric, such as wealth, beauty, or athletic prowess, achievers are vulnerable. Hubris is one of the most dangerous emotional states that investors can experience, as it often precedes the greatest losses.

The first stage of hubris is to have a series of gains or acclaim. If those gains are attributed to one’s unique talents, skills or intelligence, then they can contribute to a persistent pattern of overconfidence. For overconfident investors, risks are ignored and their belief in themselves is hypertrophied. (Peterson, 2007, p. 109).

### **Why Are We Greedy? and Why Do We Envy the Rich?**

Adam Smith believed that all humans have a ‘peculiar sympathy’ for the rich and/or famous. However, although he saw this feeling as important to underpin the structure and maintain the order of a class-structured society, he also saw this inherent human tendency as a corruption of our morality.

[T]hat wealth and greatness are often regarded with the respect and admiration which are due only to wisdom and virtue; and that the contempt, of which vice and folly are the only proper objects, is most unjustly bestowed upon poverty and weaknesses, has been the complaint of moralists in all ages ... the disposition to admire, and almost to worship, the rich and the powerful, and to despise, or at least, to neglect, persons of poor and mean condition . . . is . . . the great and most universal cause of the corruption of our moral sentiments. (Smith 1759, I, iii, *iii*, p. 84).

Recent work in neuroeconomics has given us a good deal of insight into the nature and evolution of this ‘sympathy for the rich’. It also shows that envy of the rich is not just a sentiment of the poor towards the rich. It is an emotion that exists at every step of the social ladder.

Admittedly, a social comparison of self to community expectations is consistent with what is

found in other primates. Primates are genetically predisposed to focus on status and social hierarchy. The underpinnings of this concept come from our evolutionary past and it likewise is an evolutionarily adaptive behavior in a group setting. As humans, this shows up in our obsession with the rich and powerful members of our society. It also is the unconscious basis for our desire to ‘keep up with the Joneses’. This social comparison is therefore natural. However, its excess is what is unnatural and mal-adaptive.

A fascinating experiment at Duke University Medical School code-named ‘Monkeys Pay-Per-View’ (Deaner, Khera and Platt 2005) shows that primates are hard-wired to pay close attention to high-status individuals. Although there have been many field studies of status among monkey troops, this is the first experimental evidence showing that primates automatically discriminate images of others based on social status.

A favorite treat for rhesus macaque monkeys is a slurp of sweet cherry juice. Rhesus macaque males were given the choice of pressing a lever to get a reward of the juice or to view images on a computer screen, either of the face of the high status monkey in their troop or of the rears of female monkeys. The authors report that despite the fact the monkeys were purposely made thirsty before the experiment, monkey subjects always gave up the cherry juice to view the faces of high status monkeys. However, the same monkeys had to be bribed with juice payment to view the faces of low status monkeys. The paper’s authors strongly believe that similar mental processes are at work in human primates due to the fact that we have evolved in the same kinds of social conditions.

As a matter of fact, Dunbar argues that both the size of the human brain has evolved and also human speech has evolved in order to manipulate increasing complex social orders. Further, anthropological field research shows that two-thirds of our conversations are ‘gossip’ - exploring interpersonal relationships or individuals with power and status in our lives or in our work (Dunbar 2004).

As a further explanation of our interest in the rich, de Botton deals at great length with the subject of status in society and status anxiety and its consequences (de Botton 2004). Throughout time, different societies have awarded high status to different groups—great hunters, great warriors, great philosophers, wealthy people. However, those not in that select group experience status anxiety. Status anxiety is defined by de Botton as a worry that we are in danger of failing to conform to the definitions of success laid down by our society, thus resulting in our being stripped of dignity and respect by the members of that society - or at least by our reference group.

Every adult life, according to de Botton, can be defined by two great love stories: the quest for sexual love and the quest for love from the world. Many see money, fame and influence not as ends in themselves, but as means to get love from the world. Every one of us has a nagging question inside us, “Are we loveable?” High status has consequences that are very agreeable and -whether we admit it or not - each of us craves it to some degree or another. This is because our self-image is so dependent on what others think of us. On the other hand, low status is not very pleasant. In either case, however, low status and high status have psychological, physiological and self-esteem impacts that go far beyond the economic consequences.

Sapolsky, an expert on primate stress and health states that one of the greatest challenges in public health is to understand the ‘socioeconomic gradient’, a stepwise descent in socioeconomic status (SES) that predicts increased risks of cardiovascular, respiratory, rheumatoid, and psychiatric diseases, low birth weight, infant mortality and mortality from all causes. This

relation is predominately due to the influence of SES on health and disease incidences can be several times greater at the lower extreme of socioeconomic status (Sapolsky 2005).

Further, Sapolsky reports, subjective SES is at least as good a predictor of good/poor health as is objective SES. That is, feeling poor may be at the core of why being poor predicts poor health – status anxiety caused by one’s surroundings. It seems that relative deprivation decreases a community’s ‘social capital’ by increasing feelings of mistrust, alienation and disenfranchisement. The result is that those in the ‘wrong’ social rank experience very poor health caused by their exposure to physical and psychosocial stressors. Sapolsky’s conclusion is thus a devastating attack on the inequalities of Westernized human society and its consequent toxic effect on those of lower social rank, by society’s ‘corrosively subordinating its have-nots’.

Finally, Fliessbach and colleagues show that even though money triggers dopamine reactions in the brain’s ventral striatum, it is the relative reward rather than the absolute reward that matters in social comparisons. These experimenters used side-by-side brain imaging scanners and a behavioral task in which equal performance was rewarded inequitably. Blood oxygen levels (BOLD) were elevated in the ventral striatum, a brain area that has a central role in responding to and predicting rewards and showed that this region was indeed sensitive to the relative amount of money that was paid. More importantly, this ventral striatum response occurred even when no decisions were made, suggesting that the calculation of social standing—as indexed by payment—may be automatic (Fliessbach et al. 2007).

There is a wealth of research showing that groups are self-selecting (Peck 1983). In this context, we can say that the wealthy congregate in the same country clubs, live in the same neighborhoods and travel in the same social circles. Unfortunately, unless you are Bill Gates or Warren Buffet, there is always someone with more wealth in your social circle. The pernicious effect of this is that you will continue to compare your self - especially unconsciously as the research shows – to those of your acquaintances who are wealthier than you and envy them (Deaner 2005; deBotton 2004; Sapolsky 2005 and Fliessbach 2007). This fuels the desire for more money.

However, an explosion in Happiness Research in the last decade shows convincingly that beyond a certain minimum annual income that satisfies our basic physical requirements for food and shelter - approximately \$60,000 in U.S. studies and \$22,000 in international studies - more money unfortunately does not make humans any happier (Layard 2005). This is contrary to the fact that people feel more money will make them happier, but the research results are overwhelming.

Recent research includes studies on happiness in the fields of psychology, sociology and economics and regular sessions at their respective academic annual meetings. Seligman (2002) founded the science of ‘Positive Psychology’ with his book, *Authentic Happiness* (Seligman 2002). This field of psychology that studies what makes people happy has exploded since then. Layard consolidated most of the economic research on happiness in *Happiness, Lessons from a New Science* (Layard 2005). Finally, Kasser and Kanner, with their book, *Psychology and Consumer Culture, The Struggle for a Good Life in a Materialistic World*, and Clark et al. have made significant new contributions to the field of happiness research (Kasser and Kanner 2004; Clark et al. 2008).

The consensus from these researchers is unanimous, more money does not make humans happier. So why does greed run rampant and the quest for riches occupy our desires so? One answer is in the nature of our reward system—*expected utility* is so much more stimulating than *actual utility*. Secondly, money confers *status*, and this is significant to all primates. It can entice us to seek money and power.

Kasser & Kanner call this high-priority interest in Power, Status and Money as a *materialistic value orientation* ('MVO'). An MVO includes the aims, goals and behaviors evidencing the belief that it is important to pursue the culturally sanctioned goals of attaining financial success, having nice possessions, having the right image and having high status. This MVO develops in individuals through two pathways: (a) from experiences that create feelings of insecurity (from personal experiences and environments that block or deny peoples' basic psychological needs, which are safety, relatedness & love, competence and autonomy) and (b) from exposure to social models that encourage materialistic values—parents who are excessively materialistic or by heavy exposure to the advertisements and influences of our materialistic culture or by schooling (Kasser and Kanner 2004).

There is a long history of research showing that the effects of an increased MVO can be very debilitating. Studies indicate that, compared to individuals with more intrinsic orientations, those with materialistic orientations score lower on measures of personal well-being including happiness and self-actualization and satisfaction with life (Belk 1984; Belk 1985; Ahuvia and Wong 1995; Dawson 1998). Further, they exhibit higher rates of depression, anxiety, and other psychological disorders and physical problems and overall reduced life functioning (Cohen and Cohen 1996; Kasser and Ryan, 1993; Kasser and Ryan, 1996 Kasser and Ryan, 2001; Williams, Cox et al. 2000). In addition, those with higher materialistic orientations also have less healthy relationships, less connectedness to others, are less generous, exhibit less empathy, experience more conflict between themselves and others and are more likely to engage in interpersonal manipulations. (Richins and Dawson 1992; McHoskey 1999; Sheldon and Kasser 1995).

Finally, people with strong MVOs are less willing to help the community and others in it, are less cooperative and more competitive, are less likely to engage in pro-social behavior and score higher on measures of antisocial behavior (Sheldon, Sheldon and Osbaldiston 2000; Kasser and Kanner 2004; Kasser and Ryan 1993). Many of these studies have been replicated in international studies of students in Australia, England, German, Romania, Russia, South Korea and Singapore, in addition to the U.S (Kasser and Kanner 2004, p. 19).

### **The Neuroeconomic and Psychological Consequences of Money**

The most recent research on the effects of money on individuals comes from the fields of Neuroeconomics and Psychology. These studies show how powerful a force money is. Therefore, it is critically important to take the power of money explicitly into account when thinking about how to best use it as an incentive in management and in how it affects business ethics. Pessiglione et al. devised experiments to show how the brain translates money into a force (Pessiglione et al. 2007). These researchers had their subjects view pictures of money (a penny or a pound) and were told they could keep the amount shown depending on how hard they squeezed a handgrip. The subjects received feedback in the form of a visual thermometer and the researchers also measure subjects' skin conductance response ('SCR' - to measure of autonomic

sympathetic arousal) and brain activity. Not surprisingly, the larger the amount shown, the stronger the grip force exercised by the subjects.

The brain scans by Pessiglione et al. showed activity in a specific basal forebrain area that includes the ventral striatum—the reward center of the brain (the dopamine processing brain facility)—ventral pallidum and extended amygdala. This research supports what other studies have found; namely, that this region creates the motivational effect of the money and is a key node in brain circuitry that enables expected rewards to energize behavior. More specifically, O’Dougherty et al. and Pessiglione et al. have shown that ventral striatum activity has been linked to reward prediction and reward prediction error during learning (O’Dougherty et al. 2004; and Pessiglione et al. 2006).

However, the amazing results from this experiment occurred when the subjects were shown the money amounts in display times that were subliminal (17 and 50 ms.) and therefore below the conscious perception of the subjects. The grip force, SCR and brain activity was similar even when the subjects could not consciously ‘see’ the monetary display! Thus, expected rewards energize behavior without the need for the subjects’ conscious awareness.

As to the psychological consequences of money, a recent theory by Lea and Webley characterizes money as both a ‘tool’—an interest in money for what it can be exchanged for—and a ‘drug’—an interest in money for itself (a maladaptive function). This theory further emphasizes that people value money for its instrumentality—that is, money enables people to achieve goals without aid from others (Lea and Webley 2006). Contrariwise, Price et al. show that physical and mental illness after financial strain due to job loss is triggered by reduced feelings of personal control (Price et al. 2002).

To verify these findings, Vohs et al. devised nine experiments that tested their hypothesis that when people were reminded of money they would feel more self-sufficient and would want to be free from dependency on other people and conversely not want people to depend on them. Another amazing aspect of this experiment is that the subjects were mentally primed with money or neutral concepts *subliminally*—that is, below the level of their conscious awareness. They then were ordered to perform certain tasks, some of which were actually impossible to perform (Vohs et al. 2006).

Vohs and his colleagues found that participants who were primed with the concept of money preferred to work alone, play alone and put more physical distance between themselves and a new acquaintance. Reminders of money led to reduced requests for help and reduced helpfulness towards others. These researchers conclude that the self-sufficiency pattern they found helps explain why people view money both as a great good and a great evil. As societies developed, they contend, the acquisition of money allowed people to pursue their goals with diminished reliance on friends and family. That is, money enhanced individualism but diminished communal motivations, as it still does so today. As confirmation of this, Grouzet et al. show that across 15 different cultures, ‘financial success’ as a goal is in direct opposition to goals concerning ‘community’ - although less so for poorer cultures (Grouzet et al. 2005).

Doctors and scientists often speak of how our human bodies and systems are not evolutionarily adapted to the modern world. This is the broad view of why there are epidemics of Obesity, Arteriosclerosis and Type II Diabetes in the developed world. Similarly, our brains seem to be ill adapted to handle money and materialism. This is not surprising, since our species,

*Homo sapiens*, is almost 1 million years old but money has only been used in place of barter systems for less than 5,000 years.

Even with enormous amounts of money, the wealthy are no happier than the less wealthy and are more prone to depression and psychopathology (Kasser and Kanner 2004). One major reason is that adults who engage in conspicuous consumption are largely trying to compensate for the unique human awareness of mortality and the pursuit of self-worth and meaning that this engenders—it is, in fact, an attempt to defend against a fear of death or what we term ‘existential anxiety’: the fear of going out of existence (Kasser and Kanner 2004, p.128). The fact that large amounts of wealth have little or no effect on happiness is true across national studies and in time-series studies. Real purchasing power has more than doubled in the United States, France and Japan over the last 50 years, but reported life satisfaction has not changed at all in these countries. (Seligman 2002, p. 153).

Further, Diener and Seligman interviewed members of the *Forbes 400*, the richest people in America, and found that they were only a tiny bit happier than the public as a whole. This is because, according to Diener, the wealthy often have ‘reference anxiety’. Since they often measure their self-worth according to the amount of possessions they have, they often continue to feel jealous about the possessions or prestige of others. This is another reason why their vast wealth does not confer well-being (Diener and Seligman 2004).

### **Some Conclusions and Further Research**

Our main neuroeconomic hypothesis concerning the global credit crisis is that in financial markets greed and fear are balancing forces, because they have corresponding balancing emotional forces in the human brain (homeostasis). In the recent global credit crisis, this homeostasis was out of balance and as a result untrammelled greed took over in investors’ brains. In the realm of ethics, this greed stimulated a moral meltdown in the financial marketplace – a quest for money above everything else.

There are many lessons to be learned from the financial meltdown of 2007-2009. The first is that *all* investments contain risk and the risk may be hidden. Sophisticated risk assessment models may quantify the risks that are identified, but in the old computer adage, ‘garbage in, garbage out’. Experienced individual decision-makers are the best qualified to identify all the risks in a business decision and also to ask creative questions about what they might be overlooking.

Secondly, if you do not understand an investment vehicle, do not buy it. If you do not understand the nature of the risks in a business deal, don’t do it. We may call this the ‘Warren Buffet’ rule or, if you prefer dark humor, the ‘Bernie Madoff ‘ rule. Buffet advised investors to stay away from the Internet stock bubble and from derivatives.

Thirdly, from a management perspective, corporate traders need supervision as to their risk-taking. Since they are merely humans assessing risk, we have seen there is an entire spectrum of risk appetite among the various individuals and also a basket of investment biases

that come with each employee. Managers need not ‘run scared’, but need to exercise constant benevolent vigilance over their employees.

Finally, there is a fascinating ideological and neuroeconomic vacuum that needs to be researched further. From the ideological point of view, we may frame the question, “How free should markets be?” From the neuroeconomic perspective, “How do we monitor the risk-taking of our employees and of the institutions?” Further, “How do we design safeguards and compensation systems that effectively motivate employees but also protect the institution?” The current debate about re-regulation versus the deregulation of the past administration is not at all helpful, since it is mainly a political debate between opposing ideological stances. What we need is *good regulation*. The regulatory systems will work best if they are informed by what we know about the neuroeconomics of human financial decision-making.

## References

- Ahuvia, A. C., & Wong, N. 1995. Materialism: Origins and implications for personal well-being. in F. Hansen, ed., *European Advances in Consumer Research*. Copenhagen, Denmark: Association for Consumer Research No. 2:172-178.
- Ashraf, N., C. Camerer and G. Lowenstein 2005. Adam Smith, Behavioral Economist. *Journal of Economic Perspectives* 19:3:131-145.
- Belk, R.W. 1984. Three scales to measure constructs related to materialism: Reliability, validity, and relationships to measure happiness. *Advances in Consumer Research* No. 11:291-297.
- Belk, R.W. 1985. Materialism: Trait aspects of living in the material world. *Journal of Consumer Research* No. 12:265-280.
- Camerer, Colin and Dan Lovallo 1999. Over-Confidence and Excess Entry: An Experimental Approach. *American Economic Review* 89:1:306 –18.
- Camerer, C., G. Loewenstein, D. Prelec 2005. Neuroeconomics: How Neuroscience Can Inform Economics. *Journal of Economic Literature* 34:1:9-65.
- Cassidy, J. 2008. Anatomy of a Meltdown, Ben Bernanke and the Financial Crisis. *The New Yorker* 1 December 2008:49-63.
- Chang, H.K. 2005. Emotions Can Negatively Impact Investment Decisions. September 2008. Stanford GSB. [www.gsb.stanford.edu/news/research/finance\\_shiv\\_investmentdecisions.shtml](http://www.gsb.stanford.edu/news/research/finance_shiv_investmentdecisions.shtml)
- Clark, A., P. Frijters and M. Shields 2008. Relative Income, Happiness and Utility: An Explanation for the Easterlin Paradox and Other Puzzles. *Journal of Economic Literature* 46:1: 95-144.
- Cohen, P., & J. Cohen 1996. *Life Values and Adolescent Mental Health*. Mahwah, NJ: Erlbaum.
- Daw, N. D., J.P. O’Dougherty, P. Dayan, B. Seymour and R.J. Dolan 2006. Cortical substrates for exploratory decisions in humans. *Nature*, 441 (15Jun06):876ff.
- Dawson, S. 1998, Trait materialism: Improved measures and an extension to multiple domains of life satisfaction. in S.Shapiro & A. H. Walle, eds. *AMA Winter Educators Conference Proceedings* pp. 478-481, Chicago: American Marketing Association.
- Deaner, R.O., Khera, A.V., & Platt, M.L. 2005. Monkeys Pay Per View: Adaptive Valuation of Social Images by Rhesus Macaques. *Current Biology* March 29, 2005, Vol. 15:543 – 548.
- De Martino, B., D. Kumaran, B. Seymour and R.J. Dolan 2006. Frames, Biases and Rational Decision-Making in the Human Brain. *Science* 313:5787:684-687.
- De Botton, A. 2004. *Status Anxiety*. NewYork: Pantheon Books (Random House).
- Diener, E., & Seligman, M. 2004. Beyond Money: Toward an Economy of Well-Being. *Psychological Science in the Public Interest* Vol. 5:1:1-31.
- Dunbar, R. I. M. 2004. Gossip in Evolutionary Perspective. *Review of General Psychology* 8:100.
- Economist* 2009. Greed – and Fear, A Special Report on the Future of Finance. 24Jan09:1-22.
- Economist* 2009. Three Trillion Dollars Later....16May09:23.

- Fliessbach, K., B. Weber, P. Trautner, T. Dohmen, U. Sunde, C.E. Elger, and A. Falk. 2007. Social Comparison Affects Reward-Related Brain Activity in the Human Ventral Striatum. *Science* 318:1305.
- Friedman, M. 1962. *Capitalism and Freedom*. Chicago: University of Chicago Press, reprinted in 2002.
- Friedman, M. 1970. The Social Responsibility of Business is to Increase Its Profits. *New York Times Magazine* 13 September 1970. reprinted in L. Hartman, ed. 2002. *Perspectives in Business Ethics*, 2<sup>nd</sup> Edition. New York: McGraw Hill.
- Friedman, M. and R. Friedman 1979. *Free to Choose: A Personal Statement*. reissued 1990. New York: Harvest Books/Harcourt.
- Goodman, P.S. 2008. A Fresh Look at the Apostle of Free Markets. *New York Times*, 13 April 2008, Ideas and Trends, p. 3.
- Grouzet, F.M., A. Ahuvia, Y. Kim, R.M. Ryan, P. Schmuck, T. Kasser, J.M.F. Dols, S. Lau, S. Saunders, and K.M. Sheldon 2005. The Structure of Goal Contents Across 15 Cultures. *Journal of Personality and Social Psychology* 89:5:800.
- Haidt, J. 2008. The New Synthesis in Moral Psychology. *Science* 316:1001.
- Haidt, J. and J. Graham 2007. When Morality Opposes Justice: Conservatives Have Moral Intuitions that Liberals May not Recognize. *Social Justice Research* 20:1:98-116.
- Kasser, T. and A. Kanner, eds. 2004. *Psychology and Consumer Culture, the Struggle for a Good Life in a Materialistic World*. Washington, D.C.: American Psychological Association,
- Kasser, T., & R. Ryan 1996. Further examining the American dream: Differential correlates of intrinsic and extrinsic goals. *Personality and Social Psychology Bulletin*, No. 22:280-287.
- Kasser, T., & R. Ryan 2001. Be careful what you wish for: Optimal functioning and the relative attainment of intrinsic and extrinsic goals,' in P. Schmuck & K. M. Sheldon, eds. *Life Goals and Well-being: Towards a Positive Psychology of Human Striving*, pp. 116-131. Goettingen, Germany: Hogrefe & Huber.
- Kasser, T., & R. Ryan 1993. A dark side of the American dream: Correlates of financial success as a central life aspiration. *Journal of Personality and Social Psychology* No. 65:410-422.
- Knutson, B. and J.C. Cooper 2005. Functional magnetic resonance imaging of reward prediction. *Current Opinion in Neurology* 18:4:411-417.
- Koob, G.C. and M. Le Moal 1997. Drug Abuse: Hedonic Homeostatic Dysregulation. *Science* 278:5335: 52-58.
- Körding, K. 2007. Decision Theory: What 'Should' the Nervous System Do? *Science* 26Oct07:606-610.
- Krugman, P. 2002. Greed is Bad. *New York Times* 4June02.
- Kuhnen, C. and B. Knutson 2005. The Neural Basis of Financial Risk Taking. *Neuron* 47:763-770.
- Kunda, Z. 1990. The Case for Motivated Reasoning. *Psychological Bulletin* 108:480.
- Labaton, S. 2008. The Reckoning: Agency's '04 Rule Let Banks Pile Up News Debt. *New York Times* 2October08:B-1.
- Layard, R. 2005. *Happiness, Lessons from a New Science*. New York: Penguin Books.
- Lea, S.E.G., and P. Webley 2006. Money as a tool and a drug. *Behavioral Brain Science* 29: 161.
- Lo, A., D. Repin and B. Steenbarger 2005. Fear and Greed in Financial Markets: A Clinical Study of Day-Traders. *American Economic Association Papers and Proceedings* 95:2:352-359.
- McEwen, B. 2002. *The End of Stress As We Know It*. Washington, D.C.: Joseph Henry Press.
- McHoskey, J. W. 1999. Machiavellianism, intrinsic versus extrinsic goals, and social interest: A self-determination theory analysis. *Motivation and Emotion* No. 23:267-283.
- Ming, E., Adler, G., Kessler, R., Fogg, L.F., Matthews, K., Herd, J.A., & Rose, R. 2004. Cardiovascular Reactivity to Work Stress Predicts Subsequent Onset of Hypertension: The Air Traffic Controller Health Change Study. *Psychosomatic Medicine* Vol. 66.
- O'Doherty J., M. L. Kringelbach, E. T. Rolls, J.Hornak and C. Andrews 2001. Abstract Reward and Punishment Representations in the Human Orbitofrontal Cortex. *Nature Neuroscience*. 4:1:95-102.
- O'Dougherty, J., P. Dayan, J. Schultz, R. Deichmann and K. Friston 2004. Dissociable Roles of Ventral and Dorsal Striatum in Instrumental Conditioning. *Science* 304:5669:452-454.
- Oswold, A. 1997. Happiness and Economic Performance. *Economic Journal* Vol. 107:1815-1831.
- Oxley, D. K. Smith, J. Alford et al. 2008. Political Attitudes Vary with Physiological Traits *Science* 321:1667-1670.
- Paulus, M.P. 2007. Decision-Making Dysfunctions in Psychiatry—Altered Homeostatic Processing? *Science* 318:603ff
- Peck, M. S. 1983. *People of the Lie*. New York: Simon & Schuster.
- Pessiglioni, M., L. Schmidt, B. Draganski, R. Kalisch, H. Lau, R. Dolan, and C.D. Frith 2007.

- How the Brain Translates Money into Force: A Neuroimaging Study of Subliminal Motivation. *Science* 316: 904-906.
- Peterson, Richard L. 2007. *Inside the Investor's Brain*. Hoboken, NJ: Wiley Publishers.
- Peterson, Richard L. 2005. The Neuroscience of Investing: fMRI of the reward System. *Brain Research Bulletin* 67:391-397.
- Porter, D. and V. Smith 1994. Stock Market Bubbles in the Laboratory. *Applied Mathematical Finance* Vol. 1:111-127.
- Postlewaite, A. and O. Compte 2005. Confidence-Enhanced Performance. *American Economic Review* 94:5:1536-557.
- Prentice, Robert A. 2007. Ethical Decision Making: More Needed Than Good Intentions. *Financial Analysts Journal* Volume 63:6.
- Price, R.H., J.N. Choi, and A.D. Vinokur 2002. Links in the chain of adversity following job loss. *Journal of Occupational Health and Psychology* 7: 302.
- Richins, M. L., & S. Dawson 1992. A consumer values orientation for materialism and its measurement: Scale development and validation. *Journal of Consumer Research* No. 19:303-316.
- Rietveld, E. 2008. The Skillful Body as a Concernful System of Possible Actions, Phenomena and Neurodynamics. *Theory and Psychology* 18:3:341-363.
- Roll, R. 1986. The Hubris Hypothesis of Corporate Takeovers. *Journal of Business*. 59:2:197-216.
- Schulz, W. & A. Dickinson 2000. Neuronal Coding of Prediction Errors. *Annual Review of Neuroscience* 23:473-500.
- Sapolsky, R.M. 2005. The Influence of Social Hierarchy on Primate Health. *Science*, 25Apr05:648 to 652.
- Seligman, M. 2002. *Authentic Happiness: Using the New Positive Psychology to Realize Your Potential for Lasting Happiness*. New York: The Free Press (Simon & Shuster).
- Sheldon, K. M. and T. Kasser 1995. Coherence and congruence: Two aspects of personality integration. *Journal of Personality and Social Psychology* 68:531-543.
- Sheldon, K. M., M. Sheldon and R. Osbaldiston 2000. Prosocial values and group assortment in an N-person prisoner's dilemma. *Human Nature* 11:387-404.
- Shermer, M. 2008. *The Mind of the Market: How Biology and Psychology Shape Our Economic Lives*. New York: Henry Holt and Company.
- Smith, A. 1776. *The Wealth of Nations*. reprinted with Intro. by A. Kruger 2003. New York: Bantam Dell Books (Random House).
- Smith, A. 1759. *The Theory of Moral Sentiments*. re-printed 2000. Amherst, NY: Prometheus Books.
- Taylor, S., B. Martis, K. D. Fitzgerald, R.C. Welsh, J. L. Abelson, I. Liberzon, J.A. Himle & W. J. Gehring 2006. Medial Frontal Cortex Activity and Loss-Related Responses to Errors. *The Journal of Neuroscience* 26:15:4063-4070.
- Tversky, A., and D. Kahneman. 1992. Advances in Prospect Theory: Cumulative Representation of Uncertainty. *Journal of Risk and Uncertainty* 1992: 297.
- Vohs, K.D., N.L. Mead, and M.R. Goode. 2006. The Psychological Consequences of Money. *Science* 314: 1154.
- Waldman, Michael 1994. Systematic Errors and the Theory of Natural Selection. *American Economic Review* 84:3:482-97.
- The Week*. Greenspan: The Oracle's *mea culpa*. 7 November 2008.
- Williams, G., E. Cox, V. Hedberg, and E. Deci 2000. Extrinsic life goals and health risk behaviors in adolescents. *Journal of Applied Social Psychology* 30:1756-1771.
- Xue, G., Z. Lu, I. Levin, J.A. Weller, X. Li and A. Bechara 2008. Functional Dissociations of Risk and Reward Processing in the Medial Prefrontal Cortex. *Cerebral Cortex Advance Access* published online 8 October 2008.

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